

# Supplementary material

## Tables

Table 1

*Trial Procedure*

| Group | Day 0               | Day 2          | Day 3          | Day 4          | Day 5          | Day 6          | Day 7                           |
|-------|---------------------|----------------|----------------|----------------|----------------|----------------|---------------------------------|
| NOTV  | Initial assessment: | CE             | CE             | CE             | CE             | CE             | Final assessment:               |
|       | 1. fMRI             | No media       | No media       | No media       | No media       | No media       | Identical to initial assessment |
|       | 2. MDT              |                |                |                |                |                |                                 |
|       | 3. GOT              | 90min Training | 90min Training | 90min Training | 90min Training | 90min Training |                                 |
|       | 4. Dictation        |                |                |                |                |                |                                 |
| TV    | 5. TVA              | CE             | CE             | CE             | CE             | CE             |                                 |
|       | 6. questionnaires   | 8h+ media      | 8h+ media      | 8h+ media      | 8h+ media      | 8h+ media      |                                 |
|       |                     | 90min Training | 90min Training | 90min Training | 90min Training | 90min Training |                                 |

Note: Temporal sequence of trial procedure. NOTV = control group, TV = intervention group, fMRI = functional magnetic resonance imaging, MDT = mechanical detection threshold, GOT = grating orientation task, TVA = theory of visual attention / visual attention testing, media = television or similar media, CE = controlled environment

**Table 2***Participants Characteristics*

|                                                                 | n (NOTV)            | n (TV) | n total |
|-----------------------------------------------------------------|---------------------|--------|---------|
| Subjects recruited                                              | 40                  | 39     | 79      |
| Subjects excluded                                               | 3                   | 2      | 5       |
| Subjects included                                               | 37                  | 37     | 74      |
| Female                                                          | 21                  | 19     | 37      |
| Male                                                            | 16                  | 18     | 37      |
| High media consumption time <sup>a</sup> (30+ h/week)           | 6                   | 8      | 14      |
| Average media consumption time <sup>a</sup> (15-30 h/week)      | 20                  | 14     | 34      |
| Low media consumption time <sup>a</sup> (0-14,9 h/week)         | 11                  | 15     | 26      |
| Left-handed                                                     | 2                   | 4      | 6       |
| Smoker                                                          | 5                   | 7      | 12      |
|                                                                 | mean                | SD     |         |
| Age, y                                                          | 22.89 (22.31-23.47) | 2.49   |         |
| Age (NOTV)                                                      | 23.46 (22.59-24.33) | 2.60   |         |
| Age (TV)                                                        | 22.32 (21.57-23.08) | 2.27   |         |
| Age (Female)                                                    | 22.90 (22.03-23.77) | 2.72   |         |
| Age (Male)                                                      | 22.88 (22.10-23.66) | 2.24   |         |
| Total media consumption time (hours/week)                       | 31.02 (27.81-34.23) | 13.84  |         |
| Specific Media consumption time <sup>b</sup> (hours/week)       | 20.29 (17.90-22.68) | 10.31  |         |
| Specific media consumption time <sup>b</sup> (NOTV, hours/week) | 19.51 (16.48-22.55) | 9.10   |         |
| Specific media consumption time <sup>b</sup> (TV, hours/week)   | 21.07 (17.25-24.89) | 11.46  |         |

Note: General information about the participating subjects. <sup>a</sup> Regarding specific media consumption time. <sup>b</sup> Specific media consumption time means passively and auditive-visually consumed electronic media with moving images (e.g., television, streaming movies via internet). Total media consumption time represents total screen time (including work on the PC or smartphone).

