

## A APPENDICES

### A.1 tDCS-related sensations

At the end of each tDCS session we administered a 7-item questionnaire, adapted from [Fertonani et al. 2015], to evaluate the potential adverse effects of tDCS. Participants were asked to report whether they felt 1) itching, 2) pain, 3) burning, 4) heat, 5) pinching, 6) metallic taste, or 7) fatigue, rating the intensity of their sensations using a 5-point scale (i.e., 0=absent, 1=Mild, 2=Moderate, 3=Considerable, 4=Strong). Moreover, they had to indicate when the feeling/discomfort began, when it stopped, where it was localized, and whether the it affected the performance. The reported sensations, their frequencies (out of 19 participants), and the most reported intensities can be found in table A.1.

**Table A.1: tDCS-related sensations, their frequency and the most reported intensity after frontal eye field (FEF), posterior parietal cortex (PPC), and sham stimulations**

Item	FEF		PPC		sham	
	N	Most reported	N	Most reported	N	Most reported
Itching	17	Mild	17	Mild	14	Mild
Pain	2	Mild	2	Mild	0	
Burning	12	Mild	10	Mild	8	Mild
Heat	10	Mild	8	Mild	8	Mild
Pinching	16	Mild	15	Mild	13	Mild
Metallic Taste	1	Moderate	0		0	
Fatigue	5	Moderate	4	Mild	3	Mild

Overall, all participants localized the sensations on the head and these sensations were never rated as intense as “Considerable” or “Strong”.

For FEF stimulation, 18 out of 19 participants experienced these sensations at the beginning of the stimulation, whereas only one participant at the end. In the majority of participants, i.e., 12, sensations stopped quickly or in the middle of the stimulation, whereas for 7 participants these sensations stopped at the end of the stimulation. With respect to the influence on the task, only two participants reported that the feelings may have had a mild effect on the performance. For PPC stimulation, the sensations started at the beginning of the stimulation for all participants and stopped quickly or in the middle of the stimulation for most of them (16), whereas for 3 participants at the end of the stimulation. With respect to the influence on the task, only one participant reported that the feelings may have had a mild effect on the performance. For sham stimulation, one participant reported no feelings. 17 participants experienced these sensations at the beginning of the stimulation, 1 participant in the middle. For 16 out of 19 participants the sensations stopped quickly, whereas for 2 of them at the end of the stimulation. No participants reported that these sensations might have had an effect on the performance.

### A.2 GLMM analyses of gap-overlap saccadic reaction times (SRTs)

Main effects and interactions of the gap-overlap SRTs analyses are reported in Table A.2.

**Table A.2: Main effects and interactions of gap-overlap SRTs analyses**

<b>Factors</b>	<b>X<sup>2</sup></b>	<b>df</b>	<b>p-value</b>
Stimulation	9.13	2	.010
Timepoint	41.3	1	<.001
Side	5.31	1	.021
Trial Type	3019.28	1	<.001
Stimulation * Timepoint	7.71	2	.021
Stimulation * Side	1.7	2	.427
Timepoint * Side	.03	1	.859
Stimulation * Trial Type	1.75	2	.418
Timepoint * Trial Type	4.28	1	.039
Side * Trial Type	13.48	1	<.001
Stimulation * Timepoint * Side	.98	2	.612
Stimulation * Timepoint * Trial Type	1.26	2	.533
Stimulation * Side * Trial Type	.1835	2	.204
Timepoint * Side * Trial Type	.46	1	.498
Stimulation * Timepoint * Side * Trial Type	.09	2	.957

