Supplementary Material

This online supplemental material contains further details on:

* **Section 1.** Checkup of all analyses with groups based on divergent cut-off points
* **Section 2.** Mean differences between the group values of individual competence measurements
* **Section 3.** Repeated measures ANCOVA of mathematical development with gradual addition of the covariates
* **Section 4.** Check of the explanatory value of sex for group differences in mathematics
* **Section 5.** Comparison of analyses with the initial central executive measurement vs. the utilized central executive measurement

# Section 1. Checkup of all analyses with groups based on divergent cut-off points

**Supplementary Figure 1.** Development of mathematical (K-4), vocabulary (K-3), and grammar (K-1) skills in groups (cut-off point -1.1 *SD*) with different forms of pre-school measured learning difficulties (MD/LD: *n* = 15; MD: *n* = 20; LD: *n* = 22) vs. typically achieving children (TA: *n* = 244) under the control of covariates w/o vs. w/ working memory.

**Supplementary Figure 2***.* Development of mathematical (K-4), vocabulary (K-3), and grammar (K-1) skills in groups (cut-off point -0.9 *SD*) with different forms of pre-school measured learning difficulties (MD/LD: *n* = 21; MD: *n* = 32; LD: *n* = 24) vs. typically achieving children (TA: *n* = 224) under the control of covariates w/o vs. w/ working memory.

Supplementary Table . *Differences between the group values (cut-off point -1.1 SD) of individual competence measurements under the control of covariates with vs. without working memory control*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | MD/LD\*MD | MD/LD\*LD | MD/LD\*TA | MD\*LD | MD\*TA | LD\*TA |
| *diff (SEdiff)* | *diff (SEdiff)* | *diff (SEdiff)* | *diff (SEdiff)* | *diff (SEdiff)* | *diff (SEdiff)* |
| working memory | working memory | working memory | working memory | working memory | working memory |
| w/o | w/ | w/o | w/ | w/o | w/ | w/o | w/ | w/o | w/ | w/o | w/ |
| Mathematics |  |
| t1 |  0.05(0.22) |  0.10(0.21) |  **1.44 (0.23)** |  **1.09 (0.22)** |  **1.89(0.18)** |  **1.48(0.17)** |  **1.39(0.19)** |  **1.19(0.18)** |  **1.84 (0.13)** |  **1.58 (0.13)** |  0.45(0.14) |  0.39(0.13) |
| t2 |  0.52(0.25) |  0.29 (0.24) | 0.79 (0.25) |  0.33 (0.24) |  **1.66(0.20)** |  **1.12(0.20)** |  0.28 (0.21) |  0.04 (0.20) |  **1.14 (0.15)** |  **0.83 (0.14)** |  **0.86(0.15)** |  **0.79 (0.15)** |
| t3 |  0.10 (0.25) |  0.32 (0.24) |  0.57 (0.25) |  0.08 (0.24) |  **1.31(0.20)** |  **0.74 (0.20)** |  0.67 (0.21) |  0.40 (0.20) |  **1.42(0.15)** |  **1.06 (0.14)** |  **0.74(0.15)** |  **0.66 (0.15)** |
| t4 |  0.11(0.25) |  0.31 (0.24) |  0.50(0.25) |  0.10 (0.25) |  **1.20 (0.20)** |  **0.74 (0.20)** |  0.61 (0.21) |  0.41 (0.20) |  **1.31 (0.15)** |  **1.05 (0.14)** |  **0.70(0.16)** |  0.64 (0.15) |
| Vocabulary |  |
| t1 |  **1.58(0.18)** |  **1.52(0.20)** |  0.24(0.20) |  0.12(0.20) |  **2.08(0.16)** |  **1.94(0.16)** |  **1.34(0.14)** |  **1.40(0.16)** |  **0.50(0.08)** |  0.42(0.12) |  **1.84 (0.12)** |  **1.82(0.12)** |
| t2 |  **1.40 (0.21)** |  **1.31 (0.22)** |  0.31(0.22) |  0.13(0.22) |  **1.96(0.18)** |  **1.75(0.18)** |  **1.09(0.17)** |  **1.18(0.18)** |  **0.57(0.11)** |  0.44(0.13) |  **1.65 (0.14)** |  **1.62 (0.14)** |
| t3 |  **0.83 (0.21)** |  **0.73(0.23)** |  0.07 (0.23) |  0.12 (0.23) |  **1.29(0.19)** |  **1.06(0.19)** |  **0.76(0.17)** |  **0.85 (0.19)** |  0.47(0.09) |  0.34(0.14) |  **1.22 (0.14)** |  **1.19 (0.14)** |
| Grammar |  |
| t1 |  1.57 (0.19) |  1.46 (0.21) |  **0.04(0.21)** |  **0.16(0.21)** |  **1.92(0.17)** |  **1.68(0.17)** |  **1.53(0.15)** |  **1.62(0.17)** |  0.35(0.09) |  0.22(0.12) |  **1.88(0.13)** |  **1.84 (0.13)** |
| t2 |  **1.00 (0.20)** |  0.81 (0.22) |  0.78 (0.23) |  0.44 (0.22) |  **1.85(0.18)** |  **1.45(0.18)** |  0.22 (0.16) |  0.37 (0.18) |  **0.86(0.09)** |  **0.65 (0.13)** |  **1.08 (0.14)** |  **1.01 (0.13)** |

