**The effects of life experiences and polygenic risk for depression on the development of positive and negative cognitive biases across adolescence: The CogBIAS hypothesis**

**Supporting Information**

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# **Appendix S1. Details on Genomic Cleaning**

***Genotyping.*** Saliva samples were collected from 499 (out of 504) participants at Wave, using DNA *Genotek Oragene OG-500* collection kits (in accordance with the supplied instructions). Genomic DNA was extracted and stored at -80°C, in accordance with established protocols. A total of 496 participants provided an adequate DNA sample (200mg) and were genotyped, per manufacture instructions, using the Illumina Human Omni express-24 chip, which can capture 710,000 common single nucleotide-polymorphisms (SNPs), from across the genome.

Genome-wide data were then subject to rigorous standard quality control, using a well-established pipeline (i.e., see Coleman et al., 2016). This included the removal of any duplicate SNPs; the exclusion of SNPs with minor allele frequencies (MAF) < 0.05, SNP missingness > 0.01, and also any deviating from Hardy Weinberg equilibrium (HWE) p < 1x10-8. Individuals were excluded due to gender mismatches, heterogeneity > 3 standard deviations, individual missingness > 0.01, and cryptic relatedness assessed as a proportion of identity by descent (IBD > 0.1875). This resulted in the retention of 594,667 SNPs across 491 participants.

An additional 5,129,755 SNPs were then imputed using the 1000 Genomes phase 3 reference panel (The Genomes Project Consortium et al., 2015). Further quality control in line with the Coleman et al. (2016) protocol, was then conducted, excluding poorly imputed SNPs (INFO < 0.3), those with a minor allele frequency (MAF) < 0.05, and SNP missingness < 0.01. This resulted in a total of 5,596,260 genotyped and imputed SNPs remained for analysis.

For the purpose of the current study, and for reasons previously highlighted, the sample was then reduced to include only individuals of European descent (n=391).

***Polygenic scoring*.** The polygenic (risk) scores for depression were constructed using publicly available summary statistics from a GWAS meta-analysis of major depressive disorder (MDD) (Wray et al., 2018), obtained from the psychiatric genomic consortium (http://pgc.unc.edu). The GWAS summary statistics were subject to standard quality control procedures, including the removal of duplicate and ambiguous SNPs, as well as the exclusion of any SNPs with a minor allele frequency (MAF) < 0.05.

We then used PRSice v1.25 (Euesden et al., 2015) to created eight major depressive disorder (MDD) Polygenic Risk Score (PRS) variables, at incremental p-value thresholds: 0.01, 0.05, 0.1, 0.2, 0.3, 0.4, 0.5, 1.00. The number of SNPs included at each of these p-value thresholds ranged from 8,173 at 0.01 to 114,860 at 1. In particular, the number of SNPs at each p-value threshold included: 0.05 (SNPs = 24,412); 0.1 (SNPs = 37,825); 0.2 (SNPs = 56,876); 0.3 (SNPs = 70,939); 0.4 (SNPs = 81,842); 0.5 (SNPs = 90,487). Ten ‘principal components’ (PC) were also identified and selected in order to control for population stratification amongst the sample and included as covariates when creating the PRSs.

# **Appendix S2. Preliminary Inferential Statistics**

In this section, we report several *preliminary inferential statistics* (including, for examples, our comparison of included versus excluded participants; or the correlations among our measures). To summarize: Table S1 shows that there were no significant differences between our included and excluded participants; Table S2 demonstrates the best-fitting random-effects structure (for our multilevel modeling); and Table S3 outlines the correlations among our main measures (for instance, zero-order correlations among the cognitive biases and among our predictors).

As a final note, though no formal power analysis was conducted for the CogBIAS study (because its sample size was driven primarily by resource and time constraints), we conducted a sensitivity power analysis, which indicated that for our sample size (N = 411), we have .8, .9, and .95 power to detect correlations of .14, .16, and .18, respectively. Notably, our main effects fall within these estimates, suggesting marked confidence regarding our interpretation of them. Although the same amount of confidence may not be applicable to our G x E interaction effects, our 95% confidence intervals could be used as indicators of at least non-zero effects.

## **Table S1.** Cohort Characteristics.

|  | Wave 1 (504) | | Wave 2 (450) | | Wave 3 (411) | |
| --- | --- | --- | --- | --- | --- | --- |
|  | Included (377) | Excluded (127) | Included (337) | Excluded (113) | Included (311) | Excluded (100) |
|  | | | | | | |
| **Anxiety** |  |  |  |  |  |  |
| Mean (SD) | 13.4 (7.66) | 11.4 (6.52) | 14.3 (7.93) | 12.2 (6.04) | 13.9 (7.82) | 13.2 (6.04) |
| Test Statistic1, P value | 2.60, .04 | | 1.83, .07 | | 2.11, .06 | |
| **Depression** |  |  |  |  |  |  |
| Mean (SD) | 8.25 (5.39) | 7.21 (4.49) | 9.44 (6.14) | 7.98 (4.88) | 10.2 (6.34) | 7.98 (4.88) |
| Test Statistic1, P value | 1.80, .07 | | 0.65, .51 | | -0.29, .76 | |
| **Negative Life Events** |  |  |  |  |  |  |
| Mean (SD) | 5.51 (4.16) | 5.97 (4.70) | 5.31 (4.04) | 4.95 (3.55) | 5.01 (3.48) | 4.95 (3.55) |
| Median [Min, Max] | 5.00 [0, 26.0] | 5.00 [0, 26.0] | 5.00 [0, 27.0] | 4.00 [0, 15.0] | 4.00 [0, 18.0] | 4.00 [0, 15.0] |
| Test Statistic1, P value | -0.80, .42 | | 1.08, .28 | | 1.02, .30 | |
| **Positive Life Events** |  |  |  |  |  |  |
| Mean (SD) | 6.89 (3.37) | 6.83 (2.97) | 6.35 (3.36) | 6.02 (2.52) | 6.09 (3.02) | 6.02 (2.52) |
| Median [Min, Max] | 7.00 [0, 26.0] | 7.00 [0, 13.0] | 6.00 [0, 30.0] | 6.00 [0, 12.0] | 6.00 [0, 28.0] | 6.00 [0, 12.0] |
| Test Statistic1, P value | 0.48, .63 | | 1.80, .12 | | 2.55, .04 | |
| **Memory Bias** |  |  |  |  |  |  |
| Mean (SD) | -0.499 (0.449) | -0.605 (0.396) | -0.337 (0.434) | -0.368 (0.384) | -0.301 (0.439) | -0.368 (0.384) |
| Test Statistic1, P value | 1.45, .05 | | -1.88, .14 | | -1.43, .15 | |
| **Negative Recall** |  |  |  |  |  |  |
| Mean (SD) | 2.40 (2.29) | 1.99 (2.24) | 3.59 (2.70) | 3.41 (2.29) | 3.93 (2.89) | 3.41 (2.29) |
| Test Statistic1, P value | 1.73, .08 | | -1.78, .13 | | -2.20, .05 | |
| **Positive Recall** |  |  |  |  |  |  |
| Mean (SD) | 6.76 (2.84) | 7.16 (2.86) | 6.99 (3.00) | 7.30 (2.86) | 7.07 (3.12) | 7.30 (2.86) |
| Test Statistic1, P value | -1.21, .22 | | -1.47, .12 | | -1.08, .28 | |
| **Social Interpretation Bias** |  |  |  |  |  |  |
| Mean (SD) | 0.686 (1.20) | 0.479 (1.19) | 0.611 (1.25) | 0.658 (1.12) | 0.561 (1.25) | 0.658 (1.12) |
| Test Statistic1, P value | 1.66, .09 | | 0.47, .63 | | 0.66, .50 | |
| **Negative Social Interpretation** |  |  |  |  |  |  |
| Mean (SD) | 3.26 (0.878) | 3.07 (0.884) | 3.13 (0.941) | 3.21 (0.956) | 3.11 (0.967) | 3.21 (0.956) |
| Test Statistic1, P value | 1.19, .11 | | 0.75, .45 | | 0.88, .40 | |
| **Positive Social Interpretation** |  |  |  |  |  |  |
| Mean (SD) | 2.57 (0.630) | 2.59 (0.538) | 2.52 (0.645) | 2.55 (0.573) | 2.55 (0.666) | 2.55 (0.573) |
| Test Statistic1, P value | -0.14, .88 | | 0.30, .76 | | 0.01, .99 | |
| **Non-Social Interpretation Bias** |  |  |  |  |  |  |
| Mean (SD) | -0.346 (1.03) | -0.417 (1.10) | -0.413 (1.00) | -0.321 (1.02) | -0.529 (1.00) | -0.321 (1.02) |
| Test Statistic1, P value | 0.52, .60 | | -0.31, .75 | | 2.08, .05 | |
| **Negative Non-Social Interpretation** |  |  |  |  |  |  |
| Mean (SD) | 3.16 (0.710) | 3.19 (0.621) | 3.09 (0.698) | 3.28 (0.699) | 3.07 (0.724) | 3.28 (0.699) |
| Test Statistic1, P value | -0.30, .76 | | -1.46, .14 | | 0.75, .45 | |
| **Positive Non-Social Interpretation** |  |  |  |  |  |  |
| Mean (SD) | 3.51 (0.642) | 3.60 (0.678) | 3.50 (0.694) | 3.61 (0.688) | 3.60 (0.675) | 3.61 (0.688) |
| Test Statistic1, P value | -1.12, .26 | | -1.05, .29 | | -2.37, .04 | |
|  | | | | | | |

1Test Statistic from (two-sided) t-tests, comparing respective mean differences between included and excluded participants. Some results approached traditional metrics of significance (i.e., p < .05); however, no results were significant

at lower thresholds of statistical significance (i.e., p < .01 or p < .001), or when adjusting for multiple-testing using Bonferroni correction.

## **Table S2.** Likelihood Ratio Tests.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Model | AIC | BIC | Test Statistic1 | Df | *p* |
|  | | | | | |
| Memory Bias RI | 2918.8 | 3011.0 | - | - | - |
| Memory Bias RIS | 2822.4 | 3028.3 | 4.48 | 1 | **.03\*** |
| Negative Recall RI | 5670.3 | 5711.9 | - | - | - |
| Negative Recall RIS | 5646.0 | 5692.8 | 26.30 | 1 | **2.9E-7\*\*\*** |
| Positive Recall RI | 6294.2 | 6335.7 | - | - | - |
| Positive Recall RIS | 6290.9 | 6337.7 | 5.22 | 1 | .02\* |
| Social Interpretation Bias RI | 3655.2 | 3696.7 | - | - | - |
| Social Interpretation Bias RIS | 3654.0 | 3700.7 | 3.28 | 1 | **.03\*** |
| Negative Social Interpretation RI | 2908.9 | 2950.5 | - | - | - |
| Negative Social Interpretation RIS | 2894.0 | 2940.8 | 16.91 | 1 | **3.9E-5\*\*\*** |
| Positive Social Interpretation RI | 2380.7 | 2422.3 | - | - | - |
| Positive Social Interpretation RIS | 2373.9 | 2420.6 | 8.87 | 1 | **2.8E-3\*\*\*** |
| Non-Social Interpretation Bias RI | 3360.8 | 3402.3 | - | - | - |
| Non-Social Interpretation Bias RIS | 3358.6 | 3405.3 | 4.18 | 1 | **.04\*** |
| Negative Non-Social Interpretation RI | 2450.7 | 2492.3 | - | - | - |
| Negative Non-Social Interpretation RIS | 2446.5 | 2493.2 | 6.20 | 1 | **.001\*\*** |
| Positive Non-Social Interpretation RI | 2469.4 | 2511.0 | - | - | - |
| Positive Non-Social Interpretation RIS | 2466.6 | 2513.3 | 4.86 | 1 | **.02\*** |
|  | | | | | |

*Note.* 1Test Statistic denotes Chi-Square test for comparison of random intercepts and slopes model with random intercepts only (nested) model.

RI = Random Intercepts for participants only; RIS = Random Intercepts for participants and Random Slopes for time effects (i.e., wave).

\**p* < .05, \*\**p* < .01, \*\*\**p* < .001.

