Appendix S1.*Generalized linear mixed-effect models used for the different tasks by education level (primary and secondary).*

The variables Age in years, Gender, Other Language Use, SES, Raven and EVIP were included as covariate in each model for each task.

**Simon**

***Primary education and secondary education***

Fixed effects: Group (immersion and non-immersion), Trial Type (congruent and incongruent) and Previous Trial Type (congruent and incongruent)

Random effects: intercepts of subjects and by-subject random slopes for the effect of Trial Type and Previous Trial Type

**ANT**

***Primary education***

Fixed effects: Group (immersion and non-immersion), Trial Type (congruent and incongruent) and Cue Condition (no, double, central, spatial)

Random effects: intercepts of subjects and by-subject random slopes for the effect of Trial Type

***Secondary education***

Fixed effects: Group (immersion and non-immersion), Trial Type (congruent and incongruent) and Cue Condition (no, double, central, spatial)

Random effects: intercepts of subjects and by-subject random slopes for the effect of Trial Type and Cue Condition were included

**DCCS**

***Primary education***

*Single-Tasks.*

Fixed effects: Group (immersion and non-immersion) and Single-Task Block (pre-switch and post-switch)

Random effects: intercepts of subjects and by-subject random slopes for the effect of Single-Task Blocks
*Switching Cost.*

Analyses were conducted with Group (immersion and non-immersion) and Switching Trial Type from the Mixed-task (switch and non-switch) as fixed effects and intercepts of subjects as random effects

*Mixing Cost.*

Fixed effects: Group (immersion and non-immersion) and Trial Type (single-task and non-switch)

Random effects: intercepts of subjects and by-subject random slopes for the effect of Trial Type

***Secondary education***

*Single-Tasks.*

Fixed effects: Group (immersion and non-immersion) and Single-Task Block (pre-switch and post-switch)

Random effects: intercepts of subjects and by-subject random slopes for the effect of Single-Task Blocks
*Switching Cost.*

Fixed effects: Group (immersion and non-immersion) and Switching Trial Type from the Mixed Block (switch and non-switch)

Random effects: intercepts of subjects and by-subject random slopes for the effect of Switching Trial Type

*Mixing Cost.*

Fixed effects: Group (immersion and non-immersion) and Trial Type (single-task and non-switch)

Random effects: intercepts of subjects and by-subject random slopes for the effect of Trial Type

Table S1.*Interpretation for the Bayes Factor BF10, adapted from Jeffreys (1961). Bayes Factor represents the likelihood of the data for the null (H0) hypothesis or alternative (H1) hypothesis.*

|  |  |
| --- | --- |
| **Bayes Factor** *BF10* | **Interpretation** |
| >100 | Decisive evidence for H1\* |
| 30-100 | Very strong evidence for H1\* |
| 10-30 | Strong evidence for H1\* |
| 3-10 | Substantial evidence for H1\* |
| 1-3 | Anecdotal evidence for H1\* |
| 1 | No evidence |
| 1/3-1 | Anecdotal evidence for H0\*\* |
| 1/10-1/3 | Substantial evidence for H0\*\* |
| 1/30-1/10 | Strong evidence for H0\*\* |
| 1/100-1/30 | Very strong evidence for H0\*\* |
| <1/100 | Decisive evidence for H0\*\* |

\*In comparison with H0

\*\* In comparison with H1

Table S2. *Main effects and interactions on RTs (ms) and ACC (1=100% accuracy) for additionnal analyses depending on the tasks by education level. BF10 = Bayes factor in favour of the alternative hypothesis.*

