

Supplement material for “Lasting Enhancements in Neural Efficiency by Multi-session Transcranial Direct Current Stimulation in Working Memory Training”

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Supplementary Table 1. Unadjusted (Unadj., mean and standard deviation) and baseline-adjusted (Adj., estimated marginal mean and standard error) descriptive statistics for *d*-primes and reaction times at Post1- and Post21-tests.

Condition	<i>d</i> -prime				reaction time (s)			
	4-back		6-back		4-back		6-back	
	Unadj.	Adj.	Unadj.	Adj.	Unadj.	Adj.	Unadj.	Adj.
Post1								
Active	4.124 (0.390)	4.112 (0.148)	3.446 (0.502)	3.427 (0.139)	0.575 (0.168)	0.584 (0.038)	0.672 (0.157)	0.696 (0.038)
Sham	3.464 (0.781)	3.475 (0.148)	2.897 (0.624)	2.916 (0.139)	0.597 (0.197)	0.589 (0.038)	0.684 (0.209)	0.659 (0.038)
Post21								
Active	4.163 (0.336)	4.147 (0.148)	3.143 (0.662)	3.111 (0.171)	0.595 (0.157)	0.603 (0.031)	0.713 (0.169)	0.731 (0.041)
Sham	3.506 (0.835)	3.522 (0.148)	2.725 (0.742)	2.758 (0.171)	0.608 (0.154)	0.600 (0.031)	0.680 (0.197)	0.662 (0.041)

Supplementary Table 2. Unadjusted (mean and standard deviation) and baseline-adjusted (estimated marginal mean and standard error) descriptive statistics for ERD/ERS in 4-back task at Post1- and Post21- tests.

Condition	Theta-ERS		Alpha-ERD		Beta-ERD	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Post1						
Active	1.833 (1.838)	1.733 (0.442)	0.733 (1.646)	0.666 (0.325)	0.181 (0.927)	0.132 (0.205)
Sham	1.185 (1.823)	1.285 (0.442)	-0.243 (1.135)	-0.176 (0.325)	-0.605 (0.711)	-0.556 (0.205)
Post21						
Active	1.350 (1.628)	1.230 (0.458)	-0.099 (1.483)	-0.199 (0.280)	0.089 (0.764)	0.008 (0.154)

Sham	1.789 (2.192)	1.908 (0.458)	0.203 (1.357)	0.302 (0.280)	-0.228 (0.641)	-0.146 (0.154)
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Supplementary Table 3. Unadjusted (mean and standard deviation) and baseline-adjusted (estimated marginal mean and standard error) descriptive statistics for ERD/ERS in 6-back task at Post1- and Post21- tests.

Condition	Theta-ERS		Alpha-ERD		Beta-ERD	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Post1						
Active	2.417 (2.203)	2.454 (0.437)	0.617 (1.627)	0.685 (0.297)	0.054 (0.866)	0.057 (0.184)
Sham	0.741 (1.425)	0.703 (0.437)	-0.602 (1.051)	-0.670 (0.297)	-0.451 (0.668)	-0.454 (0.184)
Post21						
Active	2.480 (1.839)	2.535 (0.429)	0.251 (1.694)	0.364 (0.274)	0.426 (0.999)	0.431 (0.168)
Sham	1.949 (2.117)	1.894 (0.429)	0.363 (1.521)	0.249 (0.274)	-0.459 (0.561)	-0.464 (0.168)

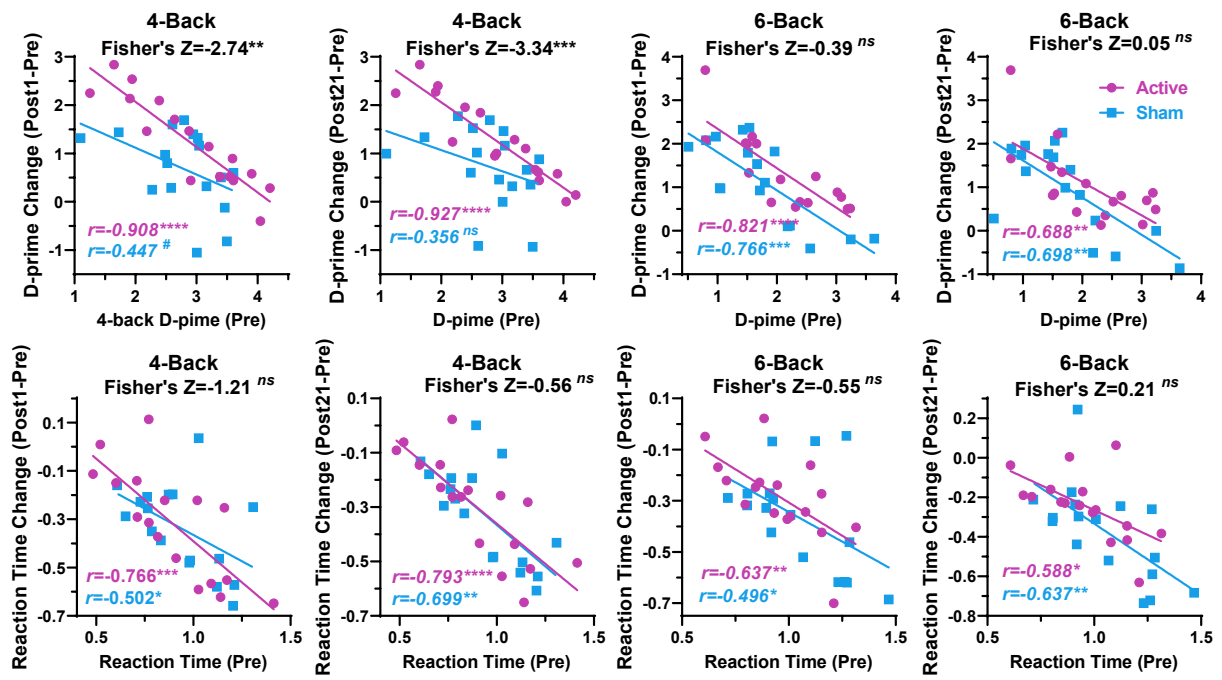
Supplementary Table 4. Unadjusted (mean and standard deviation) and baseline-adjusted (estimated marginal mean and standard error) descriptive statistics for P300 GFP at Post1- and Post21- tests.