Notes. Significant differences (p < .05) between group values of the individual competence measurements are in bold. MD/LD = children with combined learning difficulties in mathematics and linguistics (n = 15); MD = children with mathematical learning difficulties (n = 20); LD = children with linguistic learning difficulties (n = 22); TA = typical achieving children (n = 244).

Supplementary Table . *Differences between the group values (cut-off point -.9 SD) of individual competence measurements under the control of covariates with vs. without working memory control*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | MD/LD\*MD | MD/LD\*LD | MD/LD\*TA | MD\*LD | MD\*TA | LD\*TA |
| *diff (SEdiff)* | *diff (SEdiff)* | *diff (SEdiff)* | *diff (SEdiff)* | *diff (SEdiff)* | *diff (SEdiff)* |
| working memory | working memory | working memory | working memory | working memory | working memory |
| w/o | w/ | w/o | w/ | w/o | w/ | w/o | w/ | w/o | w/ | w/o | w/ |
| Mathematics |  |
| t1 |  0.24 (0.18) |  0.10 (0.17) |  **1.45(0.17)** |  **1.14(0.16)** |  **1.91(0.14)** |  **1.58(0.14)** |  **1.18(0.15)** |  **1.05(0.14)** |  **1.68(0.11)** |  **1.48(0.10)** |  **0.49 (0.10)** |  0.43 (0.10) |
| t2 |  0**.98(0.20)** |  0.74 (0.19) |  **0.80(0.20)** |  0.76 (0.19) |  **1.94(0.16)** |  **1.48(0.16)** |  0.16 (0.17) |  0.02 (0.16) |  **0.96(0.13)** |  **0.75 (0.12)** |  **0.80 (0.12)** |  **0.72 (0.11)** |
| t3 |  0.47 (0.21) |  0.48 (0.20) |  **0.88 (0.20)** |  0.25 (0.19) |  **1.48(0.17)** |  **0.99 (0.16)** |  0.41 (0.17) |  0.23 (0.16) |  **1.01(0.13)** |  **0.74 (0.12)** |  **0.60(0.12)** |  0.51 (0.11) |
| t4 |  0.05 (0.20) |  0.18(0.20) |  0.44 (0.20) |  0.09 (0.20) |  **1.12 (0.17)** |  **0.70(0.16)** |  0.39 (0.17) |  0.27(0.16) |  **1.07(0.13)** |  **0.88 (0.12)** |  **0.68 (0.12)** |  **0.61 (0.11)** |
| Vocabulary |  |
| t1 |  **1.86(0.16)** |  **1.81(0.16)** |  **0.73(0.15)** |  **0.65(0.15)** |  **2.21(0.13)** |  **2.11(0.13)** |  **1.14(0.13)** |  **1.17(0.13)** |  0.35 (0.10) |  **0.30(0.10)** |  **1.48(0.09)** |  **1.46(0.09)** |
| t2 |  **1.47(0.18)** |  **1.46(0.18)** |  0.36 (0.17) |  0.23(0.17) |  **1.87(0.14)** |  **1.70(0.14)** |  **1.11(0.15)** |  **1.17(0.15)** |  **0.39(0.11)** |  0.30 (0.11) |  **1.50(0.10)** |  **1.47(0.10)** |
| t3 |  **0.99 (0.19)** |  **0.96 (0.19)** |  0.23 (0.18) |  0.06 (0.18) |  **1.37(0.15)** |  **1.17(0.15)** |  **0.76(0.15)** |  **0.81 (0.15)** |  0.38 (0.12) |  0.30 (0.12) |  **1.14(0.11)** |  **1.11(0.11)** |
| Grammar |  |
| t1 |  **1.49(0.16)** |  **1.37(0.16)** |  0.07 (0.16) |  0.22 (0.16) |  **1.86(0.13)** |  **1.67(0.13)** |  **1.55(0.13)** |  **1.59(0.13)** |  **0.37 (0.10)** |  0.29 (0.10) |  **1.92(0.09)** |  **1.88(0.09)** |
| t2 |  **0.91 (0.18)** |  0.64 (0.18) |  **0.57 (0.18)** |  0.25 (0.17) |  **1.63(0.14)** |  **1.23(0.14)** |  0.35 (0.15) |  0.39 (0.15) |  **0.72 (0.11)** |  **0.59 (0.11)** |  **1.06(0.11)** |  **0.98 (0.10)** |