|  |  |  |  |
| --- | --- | --- | --- |
| **Primary** | **Measure** | **Test** | *BF10* |
| Simon | RT | Trial Type  |  *χ²* (1) = 175.73\*\*\* | > 100+++ |
|  |  | Trial Type\*Previous Trial Type |  *χ²* (2) = 862.86\*\*\* | > 100+++ |
|  |  | Gratton effect | *t*(24373) = 31.34\*\*\* | > 100+++ |
|  |  | Group\*Previous Trial Type |  *χ²* < 1 | 8.53e-17= = = |
|  |  | Group\*Trial Type\*Previous Trial Type |  *χ²* (1) < 1 | 0.01= =  |
|  | ACC | Trial Type  |  *χ²* (1) = 124.03\*\*\* | > 100+++ |
|  |  | Trial Type\*Previous Trial Type |  *χ²* (2) = 417.65\*\*\* | > 100+++ |
|  |  | Group\*Previous Trial Type |  *χ²* (2) = 3.57 | 0.00= = = |
|  |  | Group\*Trial Type\*Previous Trial Type |  *χ²* (1) = 1.33 | 0.01= = |
|  |  |  |  |  |
| ANT | RT | Trial Type  |  *χ²* (1) = 136.92\*\*\* | > 100+++ |
|  |  | Cue Condition |  *χ²* (3) = 129.77\*\*\* | > 100+++ |
|  |  | Alerting effect | *t*(17169) = 13.49\*\*\* | > 100+++ |
|  |  | Orientation effect | *t*(17166) = 14.92\*\*\* | > 100+++ |
|  |  | Trial Type \* Cue Condition |  *χ²* (6) = 85.54\*\*\* | > 100+++ |
|  |  | Group\*Cue Condition |  *χ²* (6) = 8.74 | 1.38e-11= = = |
|  |  | Group\*Trial Type\* Cue Condition  |  *χ²* (3) = 139.44\*\*\* | > 100+++ |
|  | ACC | Trial Type  |  *χ²* (1) = 92.69\*\*\* | > 100+++ |
|  |  | Cue Condition  |  *χ²* (3) = 10.29\* | 6.44e-05= = = |
|  |  | Alerting effect  |  z = 1.01 0.21 |
|  |  | Orientation effect  |  z = 3.02\*\* | 9.87+ |
|  |  | Trial Type \* Cue Condition |  *χ²* (6) = 7.94 | 7.25e-12= = = |
|  |  | Group\*Cue Condition |  *χ²* (6) = 7.16 | 5.10 e -12= = = |
|  |  | Group\*Trial Type\* Cue Condition |  *χ²* (3) = 2.23 | 1.18e-06= = = |
|  |  |  |  |  |
| DCCS | RT | Single-Tasks - Block |  *χ²* < 1 | 0.00= = = |
|  |  | Single-Tasks - Group\*Block |  χ²(1) = 1.18 | 0.03=  |
|  |  | Mixed-Task - Switching Cost |  *χ²* (1) = 20.19\*\*\* | > 100+++ |
|  |  | Single vs Mixed Task - Mixing Cost |  *χ²* (1) = 956.66\*\*\* | > 100+++ |
|  | ACC | Single-Tasks - Block |  *χ²* (1) = 6.27\* | 0.34 |
|  |  | Single-Tasks - Group\*Block |  *χ²* (1) = 1.74 | 0.03=  |
|  |  | Mixed-Task - Switching Cost |  *χ²* (1) = 253.7\*\* | > 100+++ |
|  |  | Single vs Mixed Task - Mixing Cost |  *χ²* (1) = 4.15\* | 0.08 |
|  |  |  |  |  |
| **Secondary** | **Measure** |  | **Test** | *BF10* |
| Simon | RT | Trial Type  |  *χ²* (1) = 160.07\*\*\* | > 100+++ |
|  |  | Trial Type\*Previous Trial Type |  *χ²* (2) = 1474.2\*\*\* | > 100+++ |
|  |  | Gratton effect | *t*(27215) = 41.05\*\*\* | > 100+++ |
|  |  | Group\*Previous Trial Type |  *χ²* (2) = 7.05\* | 0.00= = = |
|  |  | Group\*Trial Type\*Previous Trial Type |  *χ²* < 1 | 2.89 e-63= = = |
|  | ACC | Trial Type  |  *χ²* (1) = 46.10\*\*\* | > 100+++ |
|  |  | Trial Type\*Previous Trial Type |  *χ²* (2) = 563.56\*\*\* | > 100+++ |
|  |  | Group\*Previous Trial Type |  *χ²* (2) = 2.66 | 8.31e-07= = = |
|  |  | Group\*Trial Type\*Previous Trial Type |  *χ²* < 1 | 0.00= = = |
|  |  |  |  |  |
| ANT | RT | Trial Type  |  *χ²* (1) = 61.02\*\*\* | > 100+++ |
|  |  | Cue Condition |  *χ²* (3) = 173.61\*\*\* | > 100+++ |
|  |  | Alerting effect | *t*(24228) = 14.49\*\*\* | > 100+++ |
|  |  | Orientation effect | *t*(24214) = 25.26\*\*\* | > 100+++ |
|  |  | Trial Type \* Cue Condition |  *χ²* < 1 | 8.19e-40= = = |
|  |  | Group\*Cue Condition |  *χ²* < 1 | 5.88e-67= = = |
|  |  | Group\*Trial Type\*Cue Condition |  *χ²* < 1 | 9.22e-47= = = |
|  | ACC | Trial Type  |  *χ²* (1) = 155.29\*\*\* | > 100+++ |
|  |  | Cue Condition |  *χ²* (3) = 30.24\*\*\* | 0.86 |
|  |  | Alerting effect | *z* = 0.31 | 0.13 |
|  |  | Orientation effect | *z* = 5.25 | > 100+++ |
|  |  | Trial Type \*Cue Condition |  *χ²* (6) = 16.98\*\* | 2.78e-10= = = |
|  |  | Group\*Cue Condition |  *χ²* (6) = 5.91 | 1.08e-12= = = |
|  |  | Group\*Trial Type\*Cue Condition |  *χ²* (3) = 1.18 | 4.34e-07= = = |
|  |  |  |  |  |
| DCCS | RT | Single-Tasks - Block |  *χ²* < 1 | 0.01= = |
|  |  | Single-Tasks - Group\*Block |  *χ²* < 1 | 0.01= = |
|  |  | Mixed-Task - Switching Cost |  *χ²* (1) = 1.76 | 0.01= = |
|  |  | Single vs Mixed Task - Mixing Cost |  *χ²* (1) = 335.37\*\*\* | > 100+++ |
|  | ACC | Single-Tasks - Block | *χ²* (1) = 2.02 | 0.03=  |
|  |  | Single-Tasks - Group\*Block | *χ²* (1) = 1.16 | 0.02= =  |
|  |  | Mixed-Task - Switching Cost |  *χ²* (1) = 62.97\*\*\* | > 100+++ |
|  |  | Single vs Mixed Task - Mixing Cost |  *χ²* (1) = 28.54\*\*\* | > 100+++ |