## **Table S3.** Zero-order correlations among cognitive biases.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 | **-.215\*\*\*** | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3 | **.517\*\*\*** | .041 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 | **-.112\*** | **.385\*\*\*** | **-.142\*\*** | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 | **-.212\*\*\*** | **.262\*\*\*** | **-.124\*** | **.181\*\*\*** | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6 | **.418\*\*\*** | **-.265\*\*\*** | **.227\*\*\*** | **-.244\*\*\*** | **-.265\*\*\*** | 1 |  |  |  |  |  |  |  |  |  |  |  |  |
| 7 | **.594\*\*\*** | **-.186\*\*\*** | **.286\*\*\*** | **-.104\*** | **-.176\*\*\*** | **.324\*\*\*** | 1 |  |  |  |  |  |  |  |  |  |  |  |
| 8 | **-.119\*** | **.385\*\*\*** | .0350 | **.278\*\*\*** | **.139\*\*** | **-.178\*\*\*** | **-.235\*\*\*** | 1 |  |  |  |  |  |  |  |  |  |  |
| 9 | **.420\*\*\*** | -.102 | **.462\*\*\*** | -.093 | **-.166\*\*** | **.310\*\*\*** | **.609\*\*\*** | -.021 | 1 |  |  |  |  |  |  |  |  |  |
| 10 | -.092 | **.200\*\*\*** | -.0795 | **.471\*\*\*** | **.186\*\*\*** | **-.226\*\*\*** | -.0467 | **.449\*\*\*** | -.065 | 1 |  |  |  |  |  |  |  |  |
| 11 | **-.198\*\*\*** | **.189\*\*\*** | -.0713 | **.186\*\*\*** | **.470\*\*\*** | **-.185\*\*\*** | **-.329\*\*\*** | **.360\*\*\*** | **-.141\*\*** | **.255\*\*\*** | 1 |  |  |  |  |  |  |  |
| 12 | **.306\*\*\*** | **-.167\*\*** | **.195\*\*\*** | **-.182\*\*\*** | **-.178\*\*\*** | **.492\*\*\*** | **.463\*\*\*** | **-.269\*\*\*** | **.353\*\*\*** | **-.249\*\*\*** | **-.272\*\*\*** | 1 |  |  |  |  |  |  |
| 13 | **.372\*\*\*** | **-.204\*\*\*** | **.237\*\*\*** | **-.150\*\*** | **-.187\*\*\*** | **.240\*\*\*** | **.634\*\*\*** | **-.228\*\*\*** | **.499\*\*\*** | -.0875 | **-.305\*\*\*** | **.379\*\*\*** | 1 |  |  |  |  |  |
| 14 | -.072 | **.303\*\*\*** | -.0143 | **.240\*\*\*** | **.184\*\*\*** | **-.154\*\*** | **-.129\*** | **.437\*\*\*** | -.101 | **.332\*\*\*** | **.232\*\*\*** | **-.239\*\*\*** | **-.153\*\*** | 1 |  |  |  |  |
| 15 | **.317\*\*\*** | **-.168\*\*** | **.422\*\*\*** | -.068 | **-.181\*\*\*** | **.224\*\*\*** | **.413\*\*\*** | -.102 | **.577\*\*\*** | -.041 | **-.200\*\*\*** | **.286\*\*\*** | **.613\*\*\*** | -.061 | 1 |  |  |  |
| 16 | -.084 | **.163\*\*** | -.096 | **.377\*\*\*** | **.183\*\*\*** | **-.072** | **-.068** | **.211\*\*\*** | -.069 | **.464\*\*\*** | **.186\*\*\*** | **-.127\*** | .010 | **.411\*\*\*** | -.047 | 1 |  |  |
| 17 | **-.118\*** | **.185\*\*\*** | -.092 | **.202\*\*\*** | **.424\*\*\*** | **-.152\*\*** | **-.189\*\*\*** | **.216\*\*\*** | **-.137\*\*** | **.208\*\*\*** | **.524\*\*\*** | **-.189\*\*\*** | **-.272\*\*\*** | **.252\*\*\*** | **-.204\*\*\*** | **.275\*\*\*** | 1 |  |
| 18 | **.229\*\*\*** | **-.183\*\*\*** | **.207\*\*\*** | **-.174\*\*\*** | **-.205\*\*\*** | **.329\*\*\*** | **.384\*\*\*** | **-.149\*\*** | **.306\*\*\*** | **-.174\*\*\*** | **-.225\*\*\*** | **.529\*\*\*** | **.483\*\*\*** | **-.257\*\*\*** | **.335\*\*\*** | **-.165\*\*** | **-.298\*\*\*** | 1 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | | | | | |  | | | | | |  | | | | | |
|  | **WAVE 1** | | | | | | **WAVE 2** | | | | | | **WAVE 3** | | | | | |
|  | 1. Negative Social Interpretation | | | | | | 7. Negative Social Interpretation | | | | | | 13. Negative Social Interpretation | | | | | |
|  | 2. Positive Social Interpretation | | | | | | 8. Positive Social Interpretation | | | | | | 14. Positive Social Interpretation | | | | | |
|  | 3. Negative Non-Social Interpretation | | | | | | 9. Negative Non-Social Interpretation | | | | | | 15. Negative Non-Social Interpretation | | | | | |
|  | 4. Positive Non-Social Interpretation | | | | | | 10. Positive Non-Social Interpretation | | | | | | 16. Positive Non-Social Interpretation | | | | | |
|  | 5. Positive Memory | | | | | | 11. Positive Memory | | | | | | 17. Positive Memory | | | | | |
|  | 6. Negative Memory | | | | | | 12. Negative Memory | | | | | | 18. Negative Memory | | | | | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

\**p* < .05, \*\**p* < .01, \*\*\**p* < .001

## **Table S4.** Zero-order correlations between cognitive biases and psychopathology.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | DEPRESSION | | | ANXIETY | | |
|  |  | WAVE 1 | WAVE 2 | WAVE 3 | WAVE 1 | WAVE 2 | WAVE 3 |
|  |  |  |  |  |  |  |  |
| WAVE 1 | ***Memory Bias*** | **0.59\*\*\*** | **0.50\*\*\*** | **0.42\*\*\*** | **0.41\*\*\*** | **0.42\*\*\*** | **0.34\*\*\*** |
| Negative Memory | **0.60\*\*\*** | **0.47\*\*\*** | **0.38\*\*\*** | **0.40\*\*\*** | **0.36\*\*\*** | **0.31\*\*\*** |
| Positive Memory | **-0.36\*\*\*** | **-0.36\*\*\*** | **-0.31\*\*\*** | **-0.22\*\*\*** | **-0.29\*\*\*** | **-0.22\*\*\*** |
| ***Social Interpretation Bias*** | **0.46\*\*\*** | **0.36\*\*\*** | **0.31\*\*\*** | **0.50\*\*\*** | **0.35\*\*\*** | **0.32\*\*\*** |
| Negative Social Interpretation | **0.45\*\*\*** | **0.34\*\*\*** | **0.27\*\*\*** | **0.50\*\*\*** | **0.36\*\*\*** | **0.30\*\*\*** |
| Positive Social Interpretation | **-0.24\*\*\*** | **-0.19\*\*\*** | **-0.21\*\*\*** | **-0.23\*\*\*** | **-0.15\*\*\*** | **-0.17\*\*\*** |
| ***Non-Social Interpretation Bias*** | **0.32\*\*\*** | **0.29\*\*\*** | **0.25\*\*\*** | **0.35\*\*\*** | **0.28\*\*\*** | **0.22\*\*\*** |
| Negative Non-Social Interpretation | **0.25\*\*\*** | **0.22\*\*\*** | **0.19\*\*\*** | **0.29\*\*\*** | **0.21\*\*\*** | **0.18\*\*\*** |
| Positive Non-Social Interpretation | **-0.23\*\*\*** | **-0.22\*\*\*** | **-0.18\*\*\*** | **-0.23\*\*\*** | **-0.21\*\*\*** | **-0.16\*\*\*** |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| WAVE 2 | ***Memory Bias*** | **0.46\*\*\*** | **0.66\*\*\*** | **0.54\*\*\*** | **0.41\*\*\*** | **0.50\*\*\*** | **0.43\*\*\*** |
| Negative Memory | **0.45\*\*\*** | **0.63\*\*\*** | **0.53\*\*\*** | **0.40\*\*\*** | **0.48\*\*\*** | **0.41\*\*\*** |
| Positive Memory | **-0.28\*\*\*** | **-0.44\*\*\*** | **-0.33\*\*\*** | **-0.22\*\*\*** | **-0.31\*\*\*** | **-0.26\*\*\*** |
| ***Social Interpretation Bias*** | **0.34\*\*\*** | **0.51\*\*\*** | **0.42\*\*\*** | **0.38\*\*\*** | **0.46\*\*\*** | **0.42\*\*\*** |
| Negative Social Interpretation | **0.34\*\*\*** | **0.51\*\*\*** | **0.43\*\*\*** | **0.39\*\*\*** | **0.50\*\*\*** | **0.42\*\*\*** |
| Positive Social Interpretation | **-0.17\*\*\*** | **-0.26\*\*\*** | **-0.17\*\*\*** | **-0.16\*\*\*** | **-0.17\*\*\*** | **-0.20\*\*\*** |
| ***Non-Social Interpretation Bias*** | **0.31\*\*\*** | **0.47\*\*\*** | **0.39\*\*\*** | **0.32\*\*\*** | **0.46\*\*\*** | **0.36\*\*\*** |
| Negative Non-Social Interpretation | **0.28\*\*\*** | **0.39\*\*\*** | **0.35\*\*\*** | **0.33\*\*\*** | **0.44\*\*\*** | **0.34\*\*\*** |
| Positive Non-Social Interpretation | **-0.18\*\*\*** | **-0.29\*\*\*** | **-0.22\*\*\*** | **-0.14\*\*\*** | **-0.23\*\*\*** | **-0.18\*\*\*** |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| WAVE 3 | ***Memory Bias*** | **0.36\*\*\*** | **0.50\*\*\*** | **0.65\*\*\*** | **0.32\*\*\*** | **0.39\*\*\*** | **0.47\*\*\*** |
| Negative Memory | **0.32\*\*\*** | **0.46\*\*\*** | **0.62\*\*\*** | **0.28\*\*\*** | **0.36\*\*\*** | **0.46\*\*\*** |
| Positive Memory | **-0.26\*\*\*** | **-0.38\*\*\*** | **-0.43\*\*\*** | **-0.22\*\*\*** | **-0.29\*\*\*** | **-0.29\*\*\*** |
| ***Social Interpretation Bias*** | **0.25\*\*\*** | **0.41\*\*\*** | **0.52\*\*\*** | **0.28\*\*\*** | **0.38\*\*\*** | **0.52\*\*\*** |
| Negative Social Interpretation | **0.27\*\*\*** | **0.40\*\*\*** | **0.51\*\*\*** | **0.29\*\*\*** | **0.37\*\*\*** | **0.51\*\*\*** |
| Positive Social Interpretation | -0.08 | **-0.18\*\*\*** | **-0.22\*\*\*** | **-0.10\*\*\*** | **-0.17\*\*\*** | **-0.24\*\*\*** |
| ***Non-Social Interpretation Bias*** | **0.25\*\*\*** | **0.33\*\*\*** | **0.39\*\*\*** | **0.28\*\*\*** | **0.36\*\*\*** | **0.41\*\*\*** |
| Negative Non-Social Interpretation | **0.27\*\*\*** | **0.32\*\*\*** | **0.40\*\*\*** | **0.30\*\*\*** | **0.36\*\*\*** | **0.42\*\*\*** |
| Positive Non-Social Interpretation | -0.09 | **-0.15\*\*\*** | **-0.16\*\*\*** | **-0.10\*\*\*** | **-0.17\*\*\*** | **-0.18\*\*\*** |
|  |  |  |  |  |  |  |  |

\**p* < .05, \*\**p* < .01, \*\*\**p* < .001

## **Table S5.** Zero-order correlations between depression PRS and psychopathology.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **DEPRESSION** | | | **ANXIETY** | | |
|  | WAVE 1 | WAVE 2 | WAVE 3 | WAVE 1 | WAVE 2 | WAVE 3 |
|  |  |  |  |  |  |  |
| *PRS 0.001* | 0.08**\*** | 0.07 | 0.09**\*** | **0.13\*\*** | **0.12\*\*** | **0.13\*\*** |
| *PRS 0.01* | **0.12\*\*** | **0.10\*\*** | **0.11\*\*** | **0.18\*\*\*** | **0.20\*\*** | **0.20\*\*\*** |
| *PRS 0.05* | **0.14\*\*** | **0.12\*\*** | **0.12\*\*** | **0.17\*\*\*** | **0.18\*\*\*** | **0.17\*\*\*** |
| *PRS 0.1* | **0.11\*\*** | **0.11\*\*** | **0.10\*\*** | **0.16\*\*\*** | **0.14\*\*** | **0.15\*\*** |
| *PRS 0.2* | 0.08**\*** | 0.07 | 0.06 | **0.15\*\*** | **0.13\*\*** | **0.14\*\*** |
| *PRS 0.3* | 0.09**\*** | 0.07 | 0.07 | **0.15\*\*** | **0.13\*\*** | **0.14\*\*** |
| *PRS 0.4* | **0.10\*\*** | 0.07 | 0.08**\*** | **0.14\*\*** | **0.13\*\*** | **0.14\*\*** |
| *PRS 0.5* | 0.09**\*** | 0.08**\*** | 0.07 | **0.14\*\*** | **0.12\*\*** | **0.14\*\*** |
| *PRS 1.00* | 0.07 | 0.06 | 0.06 | **0.14\*\*** | **0.12\*\*** | **0.14\*\*** |
|  |  |  |  |  |  |  |

\**p* < .05, \*\**p* < .01, \*\*\**p* < .001

## **Table S6.** Zero-order correlations between depression PRS and life experiences.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **NEGATIVE LIFE EXPERIENCES** | | | **POSITIVE LIFE EXPERIENCES** | | |
|  | WAVE 1 | WAVE 2 | WAVE 3 | WAVE 1 | WAVE 2 | WAVE 3 |
|  |  |  |  |  |  |  |
| *PRS 0.001* | -0.07 | 0.01 | 0.01 | 0.01 | 0.02 | 0.00 |
| *PRS 0.01* | -0.03 | 0.01 | 0.00 | -0.01 | -0.04 | -0.05 |
| *PRS 0.05* | 0.02 | 0.07 | 0.06 | -0.02 | 0.07 | 0.03 |
| *PRS 0.1* | 0.09 | 0.05 | 0.10 | 0.02 | 0.07 | -0.01 |
| *PRS 0.2* | 0.08 | 0.01 | 0.01 | 0.06 | 0.04 | 0.06 |
| *PRS 0.3* | 0.09 | 0.05 | 0.03 | 0.09 | -0.02 | 0.00 |
| *PRS 0.4* | 0.01 | 0.00 | -0.01 | 0.02 | 0.01 | -0.08 |
| *PRS 0.5* | 0.03 | 0.05 | 0.01 | 0.05 | 0.06 | -0.01 |
| *PRS 1.00* | -0.07 | 0.01 | -0.02 | -0.05 | 0.00 | 0.08 |
|  |  |  |  |  |  |  |

*Note.* No significant zero-order correlation ensued between any PRS threshold and negative or positive life experiences, suggesting no gene-environment correlation for this sample.

