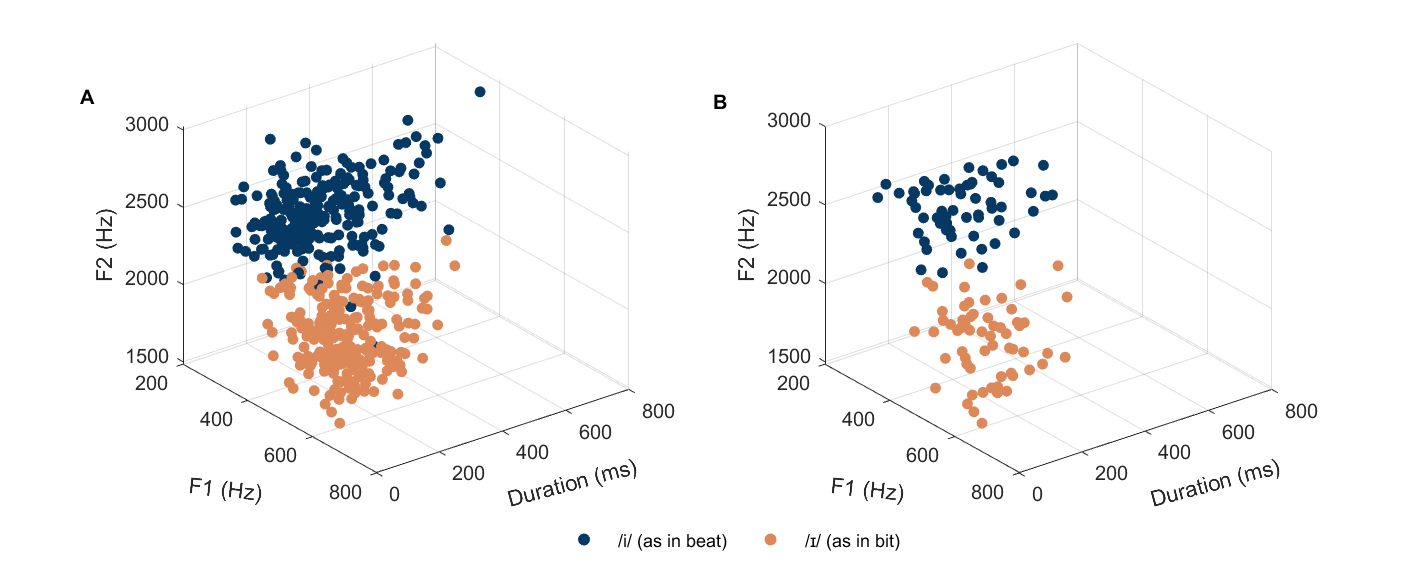
**Supplementary Materials**

**Appendix A: List of Word Stimuli**

**Table A.1** Example Word stimuli in the training program

|  |  |  |
| --- | --- | --- |
| No. | /i/ | /ɪ/ |
| 1 | deem | dim |
| 2 | gene | gin |
| 3 | sheen | shin |
| 4 | peat | pit |
| 5 | teen | tin |
| 6 | feels | fills |
| 7 | week | wick |
| 8 | eats | its |
| 9 | seeks | six |
| 10 | seen | sin |
| 11 | cheap | chip |
| 12 | beat | bit |
| 13 | beaker | Bicker |
| 14 | candied | Candid |
| 15 | fleet | flit |



**Fig. A.1** Acoustic distribution of the training stimuli along the F1, F2 and vowel duration dimensions in the two training conditions. Panel A represents the target vowels of the tokens used in the multiple-talker (MT) condition. Panel B represents the target vowels of the tokens used in the single-talker (ST) condition.

**Table A.2** Acoustic characteristics of the target vowels produced by talkers in the multiple-talker (MT) and single-talker (ST) conditions

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Vowel category | Acoustic feature | MT  *Mean* (*SD*) | ST  *Mean* (*SD*) | *p* value | MT  Variability | ST  Variability | *p* value |
| /i/ | F0 (Hz) | 180 (52) | 201 (29) | .15 | 0.018 | 0.0058 | < .01 |
| F1 (Hz) | 358 (59) | 373 (53) | .08 | 0.0050 | 0.0038 | .29 |
| F2 (Hz) | 2458 (217) | 2508 (183) | .10 | 0.0015 | 0.0011 | .25 |
| Duration (ms) | 278 (125) | 254 (110) | .19 | 0.037 | 0.036 | .51 |
| /ɪ/ | F0 (Hz) | 190 (54) | 211 (21) | .12 | 0.018 | 0.0021 | < .001 |
| F1 (Hz) | 519 (73) | 529 (82) | .40 | 0.0038 | 0.0047 | .72 |
| F2 (Hz) | 1931 (209) | 1903 (194) | .34 | 0.0022 | 0.0021 | .49 |
| Duration (ms) | 188 (90) | 175 (84) | .28 | 0.040 | 0.041 | .57 |

**Table A.3** Example word stimuli in the quizzes after training sessions

|  |  |  |
| --- | --- | --- |
| No. | /i/ | /ɪ/ |
| 1 | teal | till |
| 2 | reap | rip |
| 3 | heed | hid |
| 4 | keen | kin |
| 5 | least | list |

**Table A.4** Example word stimuli in the perception test

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Phonetic contexts | /i/ | /ɪ/ |
| 1 | Untrained words | sheep | ship |
| 2 | beach | bitch |
| 3 | deep | dip |
| 4 | seep | sip |
| 5 | deed | did |
| 6 | leek | lick |
|  |  |  |  |
| 7 | Trained words | peat | pit |
| 8 | deem | dim |
| 9 | teen | tin |
| 10 | feels | fills |