Regarding the main effect of *Stimulation*, SRTs associated to PPC ( $M=205$  ms;  $SE=4.35$  ms) were slower ( $z=-3.03$ ;  $p=.007$ ) than those associated to FEF ( $M=201$  ms;  $SE=4.32$  ms). No difference emerged between sham SRTs ( $M=203$  ms;  $SE=4.32$  ms) and FEF ( $z=-1.61$ ;  $p=.325$ ) or PPC ( $z=1.42$ ;  $p=.468$ ). With respect to *Timepoint*, SRTs were significantly faster after the stimulation ( $M=200$  ms;  $SE=4.3$  ms) than before stimulation ( $M=206$  ms;  $SE=4.29$  ms). As for the *Side*, overall SRTs for right saccades ( $M=202$  ms;  $SE=4.29$  ms) were slightly faster than for left saccades ( $M=204$  ms;  $SE=4.3$  ms). Concerning the interaction *Stimulation\*Timepoint*, SRTs were faster after both FEF stimulation (FEF pre:  $M=204$  ms;  $SE=4.4$  ms; FEF post:  $M=198$  ms;  $SE=4.41$  ms;  $p=.003$ ), and PPC tDCS (PPC pre:  $M=210$  ms;  $SE=4.42$  ms; PPC post:  $M=200$  ms;  $SE=4.45$  ms;  $p<.001$ ), but not after sham stimulation (sham pre:  $M=205$  ms;  $SE=4.41$  ms; sham post:  $M=201$  ms;  $SE=4.41$  ms;  $p=.1$ ). The interaction *Timepoint\*Trial Type* revealed that the decrease of SRTs was stronger for gap trials (pre:  $M=179$  ms;  $SE=4.34$  ms; post:  $M=170$  ms;  $SE=4.34$  ms;  $p<.001$ ) than overlap trials (pre:  $M=234$  ms;  $SE=4.37$  ms; post:  $M=229$  ms;  $SE=4.39$  ms;  $p=.036$ ). Finally, the interaction of *Side\*Trial Type* showed that, in overlap trials, SRTs for right saccades ( $M=228$  ms;  $SE=4.37$  ms) were significantly faster as compared to left saccades ( $M=235$  ms;  $SE=4.39$  ms;  $p=.001$ ), whereas no significant difference was found for the gap trials (left saccades:  $M=174$  ms;  $SE=4.34$  ms; right saccades:  $M=175$  ms;  $SE=4.33$  ms;  $p=.1$ ).

### A.3 Analyses of the Gap Effect (GE)

Main effects and interactions of the GE analyses are reported in Table A.3

**Table A.3: Main effects and interactions of GE analyses**

<b>Factors</b>	<b>F</b>	<b>df</b>	<b>p-value</b>
Stimulation	.36	2, 198	.697
Timepoint	3.56	1, 198	.061
Side	5.17	1, 198	.024
Stimulation * Timepoint	.06	2, 198	.938
Stimulation * Side	.9	2, 198	.408
Timepoint * Side	.23	1, 198	.635
Stimulation * Timepoint * Side	.14	2, 198	.868

### A.4 Explorative analyses for gap and overlap trials

Non-aggregated raw SRTs for both gap and overlap conditions were heavily right-skewed. Thereupon, for both gap and overlap trials, we tested a three-way *Simulation* (FEF, PPC, and sham)\**Timepoint* (pre- and post-stimulation)\**Side* (left and right saccades) term by employing Gamma GLMMs that regarded subjects as clusters. A random *Stimulation\*Time point* term was entered but yielded singularities; therefore, a random intercept only was fitted in both models. Deviation coding was adopted for factors. Bonferroni-corrected post-hoc comparisons were also performed.

As for the analyses of gap trials a trend was observed for *Stimulation* ( $\chi^2(2)=5.34$ ;  $p=.069$ ). Moreover, the effect of *Timepoint* was significant ( $\chi^2(1)=53.49$ ;  $p<.001$ ), i.e., SRTs were overall significantly higher prior to ( $M=178$  ms;  $SE=4.94$  ms) compared to post-stimulation ( $M=169$  ms;  $SE=4.94$  ms). Importantly, a significant *Stimulation\*Time point* interaction ( $\chi^2(2)=10$ ;  $p=.007$ ) showed that SRTs significantly decreased post-stimulation for both FEF (pre:  $M=176$ ;  $SE=5.09$ ; post:  $M=167$ ;  $SE=5.08$ ;  $p=.001$ ) and PPC (pre:  $M=182$  ms;  $SE=5.09$  ms.; post:  $M=168$  ms;  $SE=5.08$  ms;  $p<.001$ ), whereas not for Sham tDCS (pre:  $M=176$  ms;  $SE=5.10$ .; post:  $M=172$  ms;  $SE=5.07$ ;  $p=.757$ ). Notably, we did not observe significant baseline differences, i.e., prior to stimulation, neither between FEF and PPC ( $p=.182$ ), between FEF and sham ( $p=1$ ), nor between PPC and sham tDCS ( $p=.252$ ).