# **Appendix S3. Effects of time on cognitive biases**

As supplementary analyses, we examined the effects of time (i.e., measurement wave) on each cognitive bias. Such time effects were specified (in separate models) as either linear, quadratic, or interacting with life experiences or polygenic scores so as to thoroughly examine which time trend best captures the development of cognitive biases.

Our results revealed that a linear term of time (conceptualized in waves) was positively associated with ***Memory Bias*** (*β* = 0.15, 95% CI: [0.05, 0.25], *p*=.004) and *Negative Recall* (*β* = 0.07, 95% CI: [0.02, 0.12], *p* = .004); and negatively associated with ***Social Interpretation Bias*** (*β* = -0.21, 95% CI: [-0.33, -0.09], *p* < .001) and *Negative Social Interpretation* (*β* = -0.25, 95% CI: [-0.37, -0.13], *p* < .001). These effects suggest that ***Memory*** and ***Social Interpretation biases*** were enhanced and diminished, respectively, across waves. The quadratic terms of time were not significant predictors (at neither lenient, p < .05, nor adjusted thresholds), suggesting that developmental trends of cognitive biases are best captured linearly. Finally, interactions between either the fixed or random effects of *time* and our main *predictors* (i.e., life experiences and polygenic scores) were not significant (at neither lenient, p < .05, nor adjusted thresholds), suggesting that any main effects on cognitive biases are stable across time (see Appendix S6 for all non-significant effects).

# **Appendix S4. Effects of life experiences on cognitive biases**

In the first statistical model of our paper, we sought to examine the effects of life experiences on cognitive biases. To do so, we sought to adjust for possible confounding effects from genes, by adjusting the highest polygenic threshold (PRS 1.0). Another way, however, of scrutinizing this effect is to adjust for the strongest polygenic effect––which, based on our PRS results, was the PRS 0.01. Repeating our main analyses, while adjusting for PRS 0.01, we found the same effects: Positive life experiences were negatively related with ***Memory Bias*** (*β*=-0.09, 95% C.I. [-.14, -.04], *p*=1.3E-4) and ***Social Interpretation Bias*** (*β*=-0.11, 95% C.I. [-.12, -.08], *p*=4.1E-5); and positively related with *positive recall* (*β*=0.13, 95% C.I. [.07, .17], *p* = 1.7E-6) and *positive social interpretation* (*β*=-0.11, 95% C.I. [.04, .14], *p* = 1.8E-5).

Relatedly, unadjusted models (that is, models not adjusting for the main effects of PRS, highlighting ‘main,’ not ‘unique’ effects) replicated the abovementioned patterns (in particular, the effect of positive life experiences on ***Memory Bias*** (*β*=-0.10, 95% C.I. [-.15, -.05], *p*=1.1E-4), ***Social Interpretation Bias*** (*β*=-0.11, 95% C.I. [-.13, -.10], *p*=4.0E-5), as well as their positive components, that is, *positive recall* (*β*=0.14, 95% C.I. [.09, .18], *p* = 1.8E-6) and *positive social interpretation* (*β*=-0.12, 95% C.I. [.06, .16], *p* = 2.1E-5)); and revealed several new ones, which involved the effects of negative life events on: ***Memory Bias*** (*β*=0.09, 95% C.I. [.04, -.14], *p*= 4.6E-4) and ***Social Interpretation Bias*** (*β*=0.08, 95% C.I. [.02, .12], *p*=2.2E-4), as well as their two negative components––that is, *negative recall* (*β*=0.10, 95% C.I. [.02, .14], *p* = 4.2E-5) and *negative social interpretation* (*β*=0.10, 95% C.I. [.06, .18], *p* = 7.5E-5).

Because further psychopathology-unadjusted models (see Appendix S6) suggested that some effects from negative life events to particular cognitive biases existed, mediation models were estimated to assess whether these effects were mediated by psychopathology. Following a structural equation framework (Mehmetoglu, 2018), we revealed that depression, not anxiety, fully mediated the relation between negative life events and ***Memory Bias*** (delta=0.09, CI [.08, .11]), ***Social Interpretation Bias*** (delta=0.08, CI [.07, .10]), and their two negative components (deltas=.09/.07, CI [.08/.05, .12/.09], respectively). A Monte Carlo replication (500 iterations) also rejected the null hypothesis (‘indirect path of zero’), further revealing that the indirect path (that is, the SEM path from negative events to depression to cognitive biases) was several times larger in magnitude than its direct counterpart (average 12 times larger across these biases).

# **Appendix S5. Effects of polygenic risk on cognitive biases**

In the first statistical model of our paper, we sought to examine the *‘unique’* effects of polygenic risk for depression on cognitive biases (by adjusting for a number of factors, including, notably, positive and negative life experiences), revealing no significant patterns. To assess whether this ‘insignificance’ was due to the adjustment of life events, we re-estimated our models while not adjusting for environmental factors. In agreement with the ‘unique’ effects analyses, these un-adjusted ones revealed no significant main relation between PRS and any cognitive biases (for nonsignificant results, please see Appendix S8).

Further unadjusted analyses involving our depression polygenic risk scores are reported in the next section (revealing that when not adjusting for psychopathology, particular polygenic thresholds were related with some of cognitive outcomes).

# **Appendix S6. Collider bias sensitivity check**

In a regression setting, a *‘collider bias’* emerges when the regression equation conditions on an endogenous variable that is a function of both: another endogenous variable in the equation; and the exogenous (or outcome) variable. In simpler terms, the regression equation conditions on a variable that is not a true *confounder* (i.e., one that affects the relationship between another endogenous variable and the outcome), but rather a *collider* (i.e., one that is affected or caused by them) (Elwert & Winship, 2014). Here, psychopathology may have been a collider variable, as it could have been a function of some of our predictors (for example, polygenic risk scores, or life experiences) and cognitive outcomes. To examine this possibility, we re-fitted all models without adjusting for psychopathology. Our analyses (Tables S3-S8) revealed two differences between the main results and the psychopathology-unadjusted ones. Firstly, some results that were initially not significant (for example, effects from negative life events or polygenic scores toward certain negative cognitive biases) became significant. This is not surprising, given that psychopathology could explain most of the relationship between our two main predictors (i.e., environment and genetics) and cognitive outcomes (see, e.g., Appendix S4).

Conversely, a second pattern involved an effect that was originally significant (namely, the positive effect of negative life experiences onto the positive social interpretation bias); but which became non-significant, upon excluding psychopathology from its model (see Table S3). This might be due to a ‘collider bias’ (with psychopathology, for instance, inducing a spurious relation between negative life experiences and positive cognitive biases).

Finally, the main direct as well as interactive effects of PRS were replicated within our unadjusted models, suggesting that a ‘collider bias’ did not ensue for the (positive) GxE effects, despite these being somewhat reduced (see Tables S4, S5, S6).

## **Table S7.** Unadjusted effects of (positive/negative) life experiences on cognitive biases.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ssssssssssssssssssssss | Memory Bias | | | | | Negative Recall | | | | Positive Recall | | | | | | Social Interpretation Bias | | | | | Negative Social Interpretation | | | | | | Positive Social Interpretation | | | | |
|  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | 95% CI | | |  |  | 95% CI | |  | |  | 95% CI | |  |  | | 95% CI | |  |  | | | 95% CI | |  | |  | 95% CI | |  |
| *β* |  | | | *p (FDR)* | *β* |  | | *p (FDR)* | | *β* |  | | *p (FDR)* | *β* | |  | | *p (FDR)* | *β* | | |  | | *p (FDR)* | | *β* |  | | *p (FDR)* |
|  | | |  | |  |  | |  | |  | | |  | |  |  | |
|  |  | Lower | Upper | |  |  | Lower | Upper |  | |  | Lower | Upper |  |  | | Lower | Upper |  |  | | | Lower | Upper |  | |  | Lower | Upper |  |
|  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  | | |  |  |  | |  |  |  |  |
|  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  |  | | |  |  |  | |  |  |  |  |
| *Positive Life Experiences* | -.10 | -.14 | -.06 | | **1.0E-4\*** | -.02 | -.06 | .02 | .36 | | .12 | .06 | .16 | **1.2E-5\*** | -.11 | | -.15 | -.07 | **2.2E-5\*** | -.05 | | | -.09 | 0.2 | .06 | | .12 | .05 | .15 | **1.8E-5\*** |
| *Negative Life Experiences* | .11 | .02 | .14 | | **4.0E-4\*** | .12 | .04 | .16 | **5.4E-5\*** | | .04 | -.03 | .08 | .33 | .10 | | .04 | .16 | **1.2E-4\*** | .12 | | | .06 | .20 | **9.2E-5\*** | | .05 | .01 | .14 | .05 |
|  | | | |  | | | | | | | | | | | | | | | | | |  | | | |  | | | | |

***Note.*** *β*, standardized regression coefficient; 95% CI, confidence intervals; *p*, *p* value for regression coefficient.

Re-analyses of main statistical models (examining the effects of life events), excluding psychopathology.

\**p* < .05 (two-sided) after Benjamini-Hochberg FDR adjustment.

## **Table S8.** Unadjusted effects of depression PRS on cognitive biases.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ssssssssssssssssssssss | Negative Recall | | | | Positive Recall | | | | | Positive Social Interpretation | | | | | | |
|  | | | | | | | | |  | | | | | | |
|  | 95% CI | |  |  | 95% CI | |  |  | | | 95% CI | | |  | |
| *β* |  | | *p (FDR)* | *β* |  | | *p (FDR)* | *β* | | |  | | | *p (FDR)* | |
|  | |  | |  | | |
|  |  | Lower | Upper |  |  | Lower | Upper |  |  | | | Lower | Upper | |  | |
|  |  |  | |  |  |  | |  |  | | | | | | | |
|  | | | | | | | | | | | | | | | | |
| *PRS 0.001* | .01 | -.02 | .12 | .07 | -.03 | -.18 | -.01 | .05 | -.03 | | -.18 | | | -.01 | | .06 |
| *PRS 0.01* | .04 | .02 | .14 | **3.1E-2\*** | -.04 | -.17 | -.02 | **3.4E-2\*** | -.03 | | -.19 | | | -.01 | | .06 |
| *PRS 0.05* | .04 | .01 | .14 | **2.2E-2\*** | -.04 | -.16 | -.02 | **1.1E-2\*** | -.06 | | -.18 | | | -.01 | | **3.1E-2\*** |
| *PRS 0.1* | .05 | .02 | .14 | **1.1E-3\*** | -.04 | -.16 | -.02 | **2.4E-2\*** | -.10 | | -.22 | | | -.02 | | **2.4E-2\*** |
| *PRS 0.2* | .05 | .02 | .16 | **2.1E-2\*** | -.02 | -.18 | -.01 | .07 | -.11 | | -.22 | | | -.01 | | **2.1E-2\*** |
| *PRS 0.3* | .02 | -.02 | .18 | .07 | -.01 | -.18 | -.01 | .06 | -.08 | | -.20 | | | -.01 | | **4.1E-2\*** |
| *PRS 0.4* | .01 | -.02 | .18 | .06 | -.02 | -.16 | -.01 | .07 | -.02 | | -.16 | | | .01 | | .07 |
| *PRS 0.5* | .02 | -.02 | .20 | .08 | -.03 | -.16 | -.02 | .08 | -.02 | | -.16 | | | .01 | | .07 |
| *PRS 1.00* | .02 | -.01 | .20 | .11 | -.02 | -.18 | -.02 | .06 | -.02 | | -.16 | | | .01 | | .06 |
|  | | | | | | | | | | | | | | | | |

***Note.*** PRS, Polygenic Risk Scores; *β*, standardized regression coefficient in SD; 95% CI, confidence intervals; *p*, *p* value for regression coefficient.

Re-analyses of main statistical models (examining the effects of polygenic risk for depression), excluding psychopathology.

\**p* < .05 (two-sided) after Benjamini-Hochberg FDR adjustment.