**Appendix B: Summary output of the linear mixed-effects models regarding training effects**

**Table B.1** Summary output of the LMM on the word identification accuracy

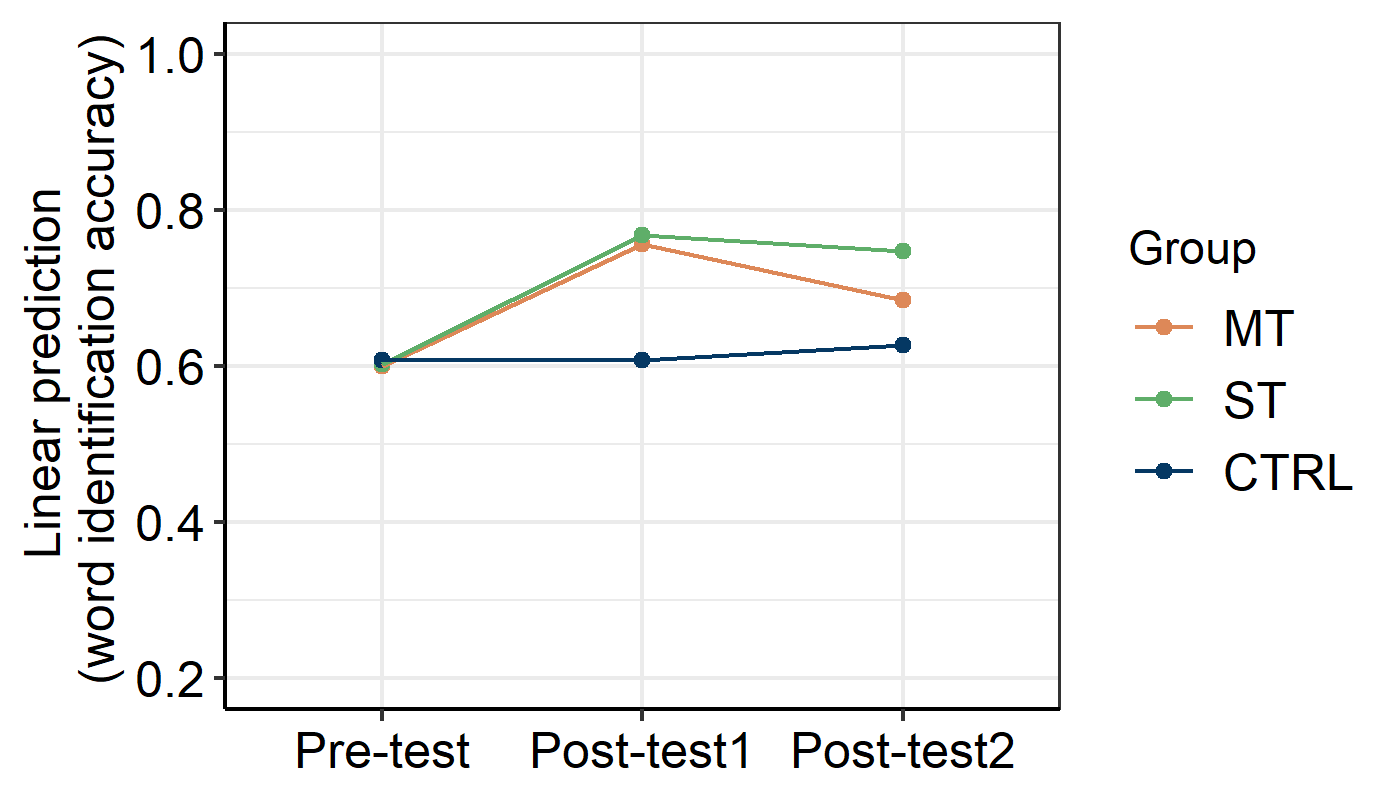
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Fixed effects | Estimate | | *SE* | *df* | *t* value | *p* value |
| (Intercept) | | 0.61 | 0.05 | 72.08 | 12.90 | <.001 |
| GroupMT | | <0.01 | 0.05 | 83.88 | 0.04 | .97 |
| GroupST | | -0.01 | 0.05 | 83.88 | -0.19 | .85 |
| Testpost1 | | -0.01 | 0.04 | 110.50 | -0.19 | .85 |
| Testpost2 | | 0.01 | 0.05 | 96.30 | 0.15 | .89 |
| Typeuntrained | | <0.01 | 0.05 | 34.39 | 0.02 | .99 |
| GroupMT:Testpost1 | | 0.14 | 0.06 | 110.50 | 2.35 | .02 |
| GroupST:Testpost1 | | 0.16 | 0.06 | 110.50 | 2.74 | .01 |
| GroupMT:Testpost2 | | 0.06 | 0.06 | 96.30 | 0.99 | .32 |
| GroupST:Testpost2 | | 0.12 | 0.06 | 96.30 | 1.86 | .07 |
| GroupMT:Typeuntrained | | -0.02 | 0.04 | 3393.00 | -0.49 | .63 |
| GroupST:Typeuntrained | | 0.01 | 0.04 | 3393.00 | 0.27 | .79 |
| Testpost1:Typeuntrained | | 0.02 | 0.04 | 3393.00 | 0.46 | .65 |
| Testpost2:Typeuntrained | | 0.03 | 0.04 | 3393.00 | 0.70 | .48 |
| GroupMT:Testpost1:Typeuntrained | | 0.04 | 0.05 | 3393.00 | 0.75 | .45 |
| GroupST:Testpost1:Typeuntrained | | 0.01 | 0.05 | 3393.00 | 0.28 | .78 |
| GroupMT:Testpost2:Typeuntrained | | <0.01 | 0.05 | 3393.00 | 0.04 | .97 |
| GroupST:Testpost2:Typeuntrained | | 0.01 | 0.05 | 3393.00 | 0.28 | .78 |
|  | |  |  |  |  |  |
| Random effects | | Term | Variance | SD | Correlation | |
| Subject | | (Intercept) | 0.02 | 0.14 |  |  |
|  | | testpost1 | 0.02 | 0.13 | -0.68 |  |
|  | | testpost2 | 0.03 | 0.16 | -0.75 | 0.95 |
| Word | | (Intercept) | 0.01 | 0.08 |  |  |

*Note*. Final models: ACC ~ Group \* Test \* Type + (1 + Test | Subject) + (1 | Word)

Reference level: Group: CTRL; Test: pre-test; Type: trained.

Linear mixed model fit by REML.

t-tests use Satterthwaite’s method.



**Fig. B.1** Visualization of the two-way interaction between Group (MT, ST, CTRL) and Test (Pre-test, Post-test1, Post-test2) on the percent correct accuracy of word identification.