*Note.* "Alpha"; ∗*p* < .05; ∗∗*p* < .01; ∗∗∗*p* < .001 and "*BF10*"; = = = *BF10* < 0.01 (decisive evidence for H0); = = *BF10* < 0.03 (very strong evidence for H0); = *BF10* < 0.10 (strong evidence for H0); + *BF10* > 10 (strong evidence for H1), ++ *BF10* > 30 (very strong evidence for H1), +++ *BF10* > 100 (decisive evidence for H1)

Table S3. *Kendall’s tau correlations between the different background and executive control measures (RTs). BF10 = Bayes factor in favour of the alternative hypothesis*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   |   | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| **1** | Age in years | \_ |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | *Kendall’s tau* | \_ |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | *BF10* | \_ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **2** | Gender |  | \_ |  |  |  |  |  |  |  |  |  |  |  |  |
|  | *Kendall’s tau* | -0.04 | \_ |  |  |  |  |  |  |  |  |  |  |  |  |
|  | *BF10* | 0.14 | \_ |  |  |  |  |  |  |  |  |  |  |  |  |
| **3** | Other Language Use |  |  | \_ |  |  |  |  |  |  |  |  |  |  |  |
|  | *Kendall’s tau* | -0.11\*\* | 0.01 | \_ |  |  |  |  |  |  |  |  |  |  |  |
|  | *BF10* | 31.22++ | 0.06=  | \_ |  |  |  |  |  |  |  |  |  |  |  |
| **4** | SES |  |  |  | \_ |  |  |  |  |  |  |  |  |  |  |
|  | *Kendall’s tau* | -0.04 | 0.09\* | -0.02 | \_ |  |  |  |  |  |  |  |  |  |  |
|  | *BF10* | 0.13 | 7.33 | 0.07=  | \_ |  |  |  |  |  |  |  |  |  |  |
| **5** | RAVEN |  |  |  |  | \_ |  |  |  |  |  |  |  |  |  |
|  | *Kendall’s tau* | 0.37\*\*\* | 0.01 | -0.15\*\*\* | 0.15\*\*\* | \_ |  |  |  |  |  |  |  |  |  |
|  | *BF10* | > 100+++ | 0.06=  | > 100+++ | > 100+++ | \_ |  |  |  |  |  |  |  |  |  |
| **6** | EVIP |  |  |  |  |  | \_ |  |  |  |  |  |  |  |  |
|  | *Kendall’s tau* | 0.43\*\*\* | 0.05 | -0.22\*\*\* | 0.13\*\*\* | 0.52\*\*\* | \_ |  |  |  |  |  |  |  |  |
|  | *BF10* | > 100+++ | 0.19 | > 100+++ | > 100+++ | > 100+++ | \_ |  |  |  |  |  |  |  |  |
| **7** | Dutch/English Receptive Vocabulary |  |  |  |  |  |  | \_ |  |  |  |  |  |  |  |
|  | *Kendall’s tau* | 0.36\*\*\* | 0.06 | -0.20\*\*\* | 0.17\*\*\* | 0.44\*\*\* | 0.49\*\*\* | \_ |  |  |  |  |  |  |  |
|  | *BF10* | > 100+++ | 0.55 | > 100+++ | > 100+++ | > 100+++ | > 100+++ | \_ |  |  |  |  |  |  |  |
| **8** | Simon Congruency Effect |  |  |  |  |  |  |  | \_ |  |  |  |  |  |  |
|  | *Kendall’s tau* | -0.16\*\*\* | 0.02 | 0.08\* | -0.04 | -0.22\*\*\* | -0.21\*\*\* | -0.16\*\*\* | \_ |  |  |  |  |  |  |