Notes. Significant differences (p < .05) between group values of the individual competence measurements are in bold. MD/LD = children with combined learning difficulties in mathematics and linguistics (n = 21); MD = children with mathematical learning difficulties (n = 24); LD = children with linguistic learning difficulties (n = 32); TA = typical achieving children (n = 224).

# Mean-differences between the group values of individual competence measurements

Supplementary Table . *Differences between the group values of individual competence measurements under the control of covariates w/o vs. with working memory control*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | MD/LD\*MD | MD/LD\*LD | MD/LD\*TA | MD\*LD | MD\*TA | LD\*TA |
| *diff (SEdiff)* | *diff (SEdiff)* | *diff (SEdiff)* | *diff (SEdiff)* | *diff (SEdiff)* | *diff (SEdiff)* |
| working memory | working memory | working memory | working memory | working memory | working memory |
| w/o | w/ | w/o | w/ | w/o | w/ | w/o | w/ | w/o | w/ | w/o | w/ |
| Mathematics |  |
| t1 |  0.23 (0.20) |  0.06 (0.19) |  **1.46(0.20)** |  **1.13(0.19)** |  **1.95(0.16)** |  **1.59(0.16)** |  **1.23(0.16)** |  **1.07(0.15)** |  **1.72(0.11)** |  **1.53(0.10)** |  **0.49 (0.12)** | 0.46 (0.12) |
| t2 |  0.73 (0.22) |  0.47 (0.21) |  **1.06(0.23)** |  0.62 (0.22) |  **1.86(0.18)** |  **1.37(0.18)** |  0.33 (0.18) |  0.15 (0.17) |  **1.13(0.12)** |  **0.90 (0.12)** |  **0.80 (0.14)** |  **0.75 (0.13)** |
| t3 |  0.23 (0.22) |  0.04 (0.21) |  0.77 (0.23) |  0.29 (0.22) |  **1.36(0.19)** |  **0.82 (0.18)** |  0.55 (0.19) |  0.34 (0.18) |  **1.13(0.13)** |  **0.87 (0.12)** |  **0.58 (0.14)** |  0.53 (0.13) |
| t4 |  0.15 (0.22) |  0.09 (0.22) |  0.70 (0.23) |  0.31 (0.23) |  **1.34 (0.19)** |  **0.90 (0.18)** |  0.55 (0.18) |  0.40 (0.18) |  **1.18(0.13)** |  **0.99 (0.12)** |  **0.64 (0.14)** |  **0.40 (0.13)** |
| Vocabulary |  |
| t1 |  **1.83(0.17)** |  **1.77(0.17)** |  **0.70(0.18)** |  **0.59(0.18)** |  **2.21(0.14)** |  **2.09(0.14)** |  **1.13(0.15)** |  **1.18(0.15)** |  **0.38 (0.10)** |  **0.33 (0.10)** |  **1.52(0.11)** |  **1.50(0.11)** |
| t2 |  **1.45(0.19)** |  **1.35(0.19)** |  0.36 (0.20) |  0.18 (0.20) |  **1.88(0.16)** |  **1.69(0.16)** |  **1.09(0.16)** |  **1.17(0.16)** |  **0.44 (0.11)** |  0.34 (0.11) |  **1.53(0.12)** |  **1.51(0.12)** |
| t3 |  **0.88 (0.20)** |  **0.76 (0.20)** |  0.29 (0.21) |  0.10 (0.21) |  **1.35(0.17)** |  **1.13(0.17)** |  0.59(0.17) |  0.67 (0.17) |  0.47 (0.12) |  0.37 (0.12) |  **1.06(0.13)** |  **1.04(0.13)** |
| Grammar |  |
| t1 |  **1.86(0.18)** |  **1.54(0.18)** |  0.05 (0.18) |  0.16 (0.18) |  **1.95(0.16)** |  **1.72(0.15)** |  **1.63(0.15)** |  **1.70(0.15)** |  0.28 (0.10) |  0.18 (0.10) |  **1.91(0.11)** |  **1.88(0.11)** |
| t2 |  **0.93 (0.20)** |  0.67 (0.19) |  0.70 (0.20) |  **0.33 (0.20)** |  **1.75(0.16)** |  **1.32(0.16)** |  0.23 (0.17) |  0.34 (0.16) |  **0.81 (0.11)** |  **0.65 (0.11)** |  **1.04(0.13)** |  **0.99 (0.12)** |