**Table 3***Acquisition Parameters of fMRI*

| MP-RAGE T1 sequence parameters        |                            | Resting-state fMRI sequence parameters |                            |
|---------------------------------------|----------------------------|----------------------------------------|----------------------------|
| Repetition time (TR)                  | 2300ms                     | Repetition time (TR)                   | 1950ms                     |
| Echo time (TE)                        | 2.07ms                     | Echo time (TE)                         | 33.60ms                    |
| Flip angle (FA)                       | alpha 9°                   | Flip angle (FA)                        | 90                         |
| Voxel size                            | 1x1x1mm <sup>3</sup>       | Voxel size                             | 1.4x1.4x1.4mm <sup>3</sup> |
| In-plane field of view (FOV)          | 256mm                      | In-plane field of view (FOV)           | 256mm                      |
| Number of (contiguous axial) slices   | 192                        | Number of slices                       | 100                        |
| Acquisition time                      | 5:21min                    | Acquisition time                       | 9:28min                    |
|                                       |                            | Multiband acceleration factor          | 4                          |
| Task-related fMRI sequence parameters |                            |                                        |                            |
| Repetition time (TR)                  | 484ms                      |                                        |                            |
| Echo time (TE)                        | 30ms                       |                                        |                            |
| Flip angle (FA)                       | 90                         |                                        |                            |
| Voxel size                            | 2.5x2.5x1.5mm <sup>3</sup> |                                        |                            |
| Number of slices                      | 56                         |                                        |                            |
| Acquisition time                      | 12 min                     |                                        |                            |
| Multiband acceleration factor         | 8                          |                                        |                            |

Note: Acquisition Parameters of anatomical and functional MRI data.

**Table 4**

| Domain      | Yeo 17N                             | Brodmann-Area <sup>a</sup>   |
|-------------|-------------------------------------|------------------------------|
| Visual      | Visual 1 (VIS1)                     | 18, 19                       |
|             | Visual 2 (VIS2)                     | 17                           |
| Somatomotor | Motor 1 (MOT1)                      | 1, 2, 3, 4, 5, 6, 41, 42, 43 |
|             | Motor 2 (MOT2)                      | 1, 2, 3, 4, 6, 41, 42, 43    |
|             | Motor 3 (MOT3)                      | 22, 39, 41, 42               |
| Attention   | Dorsal attention network 1 (DAN1)   | 6, 7                         |
|             | Dorsal attention network 2 (DAN2)   | 37, 39                       |
|             | Including FEF and IPS               |                              |
| Salience    | Ventral attention network 1 (VAN1)  | 13, 24, 32, 39, 40           |
|             | Partly including DLPFC              |                              |
| Control     | Frontoparietal network 1 (FP1)      | 9, 10, 24, 32                |
|             | Frontoparietal network 2 (FP2)      | 8, 9, 10, 11, 21, 32, 46     |
|             | Frontoparietal network 3 (FP3)      | 40, 44, 45, 46               |
|             | Frontoparietal network 4 (FP4)      | 8, 9, 44, 46                 |
|             | Including DLPFC (BA8, 9, 46)        |                              |
| Default     | Default mode network 1 (DMN1)       | 7, 23, 24, 31, 32            |
|             | Default mode network 2 (DMN2)       | 8, 9, 17, 21, 22, 39         |
|             | Default mode network 3 (DMN3)       | 20, 30                       |
|             | Including PPC (BA7, 23, 31, 39, 40) |                              |

Note: Resting-State Functional Networks (Yeo 17N<sup>28</sup>) with Spatial Cortical Classification following Brodmann<sup>104</sup>. FEF = frontal eye field, IPS = intraparietal sulcus, PPC = posterior parietal cortex, DLPFC = dorsolateral prefrontal cortex. <sup>a</sup>Overlap of Brodmann-Areas between different networks is since different areas share functions, and all areas show multiple domains of activity.

**Table 5***Touch-Typing Performance at Baseline*

| Group | n<br>included | n<br>excluded | Dictation mean cec/m<br>±SD | Training session 1 mean cec/m<br>±SD |
|-------|---------------|---------------|-----------------------------|--------------------------------------|
| NOTV  | 37            | 0             | 206.5<br>±58.21             | 45.0<br>±18.46                       |
| TV    | 37            | 0             | 208.5<br>±65.79             | 42.5<br>±14.51                       |

Note: Dictation and Training session 1 performance shown as mean correctly entered characters per minute (cec/m) in a 10-minutes-dictation. There was no significant difference between the two groups at baseline regarding their touch-typing skills,  $p > .05$ .