## **Table S9.** Unadjusted vantage GxE effects on cognitive biases.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Social Interpretation Bias | | | | *Positive Social Interpretation* | | | | | *Positive Non-Social Interpretation* | | | | | | |
|  | | | | | | | | |  | | | | | | |
|  | 95% CI | |  |  | 95% CI | |  |  | | | 95% CI | | |  | |
| *β* |  | | *p (FDR)* | *β* |  | | *p (FDR)* | *β* | | |  | | | *p (FDR)* | |
|  | |  | |  | | |
|  |  | Lower | Upper |  |  | Lower | Upper |  |  | | | Lower | Upper | |  | |
|  |  |  | |  |  |  | |  |  | | | | | | | |
|  | | | | | | | | | | | | | | | | |
| *PRS 0.001 x PLE* | .01 | -.02 | .08 | .20 | .01 | -.04 | .07 | .12 | .03 | | -.01 | | | .10 | | .14 |
| *PRS 0.01 x PLE* | -.05 | -.10 | -.01 | **1.8E-2\*** | .04 | .01 | .15 | **3.1E-2\*** | .06 | | .02 | | | .12 | | **6.2E-2\*** |
| *PRS 0.05 x PLE* | -.05 | -.10 | -.01 | **2.4E-2\*** | .10 | .02 | .15 | **2.1E-3\*** | .07 | | .03 | | | .13 | | **1.9E-2\*** |
| *PRS 0.1 x PLE* | -.05 | -.11 | -.02 | **3.2E-2\*** | .10 | .02 | .15 | **4.1E-2\*** | .09 | | .05 | | | .15 | | **1.0E-3\*** |
| *PRS 0.2 x PLE* | -.06 | -.12 | -.04 | **6.4E-3\*** | .07 | .04 | .16 | **5.6E-3\*** | .07 | | .01 | | | .13 | | **1.1E-2\*** |
| *PRS 0.3 x PLE* | -.06 | -.12 | -.04 | **6.2E-2\*** | .07 | .04 | .16 | **7.1E-1\*** | .05 | | .00 | | | .11 | | .08 |
| *PRS 0.4 x PLE* | -.06 | -.12 | -.04 | **8.3E-2\*** | .07 | .04 | .16 | **6.3E-1\*** | .04 | | .00 | | | .11 | | .05 |
| *PRS 0.5 x PLE* | -.06 | -.12 | -.04 | **7.1E-2\*** | .07 | .04 | .16 | **5.6E-2\*** | .04 | | .00 | | | .11 | | .05 |
| *PRS 1.00 x PLE* | -.06 | -.12 | -.04 | **7.5E-3\*** | .07 | .04 | .16 | **4.8E-1\*** | .05 | | .00 | | | .11 | | .06 |
|  | | | | | | | | | | | | | | | | |

***Note.*** PRS, Polygenic Risk Scores; PLE, Positive Life Experiences; *β*, standardized regression coefficient in SD; 95% CI, confidence intervals; *p*, *p* value for regression coefficient.

Re-analyses of main statistical models (examining the effects of polygenic risk for depression), excluding psychopathology.

\**p* < .05 (two-sided) after Benjamini-Hochberg FDR adjustment.

## **Table S10.** Unadjusted simple slope effects of significant vantage GxE effects on cognitive biases.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Social Interpretation Bias | | | | *Positive Social Interpretation* | | | | | *Positive Non-Social Interpretation* | | | | | | | |
|  | | | | | | | | |  | | | | | | | |
|  | 95% CI | |  |  | 95% CI | |  |  | | | 95% CI | | |  | |
| *β* |  | | *p (FDR)* | *β* |  | | *p (FDR)* | *β* | | |  | | | *p (FDR)* | |
|  | |  | |  | | |
|  |  | Lower | Upper |  |  | Lower | Upper |  |  | | | Lower | Upper | |  | |
| *HIGH PRS QUARTILE* |  |  | |  |  |  | |  |  | | | | | | | |
|  | | | | | | | | | | | | | | | | |
| *PRS 0.001 x PLE* | - | - | - | - | - | - | - | **-** | - | | - | | | - | | - |
| *PRS 0.01 x PLE* | -.14 | -.22 | -.06 | **4.5E-3\*** | .16 | .07 | .24 | **2.6E-5\*** | .06 | | -.01 | | | .15 | | **4.5E-1\*** |
| *PRS 0.05 x PLE* | -.10 | -.18 | -.02 | **5.2E-3\*** | .17 | .08 | .25 | **3.1E-5\*** | .06 | | -.01 | | | .15 | | **3.1E-1\*** |
| *PRS 0.1 x PLE* | -.12 | -.24 | -.08 | **4.1E-4\*** | .18 | .09 | .26 | **4.6E-4\*** | .10 | | .02 | | | .20 | | **4.1E-2\*** |
| *PRS 0.2 x PLE* | -.12 | -.24 | -.08 | **3.6E-4\*** | .16 | .08 | .24 | **3.5E-5\*** | .07 | | .01 | | | .14 | | **3.9E-2\*** |
| *PRS 0.3 x PLE* | -.10 | -.20 | -.04 | **6.1E-3\*** | .15 | .07 | .24 | **7.6E-4\*** | - | | - | | | - | | - |
| *PRS 0.4 x PLE* | -.10 | -.18 | -.02 | **2.1E-4\*** | .14 | .06 | .22 | **8.1E-4\*** | - | |  | | |  | |  |
| *PRS 0.5 x PLE* | -.10 | -.19 | -.03 | **4.5E-4\*** | .14 | .06 | .22 | **2.5E-5\*** | - | |  | | |  | |  |
| *PRS 1.00 x PLE* | -.10 | -.18 | -.02 | **2.6E-3\*** | .16 | .08 | .24 | **3.5E-5\*** | - | |  | | |  | |  |
|  | | | | | | | | | | | | | | | | |

***Note.*** PRS, Polygenic Risk Scores (at high quartile); PLE, Positive Life Experiences; *β*, standardized regression coefficient in SD; 95% CI, confidence intervals; *p*, *p* value for regression coefficient.

Re-analyses of main statistical models (examining the effects of polygenic risk for depression), excluding psychopathology.

\**p* < .05 (two-sided) after Benjamini-Hochberg FDR adjustment.

## **Table S11.** Unadjusted diathesis-stress GxE effects on cognitive biases.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ssssssssssssssssssssss | Negative Recall | | | | Social Interpretation | | | | | Negative Social Interpretation | | | | | | |
|  | | | | | | | | |  | | | | | | |
|  | 95% CI | |  |  | 95% CI | |  |  | | | 95% CI | | |  | |
| *β* |  | | *p (FDR)* | *β* |  | | *p (FDR)* | *β* | | |  | | | *p (FDR)* | |
|  | |  | |  | | |
|  |  | Lower | Upper |  |  | Lower | Upper |  |  | | | Lower | Upper | |  | |
|  |  |  | |  |  |  | |  |  | | | | | | | |
|  | | | | | | | | | | | | | | | | |
| *PRS 0.001 x NLE* | .01 | -.02 | .06 | .06 | .03 | 0 | .12 | 0.5 | .05 | | .01 | | | .13 | | 0.6 |
| *PRS 0.01 x NLE* | .02 | -.03 | .07 | .07 | .06 | .01 | .14 | **2.4E-2\*** | .08 | | .03 | | | .17 | | **2.2E-3\*** |
| *PRS 0.05 x NLE* | .05 | .01 | .11 | **2.1E-2\*** | .06 | .01 | .14 | **3.1E-2\*** | .08 | | .03 | | | .17 | | **2.2E-3\*** |
| *PRS 0.1 x NLE* | .05 | .01 | .11 | **2.4E-2\*** | .07 | .02 | .16 | **2.2E-3\*** | .08 | | .03 | | | .18 | | **3.4E-3\*** |
| *PRS 0.2 x NLE* | .05 | .01 | .11 | **2.3E-2\*** | .07 | .02 | .16 | **2.2E-3\*** | .07 | | .02 | | | .16 | | **2.4E-3\*** |
| *PRS 0.3 x NLE* | .06 | .02 | .12 | **1.3E-3\*** | .07 | .02 | .16 | **3.1E-3\*** | .06 | | .01 | | | .15 | | **3.2E-3\*** |
| *PRS 0.4 x NLE* | .06 | .02 | .12 | **1.2E-3\*** | .06 | .01 | .14 | **3.2E-2\*** | .07 | | .02 | | | .16 | | **3.1E-3\*** |
| *PRS 0.5 x NLE* | .03 | -.03 | .08 | 0.7 | .05 | .01 | .15 | **4.1E-2\*** | .07 | | .02 | | | .17 | | **2.1E-3\*** |
| *PRS 1.00 x NLE* | .02 | -.03 | .07 | 0.7 | .03 | -.02 | .11 | 0.6 | .06 | | .01 | | | .15 | | **1.2E-3\*** |
|  | | | | | | | | | | | | | | | | |

***Note.*** PRS, Polygenic Risk Scores; NLE, Negative Life Experiences; *β*, standardized regression coefficient in SD; 95% CI, confidence intervals; *p*, *p* value for regression coefficient.

Re-analyses of main statistical models (examining the effects of polygenic risk for depression), excluding psychopathology.

\**p* < .05 (two-sided) after Benjamini-Hochberg FDR adjustment.

## **Table S12.** Unadjusted simple slope effects of significant diathesis-stress GxE effects on cognitive biases.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ssssssssssssssssssssss | Negative Recall | | | | Social Interpretation | | | | | Negative Social Interpretation | | | | | | |
|  | | | | | | | | |  | | | | | | |
|  | 95% CI | |  |  | 95% CI | |  |  | | | 95% CI | | |  | |
| *β* |  | | *p (FDR)* | *β* |  | | *p (FDR)* | *β* | | |  | | | *p (FDR)* | |
|  | |  | |  | | |
|  |  | Lower | Upper |  |  | Lower | Upper |  |  | | | Lower | Upper | |  | |
|  |  |  | |  |  |  | |  |  | | | | | | | |
|  | | | | | | | | | | | | | | | | |
| *PRS 0.001 x NLE* |  | - | - | - | - | - | - | - |  | |  | | |  | |  |
| *PRS 0.01 x NLE* |  |  |  |  | .13 | .03 | .22 | **2.4E-3\*** | .14 | | .02 | | | .22 | | **2.1E-3\*** |
| *PRS 0.05 x NLE* | .16 | .05 | .25 | **2.6E-3\*** | .14 | .04 | .23 | **3.1E-4\*** | .14 | | .03 | | | .22 | | **2.2E-3\*** |
| *PRS 0.1 x NLE* | .14 | .03 | .22 | **2.1E-3\*** | .13 | .04 | .22 | **2.2E-3\*** | .15 | | .04 | | | .23 | | **3.1E-4\*** |
| *PRS 0.2 x NLE* | .14 | .03 | .22 | **3.2E-3\*** | .13 | .04 | .22 | **2.2E-3\*** | .15 | | .03 | | | .23 | | **3.0E-4\*** |
| *PRS 0.3 x NLE* | .17 | .06 | .26 | **2.2E-4\*** | .13 | .04 | .22 | **3.1E-3\*** | .15 | | .04 | | | .23 | | **3.2E-4\*** |
| *PRS 0.4 x NLE* | .14 | .03 | .22 | **3.2E-4\*** | .12 | .03 | .21 | **3.2E-3\*** | .15 | | .04 | | | .23 | | **3.0E-4\*** |
| *PRS 0.5 x NLE* |  |  |  |  | .13 | .04 | .22 | **4.1E-3\*** | .14 | | .03 | | | .22 | | **1.2E-3\*** |
| *PRS 1.00 x NLE* |  |  |  |  |  |  |  |  | .14 | | .03 | | | .22 | | **1.2E-3\*** |
|  | | | | | | | | | | | | | | | | |

***Note.*** PRS, Polygenic Risk Scores; NLE, Negative Life Experiences; *β*, standardized regression coefficient in SD; 95% CI, confidence intervals; *p*, *p* value for regression coefficient.

Re-analyses of main statistical models (examining the effects of polygenic risk for depression), excluding psychopathology.

\**p* < .05 (two-sided) after Benjamini-Hochberg FDR adjustment.

# **Appendix S7. Contaminated self-reporting sensitivity check**

Descriptive statistics revealed substantial variation in the manner by which respondents rated endorsed life experiences (see Table S7). Indeed, although most life experiences in the CASE (Child and Adolescent Survey of Experiences) measure were predominantly rated in either one of two ways (either predominantly positively or negatively), some of them were inconsistently rated by respondents. This inconsistency in judging the valence of particular life experiences suggests that individual characteristics may have affected self-reporting (resulting in what we termed ‘contaminated’ self-reporting). Cognitive biases may have something to do with this as they might have influenced the manner by which respondents interpreted particular life events. For instance, the event *‘my parent(s) stayed away from home overnight’* might have been rated as either a very positive or a very negative experience, depending on one’s interpretation (bias).

To examine whether cognitive biases affected the responding of life events, (binomial) logistic regression models were employed (with cognitive biases as the predictor of the valence of life events). Nine life experiences were significantly predicted by at least one cognitive bias, upon adjusting for multiple-testing (*p* < .0013) (see Table S8). An example item was the above, which was shown to be significantly predicted by several cognitive biases. These 9 items, with *double entendre*, were hereby conceptualized as ‘contaminated,’ since their ratings were partly a function of at least one (pre-existing) cognitive bias (see Table S9 for a list).

To understand whether these *‘contaminated’* items affected our main results, we re-ran our (significant) regression models without them. Our results indicated that all effects remained significant, with the exception of the previous ‘collider’ effect (see Table S10), and the positive non-social interpretation bias (simple slope) effect (see Table S12).