Notes. Significant differences (p < .05) between group values of the individual competence measurements are in bold. MD/LD = children with combined learning difficulties in mathematics and linguistics (n = 18); MD = children with mathematical learning difficulties (n = 26); LD = children with linguistic learning difficulties (n = 23); TA = typical achieving children (n = 234).

# Repeated measures ANCOVA of mathematical development with gradual addition of the covariates

Supplementary Table . *Repeated measures ANCOVA of mathematical development with gradual addition of the covariates*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | $Ƞ\_{p}^{2}$ *(F)* | $Ƞ\_{p}^{2}$ *(F)* | $Ƞ\_{p}^{2}$ *(F)* | $Ƞ\_{p}^{2}$ *(F)* | $Ƞ\_{p}^{2}$ *(F)* | $Ƞ\_{p}^{2}$ *(F)* | $Ƞ\_{p}^{2}$ *(F)* |
| Mathematic | **.88 (2111.41\*\*\*)** | **.76 (871.53\*\*\*)** | **40. (169.58\*\*\*)** | **.23 (77.06\*\*\*)** | **.13 (37.74\*\*\*)** | **.12 (34.86\*\*\*)** | **.11 (31.00\*\*\*)** |
| Mathematic\*Group | − | **.01 (2.46\*\*)** | **.04 (3.22\*\*\*)** | **.04 (3.12\*\*\*)** | **.03 (2.63\*\*)** | **.03 (2.66\*\*)** | **.03 (2.91\*\*)** |
| Mathematic\*SES | − | − | **.03 (6.96\*\*\*)** | **.03 (6.61\*\*\*)** | **.03 (7.47\*\*\*)** | **.03 (7.40\*\*\*)** | **.03 (6.71\*\*\*)** |
| Mathematic\*Sex | − | − | − | .01 (1.85) | .01 (1.83) | .01 (1.67) | .01 (1.58) |
| Mathematic\*GMDL | − | − | − | − | .01 (1.78) | .01 (2.03) | .01 (2.87) |
| Mathematic\*CE |  |  |  |  |  | **.01 (3.11\*)** | **.01(3.24\*)** |
| Mathematic\*PL |  |  |  |  |  |  | .01 (2.13) |

*Notes.* Repeated measures ANCOVA. Significant effects are highlighted in bold. SES = socioeconomic status; GMDL = German as main domestic language; CE = central executive; PL = phonological loop. *n* = 303; \*= *p* ≤ .05, \*\* = *p* ≤ .01, \*\*\* = *p* ≤ .001; *n* = 303.

# Check of the explanatory value of sex for group differences in mathematics

Supplementary Table . *Pearson correlations between working memory components and sex*

|  |  |  |
| --- | --- | --- |
|  | 1 | 2 |
| 1 Phonological loop |  |  |
| 2 Central executive | **.27\*\*** |  |
| 3 Sex | .09 | .17\*\* |

*Notes.* Values printed in bold represent significant relationships, \*= *p* ≤ .05, \*\* = *p* ≤ .01; *n* = 303.