Condition	P300 GFP			
	4-back		6-back	
	Unadjusted	Adjusted	Unadjusted	Adjusted
Post1				
Active	3.108 (1.292)	3.141 (0.279)	2.553 (1.078)	2.632 (0.233)
Sham	3.014 (1.423)	2.981 (0.279)	2.423 (1.255)	2.344 (0.233)
Post21				
Active	4.082 (1.773)	4.111 (0.328)	3.448 (1.566)	3.512 (0.283)
Sham	3.036 (1.087)	3.007 (0.328)	2.597 (0.849)	2.533 (0.283)

Supplementary Table 5. Results of correlation analyses between baseline and changes after training in behavioral and EEG measures.

Behavioral/EEG Measure		Active Group		Sham Group		Active vs. Sham	
		<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	Fisher' Z	<i>p</i>
4-back, Post1-Pre	D-prime	-0.908	<0.0001	<u>-0.447</u>	<u>0.0721</u>	-2.74	0.0031
	RT	-0.766	0.0003	-0.502	0.0402	-1.21	0.1132
	theta-ERS	-0.492	0.0446	-0.038	0.8837	<u>-1.33</u>	<u>0.0918</u>
	alpha-ERD	-0.048	0.8534	-0.243	0.3466	0.53	0.2981
	beta-ERD	-0.325	0.2039	-0.211	0.4164	-0.32	0.3745
	P300 GFP	-0.045	0.8632	-0.334	0.1900	0.80	0.2119
6-back, Post1-Pre	D-prime	-0.821	<0.0001	-0.766	0.0003	-0.39	0.3483
	RT	-0.637	0.0060	-0.496	0.0428	-0.55	0.2912
	theta-ERS	0.117	0.6552	-0.761	0.0004	2.95	0.0008
	alpha-ERD	-0.069	0.7926	-0.611	0.0092	1.70	0.0446
	beta-ERD	-0.086	0.7424	-0.580	0.0147	<u>1.52</u>	<u>0.0643</u>
	P300 GFP	-0.137	0.6008	-0.131	0.6165	-0.02	0.4920
4-back, Post21-Pre	D-prime	-0.927	<0.0001	-0.356	0.1604	-3.34	0.0004
	RT	-0.793	<0.0001	-0.699	0.0018	-0.56	0.2878
	theta-ERS	<u>-0.474</u>	<u>0.0547</u>	0.030	0.9092	<u>-1.44</u>	<u>0.0750</u>
	alpha-ERD	-0.037	0.8875	0.125	0.6331	-0.43	0.3336
	beta-ERD	-0.214	0.4085	-0.139	0.5945	-0.21	0.4169
	P300 GFP	0.358	0.1586	-0.687	0.0023	3.22	0.0007
6-back, Post21-Pre	D-prime	-0.688	0.0023	-0.698	0.0018	0.05	0.4801
	RT	-0.588	0.0131	-0.637	0.0060	0.21	0.4169
	theta-ERS	-0.217	0.4034	-0.395	0.1167	0.52	0.3016
	alpha-ERD	0.157	0.5481	-0.210	0.4180	0.98	0.1635
	beta-ERD	0.090	0.7312	-0.391	0.1207	<u>1.33</u>	<u>0.0918</u>
	P300 GFP	0.283	0.2712	-0.648	0.0049	2.81	0.0025

Note: Bold indicates statistically significant results ($p < 0.05$). Underline indicates marginally significant results ($p < 0.1$).



Supplementary Fig. 1 Behavioral performance prior to training correlates with changes in behavioral performance.
 (#: $p < 0.1$; *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$; ****: $p < 0.0001$; ns: not significant)