## **Table S13.** Descriptive Statistics of life experiences from CASE measure.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | WAVE 1 | | | WAVE 2 | | | WAVE 3 | | |
|  |  |  |  |  |  |  |  |  |  |
|  | Endorsed | Rated negative | Rated positive | Endorsed | Rated negative | Rated positive | Endorsed | Rated negative | Rated positive |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | N | N (%) | N (%) | N | N (%) | N (%) | N | N (%) | N (%) |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| CASE ITEM |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| We moved house | 108 | 9 (8.3) | 99 (91.6) | 81 | 7 (8.6) | 74 (91.3) | 64 | 8 (12.5) | 56 (87.5) |
|  |  |  |  |  |  |  |  |  |  |
| I (or my team) won a prize, award or contest | 359 | 1 (0.2) | 358 (99.7) | 303 | 2 (0.6) | 301 (99.3) | 252 | 0 (0) | 252 (100) |
|  |  |  |  |  |  |  |  |  |  |
| My parent(s) stayed away from home overnight | 287 | 115 (40) | 172 (59.9) | 295 | 107 (36.2) | 188 (63.7) | 263 | 81 (30.8) | 182 (69.2) |
|  |  |  |  |  |  |  |  |  |  |
| I got a new boyfriend or girlfriend | 113 | 6 (5.3) | 107 (94.6) | 119 | 10 (8.4) | 109 (91.6) | 102 | 9 (8.8) | 93 (91.1) |
|  |  |  |  |  |  |  |  |  |  |
| My parent(s) started a new job | 177 | 13 (7.3) | 164 (92.6) | 147 | 18 (12.2) | 129 (87.7) | 128 | 13 (10.1) | 115 (89.8) |
|  |  |  |  |  |  |  |  |  |  |
| Someone special to me moved away (who is not in your family) | 118 | 116 (98.3) | 2 (1.6) | 91 | 83 (91.2) | 8 (8.7) | 49 | 47 (95.9) | 2 (4) |
|  |  |  |  |  |  |  |  |  |  |
| Someone in my family was really sick or injured | 273 | 268 (98.1) | 5 (1.8) | 226 | 221 (97.7) | 5 (2.2) | 193 | 190 (98.4) | 3 (1.5) |
|  |  |  |  |  |  |  |  |  |  |
| My parent(s) had a baby/found out they are going to have a baby | 45 | 6 (13.3) | 39 (86.6) | 30 | 3 (10) | 27 (90) | 18 | 2 (11.1) | 16 (88.8) |
|  |  |  |  |  |  |  |  |  |  |
| My parent(s) had to see my school principal | 81 | 48 (59.2) | 33 (40.7) | 57 | 37 (64.9) | 20 (35) | 44 | 28 (63.6) | 16 (36.3) |
|  |  |  |  |  |  |  |  |  |  |
| I stayed away from home overnight | 408 | 33 (8) | 375 (91.9) | 379 | 22 (5.8) | 357 (94.2) | 357 | 33 (9.2) | 324 (90.7) |
|  |  |  |  |  |  |  |  |  |  |
| Someone came to live with our family | 110 | 17 (15.4) | 93 (84.5) | 91 | 22 (24.1) | 69 (75.8) | 88 | 17 (19.3) | 71 (80.6) |
|  |  |  |  |  |  |  |  |  |  |
| I was teased or bullied | 154 | 146 (94.8) | 8 (5.1) | 127 | 118 (92.9) | 9 (7) | 99 | 95 (95.9) | 4 (4) |
|  |  |  |  |  |  |  |  |  |  |
| My pet died, got sick, lost or injured | 170 | 165 (97) | 5 (2.9) | 146 | 139 (95.2) | 7 (4.7) | 105 | 102 (97.1) | 3 (2.8) |
|  |  |  |  |  |  |  |  |  |  |
| I had a big argument with someone in family | 199 | 191 (95.9) | 8 (4) | 196 | 177 (90.3) | 19 (9.6) | 189 | 176 (93.1) | 13 (6.8) |
|  |  |  |  |  |  |  |  |  |  |
| I was really sick or injured | 146 | 137 (93.8) | 9 (6.1) | 102 | 95 (93.1) | 7 (6.8) | 90 | 86 (95.5) | 4 (4.4) |
|  |  |  |  |  |  |  |  |  |  |
| My parent(s) split up | 34 | 30 (88.2) | 4 (11.7) | 26 | 19 (73) | 7 (26.9) | 21 | 18 (85.7) | 3 (14.2) |
|  |  |  |  |  |  |  |  |  |  |
| I did well in an important test or exam | 388 | 4 (1) | 384 (98.9) | 351 | 4 (1.1) | 347 (98.8) | 315 | 3 (0.9) | 312 (99) |
|  |  |  |  |  |  |  |  |  |  |
| My parent(s) lost their job | 27 | 24 (88.8) | 3 (11.1) | 30 | 24 (80) | 6 (20) | 25 | 24 (96) | 1 (4) |
|  |  |  |  |  |  |  |  |  |  |
| I broke up with my boyfriend or girlfriend | 99 | 66 (66.6) | 33 (33.3) | 92 | 69 (75) | 23 (25) | 85 | 61 (71.7) | 24 (28.2) |
|  |  |  |  |  |  |  |  |  |  |
| I had a big argument with someone special to me (not in family) | 179 | 173 (96.6) | 6 (3.3) | 155 | 138 (89) | 17 (10.9) | 149 | 138 (92.6) | 11 (7.3) |
|  |  |  |  |  |  |  |  |  |  |
|  | Endorsed | Rated negative | Rated positive | Endorsed | Rated negative | Rated positive | Endorsed | Rated negative | Rated positive |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | N | N (%) | N (%) | N | N (%) | N (%) | N | N (%) | N (%) |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| I made a new special friend | 290 | 5 (1.7) | 285 (98.2) | 237 | 6 (2.5) | 231 (97.4) | 160 | 4 (2.5) | 156 (97.5) |
|  |  |  |  |  |  |  |  |  |  |
| I saw something bad happen | 114 | 110 (96.4) | 4 (3.5) | 81 | 75 (92.5) | 6 (7.4) | 73 | 68 (93.1) | 5 (6.8) |
|  |  |  |  |  |  |  |  |  |  |
| I changed schools | 194 | 16 (8.2) | 178 (91.7) | 37 | 11 (29.7) | 26 (70.2) | 24 | 4 (16.6) | 20 (83.3) |
|  |  |  |  |  |  |  |  |  |  |
| Someone in the family died | 142 | 139 (97.8) | 3 (2.1) | 121 | 114 (94.2) | 7 (5.7) | 106 | 104 (98.1) | 2 (1.8) |
|  |  |  |  |  |  |  |  |  |  |
| People in the family had a big fight or argument (not including me) | 161 | 155 (96.2) | 6 (3.7) | 175 | 167 (95.4) | 8 (4.5) | 151 | 146 (96.6) | 5 (3.3) |
|  |  |  |  |  |  |  |  |  |  |
| My mum got married, engaged or began seeing someone else | 37 | 17 (45.9) | 20 (54) | 30 | 7 (23.3) | 23 (76.6) | 24 | 8 (33.3) | 16 (66.6) |
|  |  |  |  |  |  |  |  |  |  |
| Someone broke into my house | 23 | 22 (95.6) | 1 (4.3) | 21 | 18 (85.7) | 3 (14.2) | 15 | 14 (93.3) | 1 (6.6) |
|  |  |  |  |  |  |  |  |  |  |
| Someone in my family left home | 40 | 32 (80) | 8 (20) | 47 | 34 (72.3) | 13 (27.6) | 36 | 21 (58.3) | 15 (41.6) |
|  |  |  |  |  |  |  |  |  |  |
| I was in a fight (not with people in my family) | 103 | 88 (85.4) | 15 (14.5) | 87 | 69 (79.3) | 18 (20.6) | 61 | 47 (77) | 14 (22.9) |
|  |  |  |  |  |  |  |  |  |  |
| I did badly in an important test or exam | 241 | 237 (98.3) | 4 (1.6) | 253 | 246 (97.2) | 7 (2.7) | 212 | 210 (99) | 2 (0.9) |
|  |  |  |  |  |  |  |  |  |  |
| Someone special to me died (who was not in your family) | 64 | 63 (98.4) | 1 (1.5) | 46 | 44 (95.6) | 2 (4.3) | 37 | 36 (97.3) | 1 (2.7) |
|  |  |  |  |  |  |  |  |  |  |
| I was chosen to be a class monitor, prefect or school captain | 160 | 3 (1.8) | 157 (98.1) | 100 | 5 (5) | 95 (95) | 72 | 2 (2.7) | 70 (97.2) |
|  |  |  |  |  |  |  |  |  |  |
| I was seriously told of or punished by a teacher | 117 | 101 (86.3) | 16 (13.6) | 104 | 96 (92.3) | 8 (7.6) | 86 | 78 (90.7) | 8 (9.3) |
|  |  |  |  |  |  |  |  |  |  |
| I took up a new hobby/sport/activity | 322 | 4 (1.2) | 318 (98.7) | 236 | 4 (1.6) | 232 (98.3) | 183 | 0 (0) | 183 (100) |
|  |  |  |  |  |  |  |  |  |  |
| I found out I had to repeat a grade in school | 10 | 7 (70) | 3 (30) | 7 | 4 (57.1) | 3 (42.8) | 3 | 1 (33.3) | 2 (66.6) |
|  |  |  |  |  |  |  |  |  |  |
| Someone special to me was really sick or injured (not in family) | 90 | 87 (96.6) | 3 (3.3) | 69 | 65 (94.2) | 4 (5.8) | 38 | 36 (94.7) | 2 (5.2) |
|  |  |  |  |  |  |  |  |  |  |
| My dad got married, engaged or began seeing someone else | 35 | 14 (40) | 21 (60) | 33 | 19 (57.5) | 14 (42.4) | 21 | 10 (47.6) | 11 (52.3) |
|  |  |  |  |  |  |  |  |  |  |
| I went on a special holiday | 376 | 6 (1.6) | 370 (98.4) | 334 | 6 (1.8) | 328 (98.2) | 308 | 4 (1.3) | 304 (98.7) |
|  |  |  |  |  |  |  |  |  |  |

**Note:** This table displays the number of individuals endorsing each CASE item (at each wave), as well as whether or not they rated it in a positive or negative manner (based on the 6-point Likert scale cut-offs). Percentages highlighted in *red* represent the life events that were rated as *‘negative’* by most individuals (>70%). Conversely, percentages highlighted in *green* represent the life events that were rated as *‘positive’* by most individuals (>70%). Finally, percentages highlighted in *yellow* represent the life events that were rated in a *‘mixed’* way (either positive or negative by 30-70% of the sample); these life events were deemed ‘equivocal,’ and their responding was further scrutinized using logistic regression.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Memory Bias | | | Social Interpretation Bias | | | Non-social Interpretation Bias | | |
|  | | | | | | | | | |
| CASE Items (38) | OR | 95% CI | *p* | OR | 95%CI | *p* | OR | 95%CI | *p* |
|  | | | | | | | | | |
|  | | | | | | | | | |
| We moved house (indep) | 1.08 | 0.43-2.72 | .86 | 0.88 | 0.59-1.32 | .53 | 0.69 | 0.42-1.12 | .13 |
| I (or my team) won a prize, award or contest (dep) | 0.65 | 0.05-8.41 | .74 | 0.72 | 0.52-1.00 | **.047\*** | 2.24 | 0.53-9.42 | .27 |
| **My parent(s) stayed away from home overnight (indep)** | 1.86 | 1.32-2.64 | **4.57E-4\*\*\*** | 1.26 | 1.10-1.44 | **.001\*\*** | 1.38 | 1.17-1.62 | **9.18E-5\*\*\*** |
| **I got a new boyfriend or girlfriend (dep)** | 1.69 | 0.60-4.73 | .32 | 1.76 | 1.27-2.46 | **1.1E-4\*\*\*** | 1.46 | 1.04-2.03 | .02 |
| **My parent(s) started a new job (indep)** | 4.09 | 2.12-7.90 | **2.77E-5\*\*\*** | 1.83 | 1.41-2.38 | **6.30E-6\*\*\*** | 1.43 | 1.01-2.04 | .04 |
| Someone special to me moved away (who is not in your family) (indep) | 0.91 | 0.30-2.77 | .87 | 1.44 | 0.87-2.41 | .16 | 0.79 | 0.38-1.64 | .51 |
| Someone in my family was really sick or injured (indep) | 1.99 | 0.33-11.87 | .45 | 1.38 | 0.82-2.32 | .22 | 0.82 | 0.46-1.46 | .49 |
| My parent(s) had a baby/found out they are going to have a baby (indep) | 0.44 | 0.08-2.33 | .33 | 1.34 | 0.89-2.02 | .16 | 0.91 | 0.48-1.72 | .76 |
| **My parent(s) had to see my school principal (dep)** | 1.31 | 0.59-2.93 | .50 | 1.46 | 1.08-1.99 | **1.3E-4\*\*\*** | 1.49 | 1.06-2.09 | **.002\*\*** |
| **I stayed away from home overnight (ambig)** | 4.08 | 2.34-7.11 | **7.41E-7\*\*\*** | 1.52 | 1.23-1.87 | **7.42E-5\*\*\*** | 1.72 | 1.35-2.20 | **1.11E-5\*\*\*** |
| Someone came to live with our family (indep) | 2.57 | 1.22-5.39 | **.013\*** | 1.2 | 0.92-1.57 | .17 | 1.33 | 0.95-1.86 | .09 |
| I was teased or bullied (ambig) | 0,92 | 0.43-2.00 | .83 | 1.36 | 0.88-2.12 | .16 | 0.93 | 0.62-1.40 | .73 |
| My pet died, got sick, lost or injured (indep) | 0.49 | 0.12-1.96 | .31 | 1.07 | 0.61-1.87 | .81 | 0,55 | 0.34-0.90 | .01 |
| **I had a big argument with someone in our family (dep)** | 1.56 | 0.69-3.52 | .28 | 1.45 | 1.07-1.97 | **1.2E-4\*\*\*** | 0.84 | 0.58-1.22 | .36 |
| I was really sick or injured (ambig) | 1.78 | 0.46-6.92 | .40 | 1.35 | 0.81-2.26 | .24 | 1.21 | 0.72-2.03 | .46 |
| My parent(s) split up (indep) | 0.34 | 0.12-0.98 | **.04\*** | 0.88 | 0.54-1.41 | .58 | 0.55 | 0.29-1.07 | .07 |
| I did well in an important test or exam (dep) | 2.07 | 0.57-7.56 | .27 | 0.91 | 0.50-1.66 | .76 | 1.73 | 1.00-2.99 | .05 |
| My parent(s) lost their job (indep) | 3.17 | 0.43-23.54 | .25 | 0.94 | 0.53-1.69 | .84 | 1 | 0.41-2.44 | .99 |
| I broke up with my boyfriend or girlfriend (dep) | 1.23 | 0.68-2.21 | .49 | 0.98 | 0.78-1.24 | .88 | 0.94 | 0.72-1.22 | .62 |
| **I had a big argument with someone special to me (who is not in your family) (dep)** | 1.34 | 0.52-3.42 | .54 | 1.47 | 1.09-2.00 | **1.2E-4\*\*\*** | 1.11 | 0.82-1.50 | .50 |
| I made a new special friend (dep) | 6.63 | 2.06-21.35 | **.002\*\*** | 1.81 | 1.03-3.18 | **.04\*** | 2.24 | 1.28-3.91 | **.005\*\*** |
| I saw something bad happen (indep) | 0.84 | 0.20-3.61 | .81 | 1.52 | 0.84-2.76 | .16 | 0.72 | 0.34-1.51 | .38 |
| I changed schools (ambig) | 2.86 | 1.16-7.08 | **.02\*** | 1.1 | 0.78-1.55 | .58 | 1.52 | 1.03-2.23 | **.03\*** |
| Someone in the family died (indep) | 0.4 | 0.13-1.21 | .10 | 1.15 | 0.64-2.05 | .64 | 0,68 | 0.39-1.20 | .18 |
| People in the family had a big fight or argument (not including me) (indep) | 0.67 | 0.23-2.00 | .47 | 1.06 | 0.69-1.63 | .79 | 0.64 | 0.44-0.92 | **.02\*** |
| My mum got married, engaged or began seeing someone else (indep) | 0.73 | 0.28-1.89 | .51 | 0.96 | 0.68-1.35 | .81 | 0.91 | 0.56-1.48 | .70 |
| Someone broke into my house (indep) | 0.28 | 0.06-1.42 | .12 | 1.57 | 0.92-2.66 | .09 | 0.85 | 0.46-1.57 | .60 |
| Someone in my family left home (indep) | 1.54 | 0.68-3.48 | .29 | 1.38 | 1.04-1.83 | **.02\*** | 1.29 | 0.86-1.93 | .22 |
| **I was in a fight (not with people in my family) (dep)** | 1.83 | 0.84-3.99 | .13 | 1.66 | 1.25-2.21 | **4.50E-4\*** | 1.54 | 1.09-2.17 | **1.2E-4\*\*\*** |
| **I did badly in an important test or exam (dep)** | 1.01 | 0.28-3.70 | .98 | 1.49 | 0.80-2.77 | .21 | 0.55 | 0.35-0.87 | **1E-4\*\*\*** |
| Someone special to me died (who was not in your family) (indep) | 0.18 | 0.01-3.16 | .24 | 0.93 | 0.37-2.31 | .87 | 0.4 | 0.16-0.95 | **.04\*** |
| I was chosen to be a class monitor, prefect or school captain (dep) | 1.07 | 0.26-4.40 | .92 | 0.89 | 0.46-1.73 | .73 | 2.02 | 0.85-4.82 | .11 |
| I was seriously told of or punished by a teacher (dep) | 1.78 | 0.54-5.87 | .34 | 1.29 | 0.86-1.95 | .21 | 0.79 | 0.57-1.07 | .13 |
| I took up a new hobby/sport/activity (dep) | 1.61 | 0.26-10.01 | .61 | 1.38 | 0.70-2.74 | .35 | 1.03 | 0.47-2.26 | .94 |
| I found out I had to repeat a grade in school (dep) | 0.83 | 0.11-6.43 | .85 | 1.55 | 0.67-3.60 | .30 | 0.73 | 0.25-2.08 | .55 |
| Someone special to me was really sick or injured (who is not in your family) (indep) | 0,35 | 0.09-1.36 | .12 | 1.03 | 0.56-1.90 | .92 | 1.01 | 0.40-2.54 | .99 |
| My dad got married, engaged or began seeing someone else (indep) | 2.14 | 0.90-5.08 | .08 | 1.16 | 0.84-1.60 | .37 | 1.04 | 0.63-1.70 | .89 |
| I went on a special holiday (indep) | 2.54 | 1.02-6.36 | **.04\*** | 1.22 | 0.74-2.01 | .43 | 1.45 | 0.86-2.45 | .17 |
|  | | | | | | | | | |