Supplementary Table . *Univariate ANCOVA of central executive with sex as group variable*

|  |  |
| --- | --- |
|  |  |
| Central executive | **(*F*(4, 285) = 6.94, *p* < .001,** $Ƞ\_{p}^{2}$**= .09)** |
| Sex | **(*F*(4, 285) = 3.16, *p* = .044,** $Ƞ\_{p}^{2}$**= .02)**  |
| Phonological loop | **(*F*(4, 285) = 18.75, *p* < .001,** $Ƞ\_{p}^{2}$**= .06)** |
| SES | (*F*(4, 285) = .89, *p* = .346, $Ƞ\_{p}^{2}$= .01) |

*Notes.* *n* = 303 ; SES = socioeconomic status.

Supplementary Table . *Descriptive overview of mathematical competencies between male and female children*

|  |  |  |
| --- | --- | --- |
|  | male (*n* = 156) | female (*n* = 146) |
|  | *M* | *SD* | *M* | *SD* |
| Mathematics t1 | 0.58 | 1.05 | 0.36 | 0.95 |
| Mathematics t2 | 1.85 | 1.15 | 1.64 | 1.10 |
| Mathematics t2 | 2.54 | 1.20 | 2.39 | 1.11 |
| Mathematics t3 | 4.67 | 1.13 | 4.71 | 1.14 |

*Notes.* Descriptive statistics of mathematical skills in female and male children of the whole sample (*n* = 303).

# Comparison of analyses with the initial central executive measurement vs. the utilized central executive measurement

Supplementary Table . *Univariate ANCOVAs of mathematical competencies with direct vs. indirect measurement of central executive*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | central executive (direct)  | central executive (indirect) | central executive (direct)  | central executive (indirect) | central executive (direct)  | central executive (indirect) | central executive (direct)  | central executive (indirect) |
| Mathematics | t1 | t2 | t3 | t4 |
|  | $Ƞ\_{p}^{2}$ *(F)* | $Ƞ\_{p}^{2}$ *(F)* | $Ƞ\_{p}^{2}$ *(F)* | $Ƞ\_{p}^{2}$ *(F)* | $Ƞ\_{p}^{2}$ *(F)* | $Ƞ\_{p}^{2}$ *(F)* | $Ƞ\_{p}^{2}$ *(F)* | $Ƞ\_{p}^{2}$ *(F)* |
| Model | **.50(33.87\*\*\*)** | **.55(42.03\*\*\*)** | **.38(20.52\*\*\*)** | **.42(23.96\*\*\*)** | **.32(15.83\*\*\*)** | **.40(22.12\*\*\*)** | **.31(14.59\*\*\*)** | **.34(17.27\*\*\*)** |
| Group | **.30(38.21\*\*\*)** | **.35(48.32\*\*\*)** | **.12(12.69\*\*\*)** | **.15(15.63\*\*\*)** | **.07(7.02\*\*\*)** | **.10(9.64\*\*\*)** | **.10(9.42\*\*\*)** | **.11(10.88\*\*\*)** |
| GERM | .00(.78) | .00(1.19) | .01(2.14) | .01(2.54) | .00(.08) | .00(.25) | .01(2.61) | .01(1.47) |
| SES | .00(.01) | .01(1.39) | **.05(15.26\*\*\*)** | **.08(21.96\*\*\*)** | **.03(6.83\*\*)** | **.05(13.51\*\*\*)** | **.07(20.94\*\*\*)** | **.09(25.76\*\*\*)** |
| Sex | **.02(5.14\*)** | **.04(11.28\*\*\*)** | **.03(6.76\*\*)** | **.04(11.47\*\*\*)** | **.02(5.33\*)** | **.04(11.91\*\*\*)** | .00(.41) | .00(.97) |
| PL | **.03(7.84\*\*)** | **.03(7.91\*\*)** | **.07(18.71\*\*\*)** | **.07(18.69\*\*\*)** | **.05(15.38\*\*\*)** | **.05(13.76\*\*\*)** | **.06(15,76\*\*\*)** | **.05(14.73\*\*\*)** |
| CE | **.08(.30\*\*\*)** | **.17(55.56\*\*\*)** | **.04(10.91\*\*\*)** | **.09(27.21\*\*\*)** | **.06(18.03\*\*\*)** | **.17(54.43\*\*\*)** | **.01(3.72\*)** | **.06(15.20\*\*\*)** |

*Notes.* Significant effects are highlighted in bold. GERM = German as main-domestic language; SES = socioeconomic status; PL = phonological loop; CE = central executive; *n* = 303; \*= *p* ≤ .05, \*\* = *p* ≤ .01 \*\*\* = *p* ≤ .001; *n* = 303.