**Table B.2** Summary output of the LMM on the word identification response time (logRT)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Fixed effects | Estimate | | *SE* | *df* | *t* value | *p* value |
| (Intercept) | | 7.58 | 0.06 | 73.68 | 126.33 | < .001 |
| GroupMT | | 0.11 | 0.08 | 65.30 | 1.36 | .18 |
| GroupST | | 0.24 | 0.08 | 65.30 | 2.88 | .01 |
| Testpost1 | | -0.06 | 0.05 | 79.58 | -1.11 | .27 |
| Testpost2 | | -0.06 | 0.07 | 68.74 | -0.87 | .39 |
| Typeuntrained | | 0.04 | 0.03 | 77.71 | 1.14 | .26 |
| GroupMT:Testpost1 | | 0.10 | 0.08 | 79.58 | 1.28 | .20 |
| GroupST:Testpost1 | | 0.10 | 0.08 | 79.58 | 1.32 | .19 |
| GroupMT:Testpost2 | | 0.04 | 0.10 | 68.74 | 0.39 | .70 |
| GroupST:Testpost2 | | 0.08 | 0.10 | 68.74 | 0.84 | .40 |
| GroupMT:Typeuntrained | | -0.06 | 0.03 | 3393.00 | -1.66 | .10 |
| GroupST:Typeuntrained | | -0.06 | 0.03 | 3393.00 | -1.72 | .09 |
| Testpost1:Typeuntrained | | <0.01 | 0.03 | 3393.00 | -0.06 | .95 |
| Testpost2:Typeuntrained | | -0.04 | 0.03 | 3393.00 | -1.17 | .24 |
| GroupMT:Testpost1:Typeuntrained | | -0.03 | 0.05 | 3393.00 | -0.57 | .57 |
| GroupST:Testpost1:Typeuntrained | | -0.01 | 0.05 | 3393.00 | -0.21 | .84 |
| GroupMT:Testpost2:Typeuntrained | | -0.01 | 0.05 | 3393.00 | -0.15 | .88 |
| GroupST:Testpost2:Typeuntrained | | 0.01 | 0.05 | 3393.00 | 0.13 | .90 |
|  | |  |  |  |  |  |
| Random effects | | Term | Variance | SD | Correlation | |
| Subject | | (Intercept) | 0.06 | 0.24 |  |  |
|  | | testpost1 | 0.04 | 0.21 | -0.23 |  |
|  | | testpost2 | 0.08 | 0.29 | -0.28 | 0.62 |
| Word | | (Intercept) | 0.002 | 0.05 |  |  |

*Note*. Final models: logRT ~ Group \* Test \* Type + (1 + Test | Subject) + (1 | Word)

Reference level: Group: CTRL; Test: pre-test; Type: trained.

Linear mixed model fit by REML.

t-tests use Satterthwaite’s method.

**Table B.3** Summary output of the LMM on the perceptual RWA coefficient of F1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Fixed effects | Estimate | *SE* | *df* | *t* value | *p* value |
| (Intercept) | 0.14 | 0.04 | 109.80 | 3.78 | < .001 |
| GroupMT | 0.02 | 0.05 | 109.80 | 0.32 | .75 |
| GroupST | <0.01 | 0.05 | 109.80 | 0.01 | .99 |
| Testpost1 | <0.01 | 0.04 | 114.00 | -0.04 | .97 |
| Testpost2 | 0.01 | 0.04 | 114.00 | 0.25 | .81 |
| GroupMT:Testpost1 | 0.20 | 0.05 | 114.00 | 4.12 | < .001 |
| GroupST:Testpost1 | 0.21 | 0.05 | 114.00 | 4.19 | < .001 |
| GroupMT:Testpost2 | 0.17 | 0.05 | 114.00 | 3.33 | .001 |
| GroupST:Testpost2 | 0.18 | 0.05 | 114.00 | 3.70 | < .001 |
|  |  |  |  |  |  |
| Random effect | Term | Variance | SD |  |  |
| Subject | (Intercept) | 0.01 | 0.12 |  |  |

*Note*. Final models: F1 ~ Group \* Test + (1 | Subject)

Reference level: Group: CTRL; Test: pre-test.

Linear mixed model fit by REML.

t-tests use Satterthwaite’s method.

**Table B.4** Summary output of the LMM on the perceptual RWA coefficient of F2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Fixed effects | Estimate | *SE* | *df* | *t* value | *p* value |
| (Intercept) | 0.15 | 0.04 | 103.22 | 4.01 | < .001 |
| GroupMT | 0.01 | 0.05 | 103.22 | 0.13 | .90 |
| GroupST | <0.01 | 0.05 | 103.22 | -0.04 | .97 |
| Testpost1 | <0.01 | 0.04 | 114.00 | -0.03 | .98 |
| Testpost2 | <0.01 | 0.04 | 114.00 | 0.09 | .93 |
| GroupMT:Testpost1 | 0.20 | 0.05 | 114.00 | 4.12 | < .001 |
| GroupST:Testpost1 | 0.19 | 0.05 | 114.00 | 3.75 | < .001 |
| GroupMT:Testpost2 | 0.18 | 0.05 | 114.00 | 3.72 | < .001 |
| GroupST:Testpost2 | 0.17 | 0.05 | 114.00 | 3.51 | < .001 |
|  |  |  |  |  |  |
| Random effect | Term | Variance | SD |  |  |
| Subject | (Intercept) | 0.017 | 0.13 |  |  |

*Note*. Final models: F2 ~ Group \* Test + (1 | Subject)

Reference level: Group: CTRL; Test: pre-test.

Linear mixed model fit by REML.

t-tests use Satterthwaite’s method.