## **Table S14.** Logistic regression effects of cognitive biases on individual life experiences.

*Note.*\**p* < .05, \*\**p* < .01, \*\*\**p* < .001 (Bonferroni Correction = 0.05/38 = 0.0013). Contaminated (i.e., significantly predicted) items are highlighted in bold.

## **Table S15.** Uncontaminated and Contaminated Life Experiences.

|  |  |
| --- | --- |
| Uncontaminated CASE items (29) | Contaminated CASE items (9) |
|  | |
| We moved house |  |
| I (or my team) won a prize, award or contest |  |
|  | My parent(s) stayed away from home overnight |
|  | I got a new boyfriend or girlfriend |
|  | My parent(s) started a new job |
| Someone special to me moved away  (who is not in your family) |  |
| Someone in my family was really sick or injured |  |
| My parent(s) had a baby/found out they are going to have a baby |  |
|  | My parent(s) had to see my school principal |
|  | I stayed away from home overnight |
| Someone came to live with our family |  |
| I was teased or bullied |  |
| My pet died, got sick, lost or injured |  |
|  | I had a big argument with someone in our family |
| I was really sick or injured |  |
| My parent(s) split up |  |
| I did well in an important test or exam |  |
| My parent(s) lost their job |  |
| I broke up with my boyfriend or girlfriend |  |
|  | I had a big argument with someone special to me  (who is not in your family) |
| I made a new special friend |  |
| I saw something bad happen |  |
| I changed schools |  |
| Someone in the family died |  |
| People in the family had a big fight or argument (not including me) |  |
| My mum got married, engaged or began seeing someone else |  |
| Someone broke into my house |  |
| Someone in my family left home |  |
|  | I was in a fight (not with people in my family) |
|  | I did badly in an important test or exam |
| Someone special to me died (who was not in your family) |  |
| I was chosen to be a class monitor, prefect or school captain |  |
| I was seriously told of or punished by a teacher |  |
| I took up a new hobby/sport/activity |  |
| I found out I had to repeat a grade in school |  |
| Someone special to me was really sick or injured  (who is not in your family) |  |
| My dad got married, engaged or began seeing someone else |  |
| I went on a special holiday |  |
|  | |

## **Table S16.** Uncontaminated effects of (positive/negative) life experiences on cognitive biases.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ssssssssssssssssssssss | Memory Bias | | | | Positive Recall | | | | | Social Interpretation Bias | | | | | | | | Positive Social Interpretation | | | | | | |
|  | | | | | | | | |  | | | | | | | |  | | | | | | |
|  | 95% CI | |  |  | 95% CI | |  |  | | | 95% CI | | |  | |  | | | 95% CI | |  | |
| *β* |  | | *p (FDR)* | *β* |  | | *p (FDR)* | *β* | | |  | | | *p (FDR)* | | *β* | | |  | | *p (FDR)* | |
|  | |  | |  | | |  | | |  | |  | |
|  |  | Lower | Upper |  |  | Lower | Upper |  |  | | | Lower | Upper | |  | |  | | | Lower | Upper |  | |
|  |  |  | |  |  |  | |  |  | | | | | | | |  | | | | | | |
|  | | | | | | | | | | | | | | | | |  | | | | | | |
| *Positive Life Experiences* | -.06 | -.14 | -.02 | **6.2E-4\*** | .08 | .02 | .13 | **7.1E-6\*** | -.09 | | -.14 | | | -.04 | | **4.5E-5\*** | .07 | | .02 | | .13 | | **1.4E-4\*** |
| *Negative Life Experiences* | .01 | -.03 | .04 | .62 | .01 | -.02 | .10 | .06 | -.03 | | -.04 | | | .14 | | .51 | .04 | | .01 | | .12 | | .05 |
|  | | | | | | | | | | | | | | | | |  | | | | | | |

***Note.*** *β*, standardized regression coefficient in SD; 95% CI, confidence intervals; *p*, FDR-adjusted *p* value for regression coefficient.

Each cognitive bias (outcome) was regressed, in turn, on negative and positive life experiences in a *random intercepts* model, while adjusting for age, gender, random time, depression, and anxiety scores.

\**p* < .05 (two-sided) after Benjamini-Hochberg FDR adjustment.

## **Table S17.** Uncontaminated GxE interaction effects on cognitive biases.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ssssssssssssssssssssss | Social Interpretation Bias | | | | Positive Social Interpretation | | | | | Positive Non-Social Interpretation | | | | | | |
|  | | | | | | | | |  | | | | | | |
|  | 95% CI | |  |  | 95% CI | |  |  | | | 95% CI | | |  | |
| *β* |  | | *p (FDR)* | *β* |  | | *p (FDR)* | *β* | | |  | | | *p (FDR)* | |
|  | |  | |  | | |
|  |  | Lower | Upper |  |  | Lower | Upper |  |  | | | Lower | Upper | |  | |
|  |  |  | |  |  |  | |  |  | | | | | | | |
|  | | | | | | | | | | | | | | | | |
| *PRS 0.01 x PLE* | -.06 | -.09 | -.04 | **3.1E-2\*** | .08 | .01 | .10 | **2.2E-2\*** | .05 | | .01 | | | .12 | | .08 |
| *PRS 0.05 x PLE* | -.06 | -.10 | -.02 | **2.1E-3\*** | .10 | .05 | .14 | **1.1E-3\*** | .05 | | .03 | | | .15 | | .08 |
| *PRS 0.1 x PLE* | -.06 | -.11 | -.02 | **1.4E-2\*** | .10 | .06 | .16 | **2.4E-4\*** | .10 | | .04 | | | .15 | | **4.0E-2\*** |
| *PRS 0.2 x PLE* | -.07 | -.11 | -.02 | **7.4E-3\*** | .08 | .05 | .15 | **1.3E-3\*** | .05 | | .01 | | | .13 | | .07 |
| *PRS 0.3 x PLE* | -.07 | -.11 | -.02 | **4.2E-3\*** | .08 | .03 | .14 | **3.1E-3\*** | - | | - | | | - | | - |
| *PRS 0.4 x PLE* | -.07 | -.11 | -.02 | **3.2E-3\*** | .09 | .03 | .14 | **4.5E-3\*** | - | | - | | | - | | - |
| *PRS 0.5 x PLE* | -.07 | -.11 | -.02 | **4.2E-3\*** | .08 | .03 | .14 | **6.2E-3\*** | - | | - | | | - | | - |
| *PRS 1.00 x PLE* | -.07 | -.11 | -.02 | **5.8E-3\*** | .08 | .03 | .14 | **6.2E-3\*** | - | | - | | | - | | - |
|  | | | | | | | | | | | | | | | | |

***Note.*** PRS, Polygenic Risk Scores; PLE, Positive Life Experiences; *β*, standardized regression coefficient in SD; 95% CI, confidence intervals; *p*, *p* value for regression coefficient.

Each cognitive bias (outcome) was regressed on the denoted (fixed) GxE interaction effect in a random intercepts model, while adjusting for age, gender, random time, depression, and anxiety scores.

\**p* < .05 (two-sided) after Benjamini-Hochberg FDR adjustment.

## **Table S18.** Uncontaminated simple slope effects of significant GxE interaction effects.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ssssssssssssssssssssss | Social Interpretation Bias | | | | Positive Social Interpretation | | | | | Positive Non-Social Interpretation | | | | | | | |
|  | | | | | | | | |  | | | | | | | |
|  | 95% CI | |  |  | 95% CI | |  |  | | | 95% CI | | |  | |
| *β* |  | | *p (FDR)* | *β* |  | | *p (FDR)* | *β* | | |  | | | *p (FDR)* | |
|  | |  | |  | | |
|  |  | Lower | Upper |  |  | Lower | Upper |  |  | | | Lower | Upper | |  | |
| *HIGH PRS QUARTILE* |  |  | |  |  |  | |  |  | | | | | | | |
|  | | | | | | | | | | | | | | | | |
| *PRS 0.01 x PLE* | -.14 | -.22 | -.06 | **2.1E-4\*** | .16 | .08 | .25 | **1.2E-4\*** | - | | - | | | - | | - |
| *PRS 0.05 x PLE* | -.12 | -.20 | -.04 | **2.6E-3\*** | .18 | .09 | .26 | **4.2E-5\*** | - | | - | | | - | | - |
| *PRS 0.1 x PLE* | -.14 | -.22 | -.08 | **1.1E-4\*** | .20 | .11 | .28 | **4.2E-6\*** | .06 | | .02 | | | .20 | | .05 |
| *PRS 0.2 x PLE* | -.14 | -.21 | -.06 | **2.4E-4\*** | .16 | .10 | .26 | **4.8E-5\*** | - | | - | | | - | | - |
| *PRS 0.3 x PLE* | -.11 | -.19 | -.04 | **3.4E-3\*** | .15 | .08 | .26 | **1.8E-4\*** | - | | - | | | - | | - |
| *PRS 0.4 x PLE* | -.11 | -.20 | -.03 | **4.4E-3\*** | .15 | .07 | .25 | **2.6E-4\*** | - | | - | | | - | | - |
| *PRS 0.5 x PLE* | -.11 | -.20 | -.04 | **3.4E-3\*** | .15 | .07 | .25 | **2.6E-4\*** | - | | - | | | - | | - |
| *PRS 1.00 x PLE* | -.11 | -.19 | -.03 | **3.1E-3\*** | .15 | .08 | .25 | **4.4E-4\*** | - | | - | | | - | | - |
|  | | | | | | | | | | | | | | | | |

***Note.*** PRS, Polygenic Risk Scores (at high quartile); PLE, Positive Life Experiences; *β*, standardized regression coefficient in SD; 95% CI, confidence intervals; *p*, *p* value for regression coefficient.