Supplementary Table . *Univariate ANCOVAs of linguistic competencies with direct vs. indirect measurement of central executive*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | central executive (direct)  | central executive (indirect) | central executive (direct)  | central executive (indirect) | central executive (direct)  | central executive (indirect) |
| Vocabulary | t1 | t2 | t3 |
|  | $Ƞ\_{p}^{2}$ (F) | $Ƞ\_{p}^{2}$ (F) | $Ƞ\_{p}^{2}$ (F) | $Ƞ\_{p}^{2}$ (F) | $Ƞ\_{p}^{2}$ (F) | $Ƞ\_{p}^{2}$ (F) |
| Model | **.60 (50.93\*\*\*)** | **.62 (56.03\*\*\*)** | **.42 (24.85\*\*\*)** | **.43 (25.91\*\*\*)** | **.30 (14.32\*\*\*)** | **.30 (14.19\*\*\*)** |
| Group | **.41 (63.05\*\*\*)** | **.43 (68.88\*\*\*)** | **.25 (30.78\*\*\*)** | **.28 (35.98\*\*\*)** | **.11 (10.81\*\*\*)** | **.14 (13.82\*\*\*)** |
| GERM | **.08 (24.60\*\*\*)** | **.10 (29.27\*\*\*)** | .00 (.45) | .00 (.50) | **.02 (6.32\*)** | **.02 (6.18\*)** |
| SES | .00 (1.07) | .01 (1.60) | **.04 (11.55\*\*\*)** | **.04 (12.03\*\*\*)** | **.01 (2.75+)** | **.02 (3.98\*)** |
| Sex | **.04 (10.35\*\*)** | **.04 (11.02\*\*\*)** | .01 (2.62) | .01 (3.47) | .01 (2.73) | .01 (3.11) |
| PL | .01 (2.56) | .01 (2.41) | .01 (1.81) | .01 (2.42) | **.01 (3.0+)** | **.02 (4.71\*)** |
| CE | .00 (.79) | .01 (2.41) | **.03 (7.34\*\*)** | **.02 (6.51\*)** | **.03 (7.93\*)** | .01 (2.73) |
| Grammar | t1 | t2 |  |
|  | $Ƞ\_{p}^{2}$ (F) | $Ƞ\_{p}^{2}$ (F) | $Ƞ\_{p}^{2}$ (F) | $Ƞ\_{p}^{2}$ (F) |  |  |
| Model | **.55 (42.12\*\*\*)** | **.54 (40.88\*\*\*)** | **.44 (26.33\*\*\*)** | **.43 (26.11\*\*\*)** |  |  |
| Group | **.40 (61.48\*\*\*)** | **.42 (67.43\*\*\*)** | **.15 (16.50\*\*\*)** | **.20 (21.45\*\*\*)** |  |  |
| GERM | .00 (.32) | .00 (.63) | .00 (.02) | .00 (.00) |  |  |
| SES | **.01 (3.74+)** | **.02 (6.14\*)** | **.04 (12.62\*\*\*)** | **.05 (15.22\*\*\*)** |  |  |
| Sex | .00 (.90) | .00 (1.14) | .01 (2.17) | .01 (2.16) |  |  |
| PL | **.03 (7.20\*\*)** | **.04 (10.77\*\*\*)** | **.10 (30.24\*\*\*)** | **.12 (36.73\*\*\*)** |  |  |
| CE | **.06 (16.05\*\*\*)** | **.02 (4.41\*)** | **.04 (11.30\*\*\*)** | .01 (2.50) |  |  |

Notes. Significant effects are highlighted in bold. Cursive effects are divergent effects of the initial central executive measurement, which was not used in our analyses due to the unacceptable reliability (α < .50). The initial central executive measurement was collected verbally (digit backward), the utilized central executive measurement was collected nonverbally. GERM = German as main domestic language; SES = socioeconomic status; PL = phonological loop; CE = central executive; n = 303; \*= p ≤ .05, \*\* = p ≤ .01, \*\*\* = p ≤ .001.