**Table 6***Touch-Typing Performance Increase - Gain<sub>L3</sub>*

|            | Group | Gain <sub>L3</sub><br>mean | Gain <sub>L3</sub><br>difference | Gain <sub>L3</sub><br>±SD |
|------------|-------|----------------------------|----------------------------------|---------------------------|
| Day 1 to 2 | NOTV  | 1.34                       |                                  | ±0.21                     |
|            | TV    | 1.48                       | +0.14                            | ±0.20                     |
| Day 1 to 3 | NOTV  | 1.46                       |                                  | ±0.26                     |
|            | TV    | 1.59                       | +0.13                            | ±0.24                     |
| Day 1 to 4 | NOTV  | 1.57                       |                                  | ±0.33                     |
|            | TV    | 1.72                       | +0.15                            | ±0.30                     |
| Day 1 to 5 | NOTV  | 1.63                       |                                  | ±0.38                     |
|            | TV    | 1.79                       | +0.16                            | ±0.31                     |

Note: Gain<sub>L3</sub> is a marker for relative touch-typing performance gain with a predefined marker lesson (Lesson 3) as a repeating data point.

**Table 7***Change in Functional Connectivity in RSN of NOTV vs TV / Pre vs Post*

| Network 1 |                    | Network 2 |                                     | Statistical analysis                               |
|-----------|--------------------|-----------|-------------------------------------|----------------------------------------------------|
| Yeo 17N   | Area               | Yeo 17N   | Area                                |                                                    |
| VAN1      | Right precentral   | DMN1      | Right medial prefrontal             | $t = 4.65$ , $p\text{-FDR} = .002$ , $\beta = .19$ |
| VIS-A     | Right extrastriate | DMN1      | Left precuneus posterior cingulate  | $t = 3.67$ , $p\text{-FDR} = .033$ , $\beta = .19$ |
| VIS-A     | Left extrastriate  | DMN1      | Left precuneus posterior cingulate  | $t = 3.64$ , $p\text{-FDR} = .033$ , $\beta = .20$ |
| VIS-A     | Left extrastriate  | DMN1      | Right inferior parietal lobule      | $t = 3.72$ , $p\text{-FDR} = .024$ , $\beta = .18$ |
| VIS-A     | Left extrastriate  | DMN1      | Right precuneus posterior cingulate | $t = 3.62$ , $p\text{-FDR} = .024$ , $\beta = .20$ |
| VIS-A     | Left extrastriate  | DMN1      | Right temporal                      | $t = 3.23$ , $p\text{-FDR} = .040$ , $\beta = .15$ |
| VIS-A     | Left extrastriate  | DMN1      | Right dorsal prefrontal             | $t = 3.14$ , $p\text{-FDR} = .044$ , $\beta = .18$ |
| VIS-A     | Left extrastriate  | CON-C     | Right precuneus                     | $t = 3.41$ , $p\text{-FDR} = .027$ , $\beta = .18$ |

Note: Statistical parameters of significant changes in functional connectivity between RSN. For evaluation of the change in functional connectivity the change from initial to final assessment was compared.

**Table 8***Mechanical Detection Threshold (MDT) Results*

| Group | n<br>included | n<br>excluded | MDT day 0<br>(mN)   | MDT day 7<br>(mN)   | MDT change<br>(mN)   |
|-------|---------------|---------------|---------------------|---------------------|----------------------|
| NOTV  | 37            | 0             | 0.63<br>$\pm 0.059$ | 0.70<br>$\pm 0.087$ | 0.075<br>$\pm 0.10$  |
| TV    | 35            | 2             | 0.60<br>$\pm 0.079$ | 0.50<br>$\pm 0.059$ | -0.10<br>$\pm 0.084$ |

Note: MDT results denoted by mean  $\pm$  standard error in mN.

