**Supplementary Table 1.** Differences in performance of the executive function tasks among the ASD, unaffected sibling, and control groups controlling for age, sex and ADHD symptoms

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Mean (SD) | 1.ASD(N=240) | 2.Sibling(N=147) | 3.Control(N=240) |  | ANCOVA† | ANCOVA§ |
| F | Comparison | F | Comparison |
| **Digit Span (Verbal Working Memory)** |  |  |  |  |  |  |
| Digit span, forward | 7.74(1.20) | 7.99(1.07) | 8.42(0.83) | 27.38\*\*\* | 1<2<3 | 18.72\*\*\* | 1,2<3 |
| Digit span, backward | 4.94(1.73) | 5.19(1.87) | 6.12(1.63) | 36.06\*\*\* | 1,2<3 | 22.68\*\*\* | 1,2<3 |
| **Intra-dimension/Extra-dimension Shift** |  |  |  |  |  |  |  |
| Extra-dimensional shift errors  | 10.54(12.33) | 7.29(8.12) | 7.37(8.07) | 8.82\*\*\* | 1>2,3 | 5.83\*\* | 1>2,3 |
| Total errors (adjusted) | 29.56(28.95) | 19.37(15.76) | 20.20(19.95) | 10.92\*\*\* | 1>2,3 | 10.92\*\*\* | 1>2,3 |
| **Spatial Span** |  |  |  |  |  |  |  |
| Span length | 6.40(1.76) | 6.96(1.64) | 7.22(1.55) | 25.45\*\*\* | 1<2,3 | 17.66\*\*\* | 1<2,3 |
| Total usage errors | 1.92(1.85) | 1.64(1.77) | 1.33(1.40) | 11.69\*\*\* | 1>3 | 5.52\*\* | 1>3 |
| **Spatial Working Memory** |  |  |  |  |  |  |  |
| Strategy utilization | 34.51(5.25) | 33.04(5.25) | 31.64(5.27) | 24.45\*\*\* | 1>2>3 | 16.02\*\*\* | 1>2,3 |
| Total errors | 34.62(21.87) | 24.14(16.60) | 20.30(16.65) | 51.45\*\*\* | 1>2,3 | 36.78\*\*\* | 1>2,3 |
| **Stocking of Cambridge** |  |  |  |  |  |  |  |
| Problems solved in minimum moves | 7.40(2.34) | 8.11(2.04) | 8.37(2.06) | 22.13\*\*\* | 1<2,3 | 8.69\*\*\* | 1<2,3 |

Note. Group comparison significant at the 0.05 level using Bonferroni correction for multiple comparisons and further adjusted for multiple testing using false discovery rate; \* *p*<0.05; \*\* *p*<.01; \*\*\* *p*<.001. ANCOVA = Analysis of covariance; †: Controlling for age and sex;

§: Controlling for age, sex, and symptoms of attention-deficit/hyperactivity disorder (ADHD).

**Supplementary Table 2.** Individual effects of age, IQ, and symptoms of attention-deficit hyperactivity disorder (ADHD) on the executive functions

|  |  |  |  |
| --- | --- | --- | --- |
|  | Age | Full-scale intelligence quotient (IQ) | ADHD symptoms |
|  | *ß* | *p* value | *ß* | *p* value | *ß* | *p* value |
| **Digit Span (Verbal Working Memory)** |  |  |  |  |  |  |
| Digit span, forward | 0.05 | .145 | 0.02 | <.001  | 0.04 | .636 |
| Digit span, backward | 0.19 | <.001  | 0.02 | .032  | -0.08 | .319 |
| **Intra-dimension/Extra-dimension Shift** |  |  |  |  |  |  |
| Extra-dimensional shift errors  | -0.24 | .384 | -0.17 | <.001  | 0.07 | .278 |
| Total errors (adjusted) | -1.73 | .008  | -0.47 | <.001  | -0.05 | .405 |
| **Spatial Span** |  |  |  |  |  |  |
| Span length | 0.17 | <.001  | 0.04 | <.001  | 0.05 | .460 |
| Total usage errors | -0.15 | <.001  | -0.03 | <.001  | 0.04 | .587 |
| **Spatial Working Memory** |  |  |  |  |  |  |
| Strategy utilization | -0.38 | .001  | -0.09 | <.001  | -0.02 | .793 |
| Total errors | -2.40 | <.001  | -0.46 | <.001  | -0.03 | .605 |
| **Stocking of Cambridge** |  |  |  |  |  |  |
| Problems solved in minimum moves | 0.24 | <.001  | 0.05 | <.001  | -0.04 | .510 |

*ß* = regression coefficient estimate