|  | *BF10* | > 100+++ | 0.07=  | 2.26 | 0.16 | > 100+++ | > 100+++ | > 100+++ | \_ |  |  |  |  |  |  |
| **9** | Simon Gratton Effect |  |  |  |  |  |  |  |  | \_ |  |  |  |  |  |
|  | *Kendall’s tau* | -0.05 | -0.06 | -0.01 | -0.03 | -0.04 | -0.06\* | -0.04 | -0.00 | \_ |  |  |  |  |  |
|  | *BF10* | 0.30 | 0.63 | 0.06=  | 0.09=  | 0.18 | 0.46 | 0.14 | 0.06=  | \_ |  |  |  |  |  |
| **10** | ANT Congruency Effect |  |  |  |  |  |  |  |  |  | \_ |  |  |  |  |
|  | *Kendall’s tau* | -0.25\*\*\* | 0.02 | 0.10\*\* | -0.06 | -0.31\*\*\* | -0.27\*\*\* | -0.23\*\*\* | 0.14\*\*\* | 0.03 | \_ |  |  |  |  |
|  | *BF10* | > 100+++ | 0.08=  | 21.71+ | 0.35 | > 100+++ | > 100+++ | > 100+++ | > 100+++ | 0.10 | \_ |  |  |  |  |
| **11** | ANT Alerting Effect |  |  |  |  |  |  |  |  |  |  | \_ |  |  |  |
|  | *Kendall’s tau* | -0.15\*\*\* | -0.03 | -0.02 | 0.04 | -0.13\*\*\* | -0.13\*\*\* | -0.11\*\*\* | 0.04 | -0.01 | 0.09\*\* | \_ |  |  |  |
|  | *BF10* | > 100+++ | 0.11 | 0.07=  | 0.18 | > 100+++ | > 100+++ | 47.18++ | 0.17 | 0.06=  | 7.82 | \_ |  |  |  |
| **12** | ANT Orienting Effect |  |  |  |  |  |  |  |  |  |  |  | \_ |  |  |
|  | *Kendall’s tau* | -0.13\*\*\* | -0.03 | 0.07 | 0.04 | -0.05 | -0.04 | -0.05 | 0.05 | 0.02 | 0.02 | 0.07\* | \_ |  |  |
|  | *BF10* | > 100+++ | 0.10 | 0.83 | 0.12 | 0.19 | 0.17 | 0.21 | 0.19 | 0.08=  | 0.07=  | 1.11 | \_ |  |  |
| **13** | DCCS Switch Cost  |  |  |  |  |  |  |  |  |  |  |  |  | \_ |  |
|  | *Kendall’s tau* | -0.09\*\* | 0.02 | 0.05 | -0.01 | -0.10\*\*\* | -0.11\*\*\* | -0.11\*\*\* | 0.08\*\* | 0.06 | 0.06\* | 0.06\* | 0.06 | \_ |  |
|  | *BF10* | 3.99 | 0.07=  | 0.25 | 0.06=  | 18.76+ | 59.40++ | 75.59++ | 1.42 | 0.34 | 0.51 | 0.50 | 0.52 | \_ |  |
| **14** | DCCS Mixed Cost |  |  |  |  |  |  |  |  |  |  |  |  |  | \_ |
|  | *Kendall’s tau* | -0.23\*\*\* | -0.03 | 0.06 | -0.01 | -0.21\*\*\* | -0.23\*\*\* | -0.20\*\*\* | 0.07\* | 0.00 | 0.14\*\*\* | 0.05 | 0.03 | -0.10\*\*\* | \_ |
|  | *BF10* | > 100+++ | 0.10 | 0.61 | 0.06=  | > 100+++ | > 100+++ | > 100+++ | 0.73 | 0.06=  | > 100+++ | 0.30 | 0.10 | 23.55+ | \_ |

*Note.* "Alpha"; \**p* < .05; \*\**p* < .01; \*\*\**p* < .001 and "*BF10*"; = = = *BF10* < 0.01 (decisive evidence for H0); = = *BF10* < 0.03 (very strong evidence for H0); = *BF10* < 0.10 (strong evidence for H0); + *BF10* > 10 (strong evidence for H1), ++ *BF10* > 30 (very strong evidence for H1), +++ *BF10* > 100 (decisive evidence for H1)