**Table B.5** Summary output of the LMM on the perceptual RWA coefficient of duration

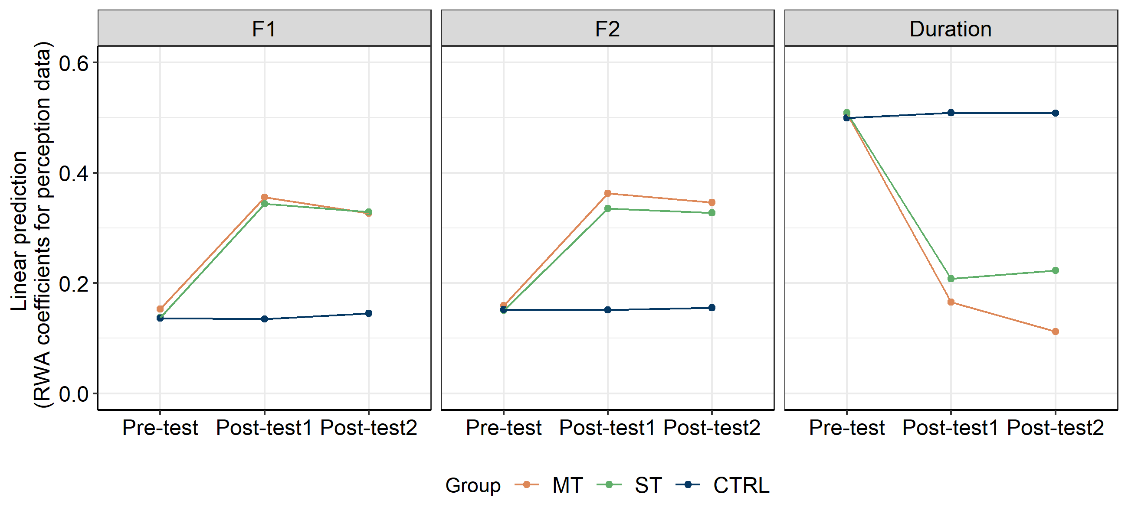
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Fixed effects | Estimate | *SE* | *df* | *t* value | *p* value |
| (Intercept) | 0.50 | 0.07 | 97.40 | 6.97 | < .001 |
| GroupMT | 0.01 | 0.10 | 97.40 | 0.08 | .94 |
| GroupST | 0.01 | 0.10 | 97.40 | 0.09 | .93 |
| Testpost1 | 0.01 | 0.06 | 114.00 | 0.15 | .88 |
| Testpost2 | 0.01 | 0.06 | 114.00 | 0.13 | .89 |
| GroupMT:Testpost1 | -0.35 | 0.09 | 114.00 | -3.95 | < .001 |
| GroupST:Testpost1 | -0.31 | 0.09 | 114.00 | -3.49 | < .001 |
| GroupMT:Testpost2 | -0.40 | 0.09 | 114.00 | -4.54 | < .001 |
| GroupST:Testpost2 | -0.29 | 0.09 | 114.00 | -3.30 | .001 |
|  |  |  |  |  |  |
| Random effect | Term | Variance | SD |  |  |
| Subject | (Intercept) | 0.063 | 0.25 |  |  |

*Note*. Final models: duration ~ Group \* Test + (1 | Subject)

Reference level: Group: CTRL; Test: pre-test.

Linear mixed model fit by REML.

t-tests use Satterthwaite’s method.



**Fig. B.2** Visualization of the two-way interaction between Group (MT, ST, CTRL) and Test (pre-test, post-test1, post-test2) on the respective RWA coefficients of F1, F2, and duration measured in perception. Post-test1 represents the post-test; post-test2 represents the delayed post-test.

**Table B.6** Summary output of the LMM on the production RWA coefficient of F1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Fixed effects | Estimate | *SE* | *df* | *t* value | *p* value |
| (Intercept) | 0.14 | 0.03 | 116.59 | 4.02 | < .001 |
| GroupMT | -0.04 | 0.05 | 116.59 | -0.80 | .43 |
| GroupST | -0.003 | 0.05 | 116.59 | -0.06 | .96 |
| Testpost1 | -0.01 | 0.03 | 114.00 | -0.34 | .74 |
| Testpost2 | 0.02 | 0.03 | 114.00 | 0.53 | .60 |
| GroupMT:Testpost1 | 0.15 | 0.05 | 114.00 | 3.10 | .002 |
| GroupST:Testpost1 | 0.12 | 0.05 | 114.00 | 2.41 | .02 |
| GroupMT:Testpost2 | 0.13 | 0.05 | 114.00 | 2.72 | .01 |
| GroupST:Testpost2 | 0.09 | 0.05 | 114.00 | 1.75 | .08 |
|  |  |  |  |  |  |
| Random effect | Term | Variance | SD |  |  |
| Subject | (Intercept) | 0.01 | 0.11 |  |  |

*Note*. Final models: F1 ~ Group \* Test + (1 | Subject)

Reference level: Group: CTRL; Test: pre-test.

Linear mixed model fit by REML.

t-tests use Satterthwaite’s method.

**Table B.7** Summary output of the LMM on the production RWA coefficient of F2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Fixed effects | Estimate | *SE* | *df* | *t* value | *p* value |
| (Intercept) | 0.11 | 0.03 | 95.69 | 3.57 | < .001 |
| GroupMT | -0.01 | 0.04 | 95.69 | -0.26 | .80 |
| GroupST | -0.01 | 0.04 | 95.69 | -0.28 | .78 |
| Testpost1 | -0.001 | 0.03 | 114.00 | -0.03 | .97 |
| Testpost2 | -0.0001 | 0.03 | 114.00 | 0.00 | 1.00 |
| GroupMT:Testpost1 | 0.09 | 0.04 | 114.00 | 2.51 | .01 |
| GroupST:Testpost1 | 0.09 | 0.04 | 114.00 | 2.31 | .02 |
| GroupMT:Testpost2 | 0.10 | 0.04 | 114.00 | 2.69 | .01 |
| GroupST:Testpost2 | 0.11 | 0.04 | 114.00 | 3.02 | .003 |
|  |  |  |  |  |  |
| Random effect | Term | Variance | SD |  |  |
| Subject | (Intercept) | 0.01 | 0.11 |  |  |

*Note*. Final models: F2 ~ Group \* Test + (1 | Subject)

Reference level: Group: CTRL; Test: pre-test.

Linear mixed model fit by REML.

t-tests use Satterthwaite’s method.