**Table 9***Grating Orientation Task (GOT) Results*

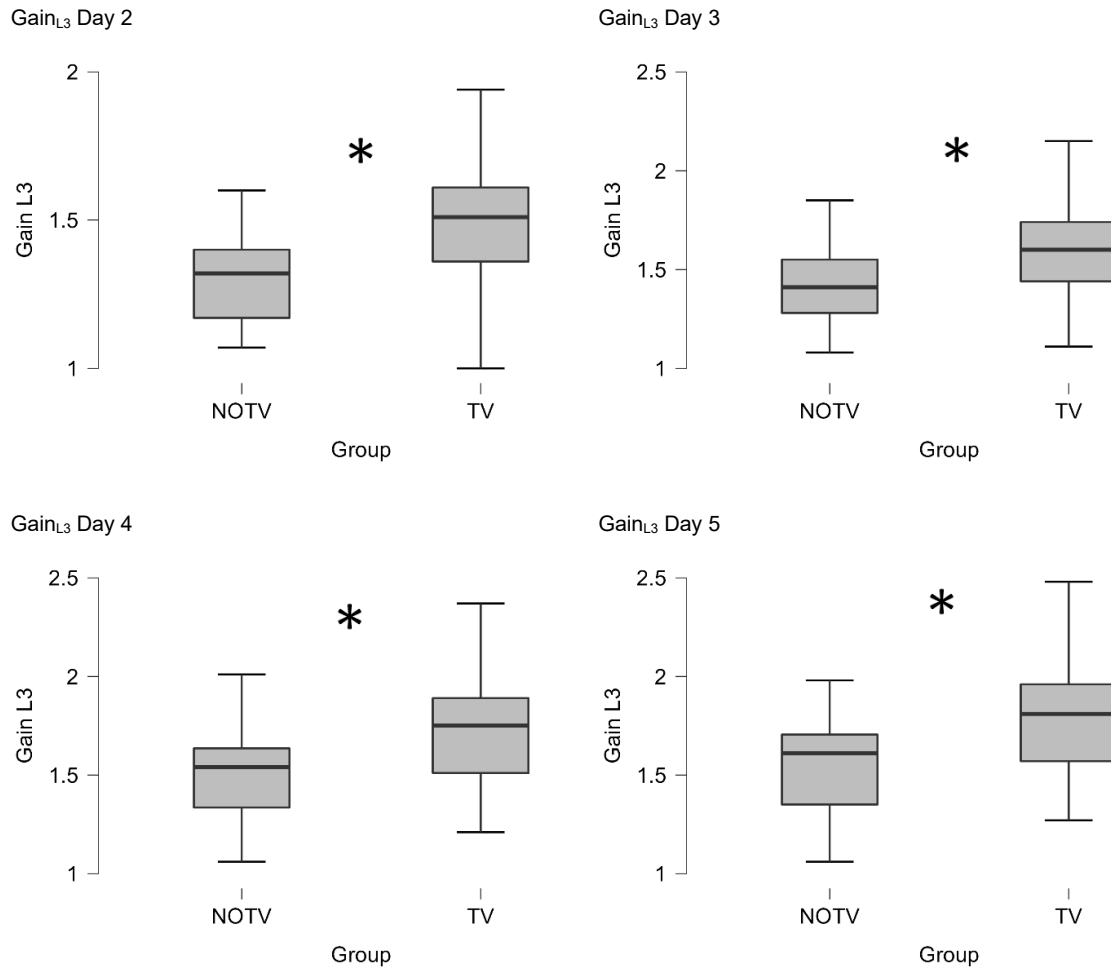
| Group | n<br>included | n<br>excluded | GOT day 0<br>(g <sub>75</sub> ) | GOT day 7<br>(g <sub>75</sub> ) | GOT change<br>(g <sub>75</sub> ) |
|-------|---------------|---------------|---------------------------------|---------------------------------|----------------------------------|
| NOTV  | 37            | 0             | 2.09                            | 1.92                            | -0.17                            |
| TV    | 35            | 2             | 1.82                            | 1.78                            | -0.05                            |

Note: GOT results denoted by g<sub>75</sub> and GOT change (g<sub>75</sub> day 7 - g<sub>75</sub> day 1).

# Figures

**Fig. 8**

## *Increase in Touch-Typing Performance – Gain<sub>L3</sub>*



Note: Performance increase in correct entered characters in the reoccurring marker lesson in touch typing training. The difference in Gain<sub>L3</sub> was significant between both groups on all days of the trial,  $p < .05$ . Star symbol (\*) is representing a significant difference between the groups. TV showed a higher Gain<sub>L3</sub> on all days. Gain<sub>L3</sub> on day 5 was 13.76% higher in TV, mean difference: .217, 95%-CI[-.36, .07],  $t(70) = -3.00$ ,  $p = .004$ ,  $d = -.708$ . Asterisk symbol (\*) marks statistically significant differences between the groups.