Simple slopes of the significant GxE interaction effects, conditional on the high PRS quartile, in a random intercepts model while adjusting for age, gender, random time, depression and anxiety scores.

\**p* < .05 (two-sided) after Benjamini-Hochberg FDR adjustment.

# **Appendix S8. Reverse-Causality sensitivity check**

A reverse-causality bias, whereby life experiences were ‘caused’ by particular cognitive biases, rather than vice versa, may have also occurred. To examine this possibility of reverse-causality, we separated the ‘independent,’ ‘dependent,’ and ‘ambiguous’ life experiences. ‘Independent’ life events are those that are thought to occur independent of one’s own actions (e.g., ‘Someone in my family was really sick or injured’). Conversely, ‘dependent’ life events are those that are thought to emerge partly or completely due to one’s own behaviour (e.g., ‘I broke up with my boyfriend/girlfriend). Finally, ‘ambiguous’ life experiences are undetermined (e.g., ‘I changed schools’) (see Allen & Rapee, 2012, for a discussion) (see Table S13).

To examine our results vis-à-vis this case of reverse-causality, we repeated our primary significant analyses, while excluding the ‘dependent’ and ‘ambiguous’ life experiences (which may have been affected by pre-existing cognitive biases) and the previous ‘contaminated’ ones (Table S13). This led to a reduced CASE measure of 18 items (see Table S14.). Despite reduced power, most results remained intact, with the exception of the: (1) collider effect (negative life experiences predicting the positive social interpretation bias) (see Table S15); (2) positive GxE effect to the positive non-social interpretation bias (see Table S16); and (3) negative GxE effect to the social interpretation bias (which was significant at only four thresholds) (Table S16).

## **Table S19.** Independent, Dependent, and Ambiguous life experiences.

|  |  |  |
| --- | --- | --- |
| Independent CASE items (20) | Dependent CASE items (14) | Ambiguous CASE items (4) |
|  | |  |
| We moved house |  |  |
|  | I (or my team) won a prize, award or contest |  |
| My parent(s) stayed away from home overnight |  |  |
|  | I got a new boyfriend or girlfriend |  |
| My parent(s) started a new job |  |  |
| Someone special to me moved away  (who is not in your family) |  |  |
| Someone in my family was really sick or injured |  |  |
| My parent(s) had a baby/found out they are going to have a baby |  |  |
|  | My parent(s) had to see my school principal |  |
|  |  | I stayed away from home overnight |
| Someone came to live with our family |  |  |
|  |  | I was teased or bullied |
| My pet died, got sick, lost or injured |  |  |
|  | I had a big argument with someone in our family |  |
|  |  | I was really sick or injured |
| My parent(s) split up |  |  |
|  | I did well in an important test or exam |  |
| My parent(s) lost their job |  |  |
|  | I broke up with my boyfriend or girlfriend |  |
|  | I had a big argument with someone special to me  (who is not in your family) |  |
|  | I made a new special friend |  |
| I saw something bad happen |  |  |
|  |  | I changed schools |
| Someone in the family died |  |  |
| People in the family had a big fight or argument (not including me) |  |  |
| My mum got married, engaged or began seeing someone else |  |  |
| Someone broke into my house |  |  |
| Someone in my family left home |  |  |
|  | I was in a fight (not with people in my family) |  |
|  | I did badly in an important test or exam |  |
| Someone special to me died (who was not in your family) |  |  |
|  | I was chosen to be a class monitor, prefect or school captain |  |
|  | I was seriously told of or punished by a teacher |  |
|  | I took up a new hobby/sport/activity |  |
|  | I found out I had to repeat a grade in school |  |
| Someone special to me was really sick or injured  (who is not in your family) |  |  |
| My dad got married, engaged or began seeing someone else |  |  |
| I went on a special holiday |  |  |
|  | |  |

## **Table S20.** Pure (i.e., independent, and uncontaminated) life experiences.

|  |
| --- |
| ‘Pure’ CASE items (18) |
|  |
| We moved house |
|  |
|  |
|  |
|  |
| Someone special to me moved away  (who is not in your family) |
| Someone in my family was really sick or injured |
| My parent(s) had a baby/found out they are going to have a baby |
|  |
|  |
| Someone came to live with our family |
|  |
| My pet died, got sick, lost or injured |
|  |
|  |
| My parent(s) split up |
|  |
| My parent(s) lost their job |
|  |
|  |
|  |
| I saw something bad happen |
|  |
| Someone in the family died |
| People in the family had a big fight or argument (not including me) |
| My mum got married, engaged or began seeing someone else |
| Someone broke into my house |
| Someone in my family left home |
|  |
|  |
| Someone special to me died (who was not in your family) |
|  |
|  |
|  |
|  |
| Someone special to me was really sick or injured  (who is not in your family) |
| My dad got married, engaged or began seeing someone else |
| I went on a special holiday |
|  |

## **Table S21.** Pure effects of (positive/negative) life experiences on cognitive biases.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ssssssssssssssssssssss | Memory Bias | | | | Positive Recall | | | | | Social Interpretation Bias | | | | | | | | Positive Social Interpretation | | | | | | |
|  | | | | | | | | |  | | | | | | | |  | | | | | | |
|  | 95% CI | |  |  | 95% CI | |  |  | | | 95% CI | | |  | |  | | | 95% CI | |  | |
| *β* |  | | *p (FDR)* | *β* |  | | *p (FDR)* | *β* | | |  | | | *p (FDR)* | | *β* | | |  | | *p (FDR)* | |
|  | |  | |  | | |  | | |  | |  | |
|  |  | Lower | Upper |  |  | Lower | Upper |  |  | | | Lower | Upper | |  | |  | | | Lower | Upper |  | |
|  |  |  | |  |  |  | |  |  | | | | | | | |  | | | | | | |
|  | | | | | | | | | | | | | | | | |  | | | | | | |
| *Positive Life Experiences* | -.05 | -.12 | -.02 | **5.1E-4\*** | .08 | 0.6 | .16 | **6.0E-6\*** | -.08 | | -.14 | | | -.04 | | **2.3E-5\*** | .07 | | .03 | | .14 | | **1.0E-4\*** |
| *Negative Life Experiences* | .01 | -.04 | .06 | .14 | .02 | 0.1 | .16 | .06 | -.02 | | -.06 | | | .07 | | .10 | .03 | | .01 | | .12 | | .07 |
|  | | | | | | | | | | | | | | | | |  | | | | | | |

***Note.*** *β*, standardized regression coefficient in SD; 95% CI, confidence intervals; *p*, FDR-adjusted *p* value for regression coefficient.

Each cognitive bias (outcome) was regressed, in turn, on negative and positive life experiences in a *random intercepts* model, while adjusting for age, gender, random time, depression, and anxiety scores.

\**p* < .05 (two-sided) after Benjamini-Hochberg FDR adjustment.

## **Table S22.** Pure GxE interaction effects on cognitive biases.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ssssssssssssssssssssss | Social Interpretation Bias | | | | Positive Social Interpretation | | | | | Positive Non-Social Interpretation | | | | | | |
|  | | | | | | | | |  | | | | | | |
|  | 95% CI | |  |  | 95% CI | |  |  | | | 95% CI | | |  | |
| *β* |  | | *p (FDR)* | *β* |  | | *p (FDR)* | *β* | | |  | | | *p (FDR)* | |
|  | |  | |  | | |
|  |  | Lower | Upper |  |  | Lower | Upper |  |  | | | Lower | Upper | |  | |
|  |  |  | |  |  |  | |  |  | | | | | | | |
|  | | | | | | | | | | | | | | | | |
| *PRS 0.01 x PLE* | -.04 | -.10 | 0 | .07 | .07 | .04 | .16 | **3.2E-2\*** | .04 | | .01 | | | .13 | | .07 |
| *PRS 0.05 x PLE* | -.04 | -.11 | -.01 | .06 | .08 | .04 | .17 | **1.6E-3\*** | .05 | | .03 | | | .16 | | .06 |
| *PRS 0.1 x PLE* | -.07 | -.12 | -.01 | **3.4E-2\*** | .08 | .04 | .17 | **2.8E-4\*** | .05 | | .04 | | | .16 | | .05 |
| *PRS 0.2 x PLE* | -.07 | -.13 | -.01 | **3.2E-2\*** | .07 | .04 | .18 | **1.6E-3\*** | .04 | | .01 | | | .14 | | .08 |
| *PRS 0.3 x PLE* | -.06 | -.13 | 0 | **4.2E-2\*** | .07 | .02 | .18 | **3.4E-3\*** | - | | - | | | - | | - |
| *PRS 0.4 x PLE* | -.06 | -.13 | 0 | **4.1E-2\*** | .08 | .02 | .18 | **4.8E-3\*** | - | | - | | | - | | - |
| *PRS 0.5 x PLE* | -.04 | -.13 | 0 | .06 | .07 | .02 | .17 | **7.0E-3\*** | - | | - | | | - | | - |
| *PRS 1.00 x PLE* | -.04 | -.13 | 0 | .06 | .07 | .02 | .17 | **7.2E-3\*** | - | | - | | | - | | - |
|  | | | | | | | | | | | | | | | | |

***Note.*** PRS, Polygenic Risk Scores; PLE, Positive Life Experiences; *β*, standardized regression coefficient in SD; 95% CI, confidence intervals; *p*, *p* value for regression coefficient.

Each cognitive bias (outcome) was regressed on the denoted (fixed) GxE interaction effect in a random intercepts model, while adjusting for age, gender, random time, depression, and anxiety scores.

\**p* < .05 (two-sided) after Benjamini-Hochberg FDR adjustment.

## **Table S23.** Pure simple slope effects of significant GxE interaction effects.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ssssssssssssssssssssss | Social Interpretation Bias | | | | Positive Social Interpretation Bias | | | | | Positive Non-Social Interpretation | | | | | | | |
|  | | | | | | | | |  | | | | | | | |
|  | 95% CI | |  |  | 95% CI | |  |  | | | 95% CI | | |  | |
| *β* |  | | *p (FDR)* | *β* |  | | *p (FDR)* | *β* | | |  | | | *p (FDR)* | |
|  | |  | |  | | |
|  |  | Lower | Upper |  |  | Lower | Upper |  |  | | | Lower | Upper | |  | |
| *HIGH PRS QUARTILE* |  |  | |  |  |  | |  |  | | | | | | | |
|  | | | | | | | | | | | | | | | | |
| *PRS 0.01 x PLE* | - | - | - | **-** | .14 | .06 | .28 | **1.4E-4\*** | - | | - | | | - | | - |
| *PRS 0.05 x PLE* | - | - | - | **-** | .14 | .08 | .29 | **4.4E-5\*** | - | | - | | | - | | - |
| *PRS 0.1 x PLE* | -.13 | -.20 | -.08 | **1.8E-3\*** | .16 | .10 | .32 | **4.4E-6\*** | - | | - | | | - | | - |
| *PRS 0.2 x PLE* | -.12 | -.20 | -.04 | **3.3E-3\*** | .13 | .08 | .28 | **5.0E-5\*** | - | | - | | | - | | - |
| *PRS 0.3 x PLE* | -.09 | -.16 | -.02 | **4.6E-2\*** | .13 | .06 | .28 | **2.1E-4\*** | - | | - | | | - | | - |
| *PRS 0.4 x PLE* | -.09 | -.16 | -.02 | **4.6E-2\*** | .13 | .06 | .28 | **2.8E-4\*** | - | | - | | | - | | - |
| *PRS 0.5 x PLE* | - | - | - | **-** | .13 | .06 | .28 | **2.8E-4\*** | - | | - | | | - | | - |
| *PRS 1.00 x PLE* |  |  |  |  | .13 | .06 | .28 | **4.8E-4\*** | - | | - | | | - | | - |
|  | | | | | | | | | | | | | | | | |

***Note.*** PRS, Polygenic Risk Scores (at high quartile); PLE, Positive Life Experiences; *β*, standardized regression coefficient in SD; 95% CI, confidence intervals; *p*, *p* value for regression coefficient.

Simple slopes of the significant GxE interaction effects, conditional on the high PRS quartile, in a random intercepts model while adjusting for age, gender, random time, depression, and anxiety scores.

\**p* < .05 (two-sided) after Benjamini-Hochberg FDR adjustment.

# **Appendix S9. Unadjusted Sensitivity Analyses**

Following the suggestion of an anonymous reviewer, we conducted our sensitivity analyses on the psychopathology-unadjusted version of our models. Thus, we excluded the ‘contaminated,’ ‘dependent,’ and ‘ambiguous’ life events (see Appendices S7, S8) and repeated our significant unadjusted models (Appendix S6). The results revealed that most effects remained significant, with the exception of: (1) several vantage effects on the ***Social Interpretation Bias*** (Table S25); (2) no vantage effects on the *positive nonsocial interpretation* (Table S25); and finally (3) some diathesis-stress patterns on negative recall (Table S27).