**Table B.8** Summary output of the LMM on the production RWA coefficient of duration

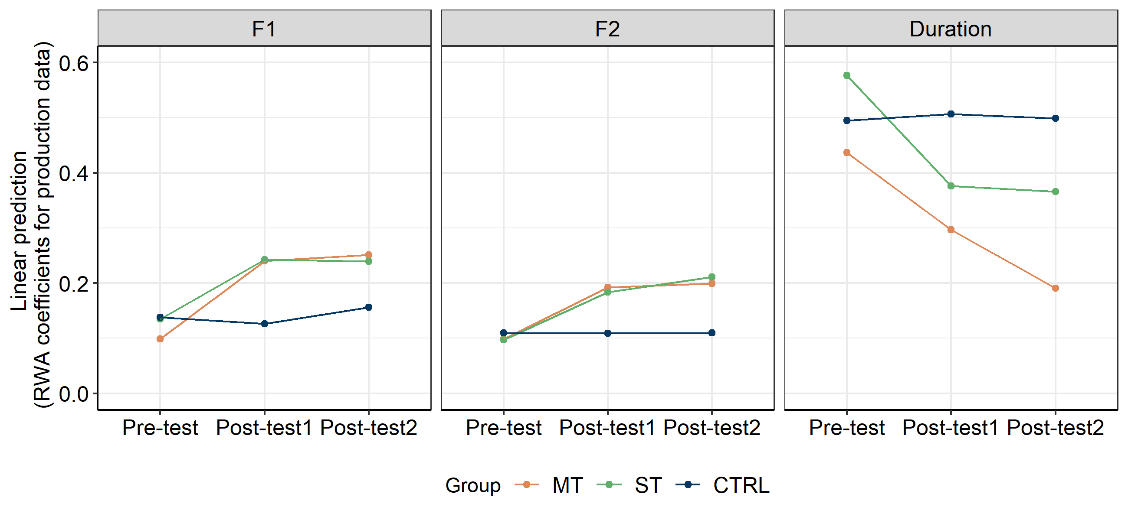
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Fixed effects | Estimate | *SE* | *df* | *t* value | *p* value |
| (Intercept) | 0.49 | 0.04 | 116.18 | 11.14 | < .001 |
| GroupMT | -0.06 | 0.06 | 116.18 | -0.92 | .36 |
| GroupST | 0.08 | 0.06 | 116.18 | 1.31 | .19 |
| Testpost1 | 0.01 | 0.05 | 114.00 | 0.26 | .80 |
| Testpost2 | <0.01 | 0.05 | 114.00 | 0.08 | .94 |
| GroupMT:Testpost1 | -0.15 | 0.06 | 114.00 | -2.38 | .02 |
| GroupST:Testpost1 | -0.21 | 0.06 | 114.00 | -3.33 | .001 |
| GroupMT:Testpost2 | -0.25 | 0.06 | 114.00 | -3.93 | < .001 |
| GroupST:Testpost2 | -0.21 | 0.06 | 114.00 | -3.37 | .001 |
|  |  |  |  |  |  |
| Random effect | Term | Variance | SD |  |  |
| Subject | (Intercept) | 0.02 | 0.14 |  |  |

*Note*. Final models: duration ~ Group \* Test + (1 | Subject)

Reference level: Group: CTRL; Test: pre-test.

Linear mixed model fit by REML.

t-tests use Satterthwaite’s method.



**Fig. B.3** Visualization of the two-way interaction between Group (MT, ST, CTRL) and Test (Pre-test, Post-test1, Post-test2) on the respective RWA coefficients of F1, F2, and vowel duration measured in production.

**Appendix C: Summary output of the linear mixed-effects models with cognitive factors being included as fixed effects**

**Table C.1** Summary output of the LMM on the word identification accuracy with cognitive variables

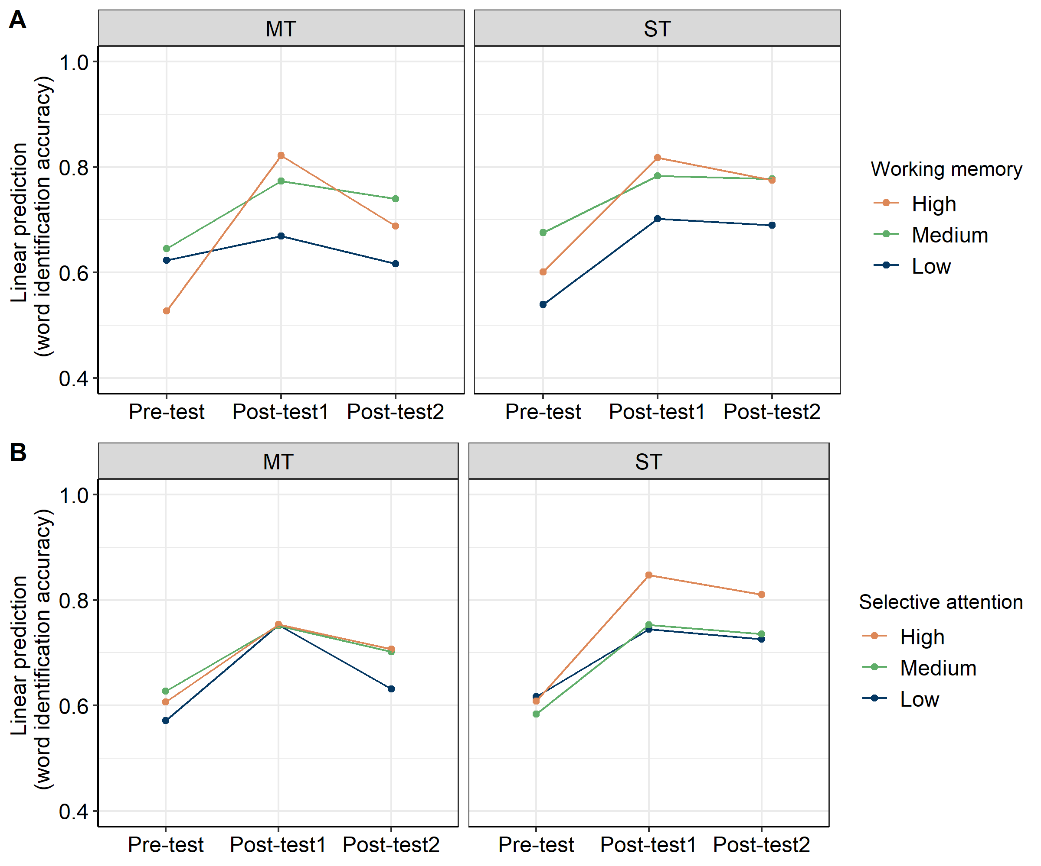
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Fixed effects | Estimate | *SE* | *df* | *t* value | *p* value |
| (Intercept) | 0.61 | 0.04 | 58.45 | 16.01 | < .001 |
| GroupST | -0.02 | 0.04 | 110.30 | -0.51 | .61 |
| Testpost1 | 0.12 | 0.03 | 2312.00 | 4.17 | < .001 |
| Testpost2 | 0.07 | 0.03 | 2312.00 | 2.36 | .02 |
| Typeuntrained | -0.02 | 0.04 | 37.79 | -0.40 | .69 |
| Flanker\_c | 0.01 | 0.02 | 110.30 | 0.82 | .41 |
| WM\_acc\_c | -0.42 | 0.31 | 110.30 | -1.34 | .18 |
| GroupST:Testpost1 | 0.04 | 0.04 | 2312.00 | 0.90 | .37 |
| GroupST:Testpost2 | 0.06 | 0.04 | 2312.00 | 1.51 | .13 |
| GroupST:Typeuntrained | 0.03 | 0.04 | 2312.00 | 0.78 | .44 |
| Testpost1:Typeuntrained | 0.06 | 0.04 | 2312.00 | 1.52 | .13 |
| Testpost2:Typeuntrained | 0.03 | 0.04 | 2312.00 | 0.71 | .48 |
| GroupST:Flanker\_c | 0.03 | 0.02 | 110.30 | 1.14 | .26 |
| GroupST:WM\_acc\_c | 0.56 | 0.39 | 110.30 | 1.42 | .16 |
| Testpost1:Flanker\_c | -0.01 | 0.02 | 2312.00 | -0.96 | .34 |
| Testpost2:Flanker\_c | 0.03 | 0.02 | 2312.00 | 1.91 | .06 |
| Testpost1:WM\_acc\_c | 1.06 | 0.32 | 2312.00 | 3.38 | < .001 |
| Testpost2:WM\_acc\_c | 0.53 | 0.32 | 2312.00 | 1.70 | .09 |
| Typeuntrained:Flanker\_c | 0.01 | 0.01 | 2312.00 | 0.37 | .71 |
| Typeuntrained:WM\_acc\_c | -0.10 | 0.29 | 2312.00 | -0.36 | .72 |
| GroupST:Testpost1:Typeuntrained | -0.02 | 0.05 | 2312.00 | -0.44 | .66 |
| GroupST:Testpost2:Typeuntrained | 0.01 | 0.05 | 2312.00 | 0.27 | .79 |
| GroupST:Testpost1:Flanker\_c | -0.01 | 0.02 | 2312.00 | -0.57 | .57 |
| GroupST:Testpost2:Flanker\_c | -0.06 | 0.02 | 2312.00 | -2.24 | .02 |
| GroupST:Testpost1:WM\_acc\_c | -0.82 | 0.40 | 2312.00 | -2.05 | .04 |
| GroupST:Testpost2:WM\_acc\_c | -0.27 | 0.40 | 2312.00 | -0.67 | .51 |
| GroupST:Typeuntrained:Flanker\_c | 0.01 | 0.02 | 2312.00 | 0.42 | .68 |
| GroupST:Typeuntrained:WM\_acc\_c | 0.12 | 0.37 | 2312.00 | 0.34 | .74 |
| Testpost1:Typeuntrained:Flanker\_c | 0.00 | 0.02 | 2312.00 | 0.02 | .99 |
| Testpost2:Typeuntrained:Flanker\_c | -0.02 | 0.02 | 2312.00 | -0.81 | .42 |
| Testpost1:Typeuntrained:WM\_acc\_c | -0.03 | 0.41 | 2312.00 | -0.06 | .95 |
| Testpost2:Typeuntrained:WM\_acc\_c | 0.17 | 0.41 | 2312.00 | 0.42 | .68 |
| GroupST:Testpost1:Typeuntrained:Flanker\_c | -0.02 | 0.03 | 2312.00 | -0.77 | .44 |
| GroupST:Testpost2:Typeuntrained:Flanker\_c | -0.02 | 0.03 | 2312.00 | -0.48 | .63 |
| GroupST:Testpost1:Typeuntrained:WM\_acc\_c | 0.18 | 0.52 | 2312.00 | 0.35 | .73 |
| GroupST:Testpost2:Typeuntrained:WM\_acc\_c | -0.21 | 0.52 | 2312.00 | -0.41 | .68 |
|  |  |  |  |  |  |
| Random effects | Term | Variance | SD |  |  |
| Subject | (Intercept) | 0.008 | 0.09 |  |  |
| Word | (Intercept) | 0.005 | 0.07 |  |  |