Analyses of the overlap trials revealed a trend for the main effect of *Stimulation* ( $\chi^2(2)=5.95$ ;  $p=.051$ ). Moreover, concerning the effect of *Timepoint*, SRTs were overall significantly higher ( $\chi^2(1)=7.31$ ;  $p=.007$ ) before tDCS ( $M=236$  ms;  $SE=5.17$  ms) as compared to after stimulation ( $M=231$  ms;  $SE=5.15$  ms). Furthermore, the main effect of *Side* ( $\chi^2(1)=12.32$ ;  $p<.001$ ) showed that rightward saccades ( $M=231$ ;  $SE=5.15$ ) were faster than leftward ones ( $M=236$  ms  $SE=5.17$  ms). No significant interactions were detected. Result of gap analyses are reported in Table A.4 and depicted in Figure A.1, whereas results of overlap analyses can be found in table A.5 and Figure A.1

**Table A.4: Main effects and interactions for gap SRTs**

<b>Factors</b>	<b>X<sup>2</sup></b>	<b>df</b>	<b>p-value</b>
Stimulation	5.34	2	.069
Timepoint	53.5	1	<.001
Side	1.02	1	.312
Stimulation * Timepoint	10	2	.007
Stimulation * Side	.24	2	.885
Timepoint * Side	.4	1	.528
Stimulation * Timepoint * Side	.85	2	.654

**Table A.5: Main effects and interactions for overlap SRTs**

<b>Factors</b>	<b>X<sup>2</sup></b>	<b>df</b>	<b>p-value</b>
Stimulation	5.95	2	.051
Timepoint	7.31	1	.007
Side	12.32	1	<.001
Stimulation * Timepoint	1.41	2	.495
Stimulation * Side	3.58	2	.167
Timepoint * Side	.17	1	.683
Stimulation * Timepoint * Side	.75	2	.688

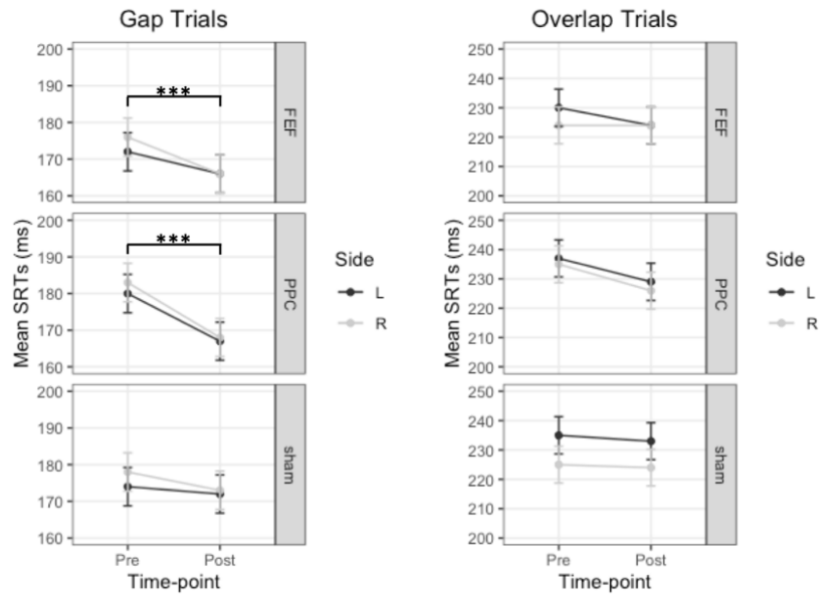


Figure A.1: Main results of gap and overlap saccadic reaction times (SRTs) according to *Stimulation*, *Timepoint*, and *Side* of saccade. The significant *Stimulation\*Timepoint* for gap trials is also depicted. Values represent estimated marginal means and the standard error of the mean. FEF= frontal eye field; PPC= posterior parietal cortex; L= left; R= right. \*\*\*=  $p < .001$ .