## **Table S24.** Pure and unadjusted effects of (positive/negative) life experiences on cognitive biases.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ***Memory Bias*** | | | | | Negative Recall | | | | Positive Recall | | | | | | ***Social Interpretation Bias*** | | | | Negative Social Interpretation | | | | | | Positive Social Interpretation | | | | |
|  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | 95% CI | | |  |  | 95% CI | |  | |  | 95% CI | |  |  | | 95% CI | |  | |  | 95% CI | |  | |  | 95% CI | |  |
| *β* |  | | | *p (FDR)* | *β* |  | | *p (FDR)* | | *β* |  | | *p (FDR)* | *β* | |  | | *p (FDR)* | | *β* |  | | *p (FDR)* | | *β* |  | | *p (FDR)* |
|  | | |  | |  |  | |  | |  |  | |  |  | |
|  |  | Lower | Upper | |  |  | Lower | Upper |  | |  | Lower | Upper |  |  | | Lower | Upper |  | |  | Lower | Upper |  | |  | Lower | Upper |  |
|  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  | |  |  |  |  | |  |  |  |  |
|  |  |  |  | |  |  |  |  |  | |  |  |  |  |  | |  |  |  | |  |  |  |  | |  |  |  |  |
| *Positive Life Experiences* | -.06 | -.10 | -.02 | | **1.3E-4\*** | -.01 | -.04 | .01 | .36 | | .08 | .02 | .12 | **3.1E-5\*** | -.09 | | -.13 | -.05 | **4.1E-5\*** | | -.04 | -.08 | 0.1 | .06 | | .08 | .01 | .12 | **4.2E-5\*** |
| *Negative Life Experiences* | .09 | .01 | .12 | | **3.4E-4\*** | .10 | .02 | .14 | **6.1E-5\*** | | .03 | -.02 | .06 | .40 | .08 | | .02 | .14 | **3.6E-4\*** | | .10 | .04 | .18 | **4.2E-5\*** | | .04 | 0 | .12 | .06 |
|  | | | |  | | | | | | | | | | | | | | | | |  | | | |  | | | | |

***Note.*** *β*, standardized regression coefficient; 95% CI, confidence intervals; *p*, *p* value for regression coefficient.

Re-analyses of main statistical models (examining the effects of life events), excluding psychopathology.

\**p* < .05 (two-sided) after Benjamini-Hochberg FDR adjustment.

## **Table S25.** Pure and unadjusted vantage GxE effects on cognitive biases.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Social Interpretation Bias | | | | *Positive Social Interpretation* | | | | | *Positive Non-Social Interpretation* | | | | | | |
|  | | | | | | | | |  | | | | | | |
|  | 95% CI | |  |  | 95% CI | |  |  | | | 95% CI | | |  | |
| *β* |  | | *p (FDR)* | *β* |  | | *p (FDR)* | *β* | | |  | | | *p (FDR)* | |
|  | |  | |  | | |
|  |  | Lower | Upper |  |  | Lower | Upper |  |  | | | Lower | Upper | |  | |
|  |  |  | |  |  |  | |  |  | | | | | | | |
|  | | | | | | | | | | | | | | | | |
| *PRS 0.001 x PLE* | - | - | - | - | - | - | - | - | - | | - | | | - | | - |
| *PRS 0.01 x PLE* | -.01 | -.06 | 0 | .06 | .05 | .01 | .13 | **2.2E-2\*** | .04 | | 0 | | | .10 | | .08 |
| *PRS 0.05 x PLE* | -.03 | -.08 | -.02 | .04 | .08 | .04 | .15 | **4.7E-3\*** | .04 | | 0 | | | .10 | | .10 |
| *PRS 0.1 x PLE* | -.04 | -.09 | -.03 | **1.1E-2\*** | .08 | .04 | .15 | **1.3E-2\*** | .02 | | -.02 | | | .08 | | .07 |
| *PRS 0.2 x PLE* | -.05 | -.10 | -.04 | **7.8E-3\*** | .06 | .02 | .14 | **4.2E-3\*** | .03 | | -.01 | | | .09 | | .06 |
| *PRS 0.3 x PLE* | -.05 | -.10 | -.04 | **3.5E-2\*** | .06 | .02 | .14 | **2.4E-2\*** | - | | - | | | - | | - |
| *PRS 0.4 x PLE* | -.04 | -.10 | -.03 | **3.1E-2\*** | .06 | .02 | .14 | **3.2E-2\*** | - | | - | | | - | | - |
| *PRS 0.5 x PLE* | -.01 | -.06 | .01 | .08 | .06 | .02 | .14 | **4.3E-2\*** | - | | - | | | - | | - |
| *PRS 1.00 x PLE* | -.01 | -.06 | .01 | .05 | .02 | -.01 | .13 | 0.06 | - | | - | | | - | | - |
|  | | | | | | | | | | | | | | | | |

***Note.*** PRS, Polygenic Risk Scores; PLE, Positive Life Experiences; *β*, standardized regression coefficient in SD; 95% CI, confidence intervals; *p*, *p* value for regression coefficient.

Re-analyses of main statistical models (examining the effects of polygenic risk for depression), excluding psychopathology.

\**p* < .05 (two-sided) after Benjamini-Hochberg FDR adjustment.

## **Table S26.** Pure and unadjusted simple slope effects of significant vantage GxE effects on cognitive biases.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Social Interpretation Bias | | | | *Positive Social Interpretation* | | | | | *Positive Non-Social Interpretation* | | | | | | | |
|  | | | | | | | | |  | | | | | | | |
|  | 95% CI | |  |  | 95% CI | |  |  | | | 95% CI | | |  | |
| *β* |  | | *p (FDR)* | *β* |  | | *p (FDR)* | *β* | | |  | | | *p (FDR)* | |
|  | |  | |  | | |
|  |  | Lower | Upper |  |  | Lower | Upper |  |  | | | Lower | Upper | |  | |
| *HIGH PRS QUARTILE* |  |  | |  |  |  | |  |  | | | | | | | |
|  | | | | | | | | | | | | | | | | |
| *PRS 0.001 x PLE* | - | - | - | - | - | - | - | **-** | - | | - | | | - | | - |
| *PRS 0.01 x PLE* | - | - | - | **-** | .14 | .06 | .22 | **3.1E-5\*** | - | | - | | | - | | - |
| *PRS 0.05 x PLE* | - | - | - | **-** | .15 | .07 | .23 | **7.5E-5\*** | - | | - | | | - | | - |
| *PRS 0.1 x PLE* | -.10 | -.22 | -.06 | **3.1E-4\*** | .16 | .08 | .24 | **3.3E-4\*** | - | | - | | | - | | **-** |
| *PRS 0.2 x PLE* | -.10 | -.22 | -.06 | **3.6E-4\*** | .16 | .08 | .24 | **6.4E-5\*** | - | | - | | | - | | - |
| *PRS 0.3 x PLE* | -.08 | -.16 | -.04 | **7.2E-3\*** | .14 | .06 | .22 | **8.4E-4\*** | - | | - | | | - | | - |
| *PRS 0.4 x PLE* | -.08 | -.16 | -.04 | **6.4E-4\*** | .12 | .04 | .20 | **9.1E-4\*** | - | |  | | |  | |  |
| *PRS 0.5 x PLE* | - | - | - | **-** | .12 | .04 | .20 | **3.6E-5\*** | - | |  | | |  | |  |
| *PRS 1.00 x PLE* | - | - | - | - | - | - | - | **-** | - | |  | | |  | |  |
|  | | | | | | | | | | | | | | | | |

***Note.*** PRS, Polygenic Risk Scores (at high quartile); PLE, Positive Life Experiences; *β*, standardized regression coefficient in SD; 95% CI, confidence intervals; *p*, *p* value for regression coefficient.

Re-analyses of main statistical models (examining the effects of polygenic risk for depression), excluding psychopathology.

\**p* < .05 (two-sided) after Benjamini-Hochberg FDR adjustment.

## **Table S27.** Pure and unadjusted diathesis-stress GxE effects on cognitive biases.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Negative Recall | | | | Social Interpretation | | | | | Negative Social Interpretation | | | | | | |
|  | | | | | | | | |  | | | | | | |
|  | 95% CI | |  |  | 95% CI | |  |  | | | 95% CI | | |  | |
| *β* |  | | *p (FDR)* | *β* |  | | *p (FDR)* | *β* | | |  | | | *p (FDR)* | |
|  | |  | |  | | |
|  |  | Lower | Upper |  |  | Lower | Upper |  |  | | | Lower | Upper | |  | |
|  |  |  | |  |  |  | |  |  | | | | | | | |
|  | | | | | | | | | | | | | | | | |
| *PRS 0.001 x NLE* | - | - | - | - | - | - | - | - | - | | - | | | - | | - |
| *PRS 0.01 x NLE* | - | - | - | - | .04 | .01 | .10 | **3.5E-2\*** | .06 | | .02 | | | .14 | | **3.4E-3\*** |
| *PRS 0.05 x NLE* | .03 | .01 | .09 | **3.2E-2\*** | .04 | .01 | .10 | **2.4E-2\*** | .06 | | .02 | | | .14 | | **1.1E-3\*** |
| *PRS 0.1 x NLE* | .04 | .02 | .10 | **1.6E-2\*** | .06 | .03 | .12 | **1.4E-3\*** | .06 | | .02 | | | .14 | | **2.2E-3\*** |
| *PRS 0.2 x NLE* | .03 | .01 | .09 | **2.2E-2\*** | .06 | .03 | .12 | **6.2E-3\*** | .07 | | .03 | | | .15 | | **4.6E-3\*** |
| *PRS 0.3 x NLE* | .02 | 0 | .08 | **3.1E-2\*** | .06 | .03 | .12 | **4.5E-3\*** | .05 | | .01 | | | .13 | | **6.2E-3\*** |
| *PRS 0.4 x NLE* | .02 | 0 | .08 | .05 | .03 | 0 | .10 | .05 | .05 | | .01 | | | .13 | | **2.3E-3\*** |
| *PRS 0.5 x NLE* | - | - | - | - | .03 | 0 | .10 | .07 | .05 | | .01 | | | .14 | | **5.4E-3\*** |
| *PRS 1.00 x NLE* | - | - | - | - | - | - | - | - | .04 | | 0 | | | .12 | | **3.2E-2\*** |
|  | | | | | | | | | | | | | | | | |

***Note.*** PRS, Polygenic Risk Scores; NLE, Negative Life Experiences; *β*, standardized regression coefficient in SD; 95% CI, confidence intervals; *p*, *p* value for regression coefficient.

Re-analyses of main statistical models (examining the effects of polygenic risk for depression), excluding psychopathology.

\**p* < .05 (two-sided) after Benjamini-Hochberg FDR adjustment.

## **Table S28.** Pure and unadjusted simple slope effects of significant diathesis-stress GxE effects on cognitive biases.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Negative Recall | | | | Social Interpretation | | | | | Negative Social Interpretation | | | | | | |
|  | | | | | | | | |  | | | | | | |
|  | 95% CI | |  |  | 95% CI | |  |  | | | 95% CI | | |  | |
| *β* |  | | *p (FDR)* | *β* |  | | *p (FDR)* | *β* | | |  | | | *p (FDR)* | |
|  | |  | |  | | |
|  |  | Lower | Upper |  |  | Lower | Upper |  |  | | | Lower | Upper | |  | |
|  |  |  | |  |  |  | |  |  | | | | | | | |
|  | | | | | | | | | | | | | | | | |
| *PRS 0.001 x NLE* |  | - | - | - | - | - | - | - |  | |  | | |  | |  |
| *PRS 0.01 x NLE* |  |  |  |  | .12 | .04 | .20 | **1.2E-3\*** | .10 | | .02 | | | .18 | | **4.2E-3\*** |
| *PRS 0.05 x NLE* | .14 | .06 | .22 | **4.1E-3\*** | .12 | .04 | .22 | **2.4E-4\*** | .10 | | .02 | | | .18 | | **1.4E-3\*** |
| *PRS 0.1 x NLE* | .12 | .04 | .20 | **3.4E-3\*** | .10 | .02 | .18 | **3.6E-3\*** | .13 | | .05 | | | .21 | | **2.3E-4\*** |
| *PRS 0.2 x NLE* | .12 | .04 | .20 | **4.1E-3\*** | .11 | .03 | .19 | **2.6E-3\*** | .13 | | .05 | | | .21 | | **2.5E-4\*** |
| *PRS 0.3 x NLE* | .15 | .07 | .23 | **1.5E-4\*** | .11 | .03 | .19 | **1.4E-3\*** | .13 | | .05 | | | .21 | | **2.1E-4\*** |
| *PRS 0.4 x NLE* | .12 | .04 | .20 | **2.4E-4\*** | .10 | .02 | .18 | **1.6E-3\*** | .12 | | .04 | | | .20 | | **2.2E-4\*** |
| *PRS 0.5 x NLE* |  |  |  |  | .12 | .04 | .22 | **2.2E-3\*** | .11 | | .03 | | | .19 | | **4.4E-3\*** |
| *PRS 1.00 x NLE* |  |  |  |  |  |  |  |  | .11 | | .03 | | | .19 | | **5.1E-3\*** |
|  | | | | | | | | | | | | | | | | |

***Note.*** PRS, Polygenic Risk Scores; NLE, Negative Life Experiences; *β*, standardized regression coefficient in SD; 95% CI, confidence intervals; *p*, *p* value for regression coefficient.

Re-analyses of main statistical models (examining the effects of polygenic risk for depression), excluding psychopathology.

\**p* < .05 (two-sided) after Benjamini-Hochberg FDR adjustment.

# **Appendix S10. Preregistration and Online Supplement**

The current study (including its background information, rationale, and research questions and hypotheses) was preregistered on May 25, 2021 (see <https://doi.org/10.17605/OSF.IO/254JG>). Code, as well as additional supplementary information (for instance, non-significant findings), can be found online on the Open Science Framework: <https://osf.io/67ngd/>.

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