*Note*. Final model: Accuracy ~ Group \* Test \* Type \* (Flanker\_c + WM\_acc\_c) + (1 | Subject) + (1 | Word)

Reference level: Group: MT; Test: pre-test; Type: untrained.

Linear mixed model fit by REML.

t-tests use Satterthwaite’s method.



**Fig. C.1** Panel A shows visualization of the three-way interaction between Group (MT, ST, CTRL), Test (Pre-test, Post-test1, Post-test2) and Working memory capacity (high, medium, low) on the word identification accuracy for two training groups (MT versus ST). Panel B shows visualization of the three-way interaction between Group (MT, ST, CTRL), Test (pre-test, post-test1, post-test2) and Selective attention ability (high, medium, low) on the word identification accuracy for two training group (MT versus ST).

**Table C.2** Summary output of the LMM on the perceptual RWA coefficient of F1 with cognitive variables

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Fixed effects | Estimate | *SE* | *df* | *t* value | *p* value |
| (Intercept) | 0.16 | 0.04 | 78.34 | 4.14 | < .001 |
| GroupST | -0.02 | 0.05 | 78.34 | -0.42 | .68 |
| Testpost1 | 0.20 | 0.04 | 68.00 | 4.69 | < .001 |
| Testpost2 | 0.17 | 0.04 | 68.00 | 4.03 | < .001 |
| Flanker\_c | 0.03 | 0.02 | 78.34 | 1.37 | .17 |
| WM\_acc\_c | -0.35 | 0.42 | 78.34 | -0.84 | .41 |
| GroupST:Testpost1 | 0.01 | 0.06 | 68.00 | 0.14 | .89 |
| GroupST:Testpost2 | 0.02 | 0.06 | 68.00 | 0.37 | .71 |
| GroupST:Glanker\_c | -0.01 | 0.03 | 78.34 | -0.33 | .74 |
| GroupST:WM\_acc\_c | 0.28 | 0.54 | 78.34 | 0.52 | .60 |
| Testpost1:Flanker\_c | 0.00 | 0.02 | 68.00 | -0.09 | .93 |
| Testpost2:Flanker\_c | -0.02 | 0.02 | 68.00 | -1.00 | .32 |
| Testpost1:WM\_acc\_c | 0.86 | 0.47 | 68.00 | 1.84 | .07 |
| Testpost2: WM \_acc\_c | 0.35 | 0.47 | 68.00 | 0.75 | .46 |
| GroupST:Testpost1:Flanker\_c | 0.02 | 0.04 | 68.00 | 0.49 | .63 |
| GroupST:Testpost2:Flanker\_c | 0.04 | 0.04 | 68.00 | 1.19 | .24 |
| GroupST:Testpost1:WM\_acc\_c | -0.71 | 0.59 | 68.00 | -1.19 | .24 |
| GroupST:Testpost2:WM\_acc\_c | -0.05 | 0.59 | 68.00 | -0.08 | .94 |
|  |  |  |  |  |  |
| Random effects | Term | Variance | SD |  |  |
| Subject | (Intercept) | 0.01 | 0.11 |  |  |

*Note*. Final model: F1 ~ Group \* Test \* (Flanker\_c + WM\_acc\_c) + (1 | Subject)

Reference level: Group: MT; Test: pre-test.

Linear mixed model fit by REML.

t-tests use Satterthwaite’s method.

**Table C.3** Summary output of the LMM on the perceptual RWA coefficient of F2 with cognitive variables

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Fixed effects | Estimate | *SE* | *df* | *t* value | *p* value |
| (Intercept) | 0.16 | 0.04 | 75.26 | 4.24 | < .001 |
| GroupST | -0.02 | 0.05 | 75.26 | -0.30 | .77 |
| Testpost1 | 0.20 | 0.04 | 68.00 | 4.79 | < .001 |
| Testpost2 | 0.18 | 0.04 | 68.00 | 4.39 | < .001 |
| Flanker\_c | 0.03 | 0.02 | 75.26 | 1.42 | .16 |
| WM\_acc\_c | -0.38 | 0.43 | 75.26 | -0.88 | .38 |
| GroupST:Testpost1 | -0.01 | 0.06 | 68.00 | -0.25 | .80 |
| GroupST:Testpost2 | <0.01 | 0.06 | 68.00 | -0.08 | .94 |
| GroupST:Glanker\_c | -0.01 | 0.03 | 75.26 | -0.34 | .74 |
| GroupST:WM\_acc\_c | 0.30 | 0.54 | 75.26 | 0.54 | .59 |
| Testpost1:Flanker\_c | <0.01 | 0.02 | 68.00 | 0.01 | .99 |
| Testpost2:Flanker\_c | -0.02 | 0.02 | 68.00 | -1.08 | .28 |
| Testpost1:WM\_acc\_c | 0.75 | 0.46 | 68.00 | 1.64 | .11 |
| Testpost2: WM \_acc\_c | 0.39 | 0.46 | 68.00 | 0.86 | .40 |
| GroupST:Testpost1:Flanker\_c | 0.02 | 0.04 | 68.00 | 0.44 | .66 |
| GroupST:Testpost2:Flanker\_c | 0.04 | 0.04 | 68.00 | 1.21 | .23 |
| GroupST:Testpost1:WM\_acc\_c | -0.57 | 0.59 | 68.00 | -0.98 | .33 |
| GroupST:Testpost2:WM\_acc\_c | 0.05 | 0.59 | 68.00 | 0.08 | .94 |
|  |  |  |  |  |  |
| Random effects | Term | Variance | SD |  |  |
| Subject | (Intercept) | 0.01 | 0.11 |  |  |

*Note*. Final model: F2 ~ Group \* Test \* (Flanker\_c + WM\_acc\_c) + (1 | Subject)

Reference level: Group: MT; Test: pre-test.

Linear mixed model fit by REML.

t-tests use Satterthwaite’s method.

**Table C.4** Summary output of the LMM on the perceptual RWA coefficient of duration with cognitive variables

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Fixed effects | Estimate | *SE* | *df* | *t* value | *p* value |
| (Intercept) | 0.50 | 0.07 | 66.16 | 7.04 | < .001 |
| GroupST | 0.02 | 0.10 | 66.16 | 0.16 | .88 |
| Testpost1 | -0.34 | 0.07 | 68.00 | -4.81 | < .001 |
| Testpost2 | -0.39 | 0.07 | 68.00 | -5.58 | < .001 |
| Flanker\_c | -0.03 | 0.04 | 66.16 | -0.71 | .48 |
| WM\_acc\_c | 0.32 | 0.79 | 66.16 | 0.41 | .68 |
| GroupST:Testpost1 | 0.03 | 0.10 | 68.00 | 0.31 | .76 |
| GroupST:Testpost2 | 0.10 | 0.10 | 68.00 | 1.03 | .31 |
| GroupST:Glanker\_c | -0.01 | 0.06 | 66.16 | -0.10 | .92 |
| GroupST:WM\_acc\_c | 0.81 | 1.00 | 66.16 | 0.81 | .42 |
| Testpost1:Flanker\_c | -0.01 | 0.04 | 68.00 | -0.24 | .81 |
| Testpost2:Flanker\_c | 0.03 | 0.04 | 68.00 | 0.79 | .43 |
| Testpost1:WM\_acc\_c | -1.12 | 0.77 | 68.00 | -1.44 | .15 |
| Testpost2: WM \_acc\_c | -0.41 | 0.77 | 68.00 | -0.53 | .60 |
| GroupST:Testpost1:Flanker\_c | -0.01 | 0.06 | 68.00 | -0.23 | .82 |
| GroupST:Testpost2:Flanker\_c | -0.07 | 0.06 | 68.00 | -1.23 | .23 |
| GroupST:Testpost1:WM\_acc\_c | 0.03 | 0.98 | 68.00 | 0.03 | .97 |
| GroupST:Testpost2:WM\_acc\_c | -0.89 | 0.98 | 68.00 | -0.90 | .37 |
|  |  |  |  |  |  |
| Random effects | Term | Variance | SD |  |  |
| Subject | (Intercept) | 0.01 | 0.11 |  |  |

*Note*. Final model: duration ~ Group \* Test \* (Flanker\_c + WM\_acc\_c) + (1 | Subject)

Reference level: Group: MT; Test: pre-test.

Linear mixed model fit by REML.

t-tests use Satterthwaite’s method.

**Table C.5** Summary output of the LMM on the production RWA coefficient of F1 with cognitive variables

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Fixed effects | Estimate | *SE* | *df* | *t* value | *p* value |
| (Intercept) | 0.10 | 0.04 | 67.15 | 2.55 | < .001 |
| GroupST | 0.04 | 0.05 | 67.15 | 0.72 | .47 |
| Testpost1 | 0.14 | 0.04 | 68.00 | 3.84 | < .001 |
| Testpost2 | 0.16 | 0.04 | 68.00 | 4.20 | < .001 |
| Flanker\_c | -0.02 | 0.02 | 67.15 | -0.76 | .45 |
| WM\_acc\_c | 0.39 | 0.41 | 67.15 | 0.95 | .35 |
| GroupST:Testpost1 | -0.03 | 0.05 | 68.00 | -0.64 | .52 |
| GroupST:Testpost2 | -0.05 | 0.05 | 68.00 | -0.99 | .33 |
| GroupST:Glanker\_c | 0.03 | 0.03 | 67.15 | 1.06 | .30 |
| GroupST:WM\_acc\_c | -0.35 | 0.53 | 67.15 | -0.67 | .51 |
| Testpost1:Flanker\_c | 0.01 | 0.02 | 68.00 | 0.71 | .48 |
| Testpost2:Flanker\_c | 0.02 | 0.02 | 68.00 | 1.23 | .22 |
| Testpost1:WM\_acc\_c | 0.10 | 0.41 | 68.00 | 0.24 | .81 |
| Testpost2: WM \_acc\_c | -0.08 | 0.41 | 68.00 | -0.21 | .84 |
| GroupST:Testpost1:Flanker\_c | -0.04 | 0.03 | 68.00 | -1.20 | .23 |
| GroupST:Testpost2:Flanker\_c | -0.03 | 0.03 | 68.00 | -0.84 | .40 |
| GroupST:Testpost1:WM\_acc\_c | -0.29 | 0.52 | 68.00 | -0.55 | .58 |
| GroupST:Testpost2:WM\_acc\_c | -0.14 | 0.52 | 68.00 | -0.27 | .79 |
|  |  |  |  |  |  |
| Random effects | Term | Variance | SD |  |  |
| Subject | (Intercept) | 0.01 | 0.12 |  |  |

*Note*. Final model: F1 ~ Group \* Test \* (Flanker\_c + WM\_acc\_c) + (1 | Subject)

Reference level: Group: MT; Test: pre-test.

Linear mixed model fit by REML.

t-tests use Satterthwaite’s method.

**Table C.6** Summary output of the LMM on the production RWA coefficient of F2 with cognitive variables

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Fixed effects | Estimate | *SE* | *df* | *t* value | *p* value |
| (Intercept) | 0.10 | 0.03 | 62.60 | 3.08 | < .001 |
| GroupST | <0.01 | 0.05 | 62.60 | -0.01 | 1.00 |
| Testpost1 | 0.09 | 0.03 | 68.00 | 3.03 | .003 |
| Testpost2 | 0.10 | 0.03 | 68.00 | 3.39 | .001 |
| Flanker\_c | 0.01 | 0.02 | 62.60 | 0.40 | .69 |
| WM\_acc\_c | -0.02 | 0.36 | 62.60 | -0.07 | .95 |
| GroupST:Testpost1 | <0.01 | 0.04 | 68.00 | -0.05 | .96 |
| GroupST:Testpost2 | 0.01 | 0.04 | 68.00 | 0.34 | .74 |
| GroupST:Glanker\_c | <0.01 | 0.03 | 62.60 | -0.05 | .96 |
| GroupST:WM\_acc\_c | 0.41 | 0.45 | 62.60 | 0.90 | .37 |
| Testpost1:Flanker\_c | 0.01 | 0.02 | 68.00 | 0.65 | .52 |
| Testpost2:Flanker\_c | 0.01 | 0.02 | 68.00 | 0.84 | .41 |
| Testpost1:WM\_acc\_c | 0.42 | 0.33 | 68.00 | 1.27 | .21 |
| Testpost2: WM \_acc\_c | -0.09 | 0.33 | 68.00 | -0.26 | .79 |
| GroupST:Testpost1:Flanker\_c | -0.03 | 0.03 | 68.00 | -1.06 | .29 |
| GroupST:Testpost2:Flanker\_c | -0.04 | 0.03 | 68.00 | -1.56 | .12 |
| GroupST:Testpost1:WM\_acc\_c | -0.05 | 0.43 | 68.00 | -0.12 | .91 |
| GroupST:Testpost2:WM\_acc\_c | 0.30 | 0.43 | 68.00 | 0.69 | .49 |
|  |  |  |  |  |  |
| Random effects | Term | Variance | SD |  |  |
| Subject | (Intercept) | 0.01 | 0.11 |  |  |

*Note*. Final model: F2 ~ Group \* Test \* (Flanker\_c + WM\_acc\_c) + (1 | Subject)

Reference level: Group: MT; Test: pre-test.

Linear mixed model fit by REML.

t-tests use Satterthwaite’s method.

**Table C.7** Summary output of the LMM on the production RWA coefficient of duration with cognitive variables

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Fixed effects | Estimate | *SE* | *df* | *t* value | *p* value |
| (Intercept) | 0.43 | 0.05 | 66.38 | 9.36 | < .001 |
| GroupST | 0.15 | 0.07 | 66.38 | 2.25 | .03 |
| Testpost1 | -0.13 | 0.05 | 68.00 | -2.97 | .004 |
| Testpost2 | -0.24 | 0.05 | 68.00 | -5.35 | < .001 |
| Flanker\_c | -0.03 | 0.02 | 66.38 | -1.01 | .32 |
| WM\_acc\_c | 0.41 | 0.51 | 66.38 | 0.81 | .42 |
| GroupST:Testpost1 | -0.07 | 0.06 | 68.00 | -1.14 | .26 |
| GroupST:Testpost2 | 0.03 | 0.06 | 68.00 | 0.42 | .67 |
| GroupST:Glanker\_c | -0.02 | 0.04 | 66.38 | -0.55 | .59 |
| GroupST:WM\_acc\_c | -0.85 | 0.65 | 66.38 | -1.31 | .20 |
| Testpost1:Flanker\_c | 0.02 | 0.02 | 68.00 | 0.88 | .38 |
| Testpost2:Flanker\_c | 0.04 | 0.02 | 68.00 | 1.56 | .12 |
| Testpost1:WM\_acc\_c | -0.58 | 0.50 | 68.00 | -1.16 | .25 |
| Testpost2: WM \_acc\_c | -0.08 | 0.50 | 68.00 | -0.15 | .88 |
| GroupST:Testpost1:Flanker\_c | 0.04 | 0.04 | 68.00 | 1.07 | .29 |
| GroupST:Testpost2:Flanker\_c | <0.01 | 0.04 | 68.00 | -0.03 | .98 |
| GroupST:Testpost1:WM\_acc\_c | 0.48 | 0.64 | 68.00 | 0.75 | .46 |
| GroupST:Testpost2:WM\_acc\_c | -0.10 | 0.64 | 68.00 | -0.16 | .87 |
|  |  |  |  |  |  |
| Random effects | Term | Variance | SD |  |  |
| Subject | (Intercept) | 0.02 | 0.15 |  |  |

*Note*. Final model: duration ~ Group \* Test \* (Flanker\_c + WM\_acc\_c) + (1 | Subject)

Reference level: Group: MT; Test: pre-test.

Linear mixed model fit by REML.

t-tests use Satterthwaite’s method.