

Supplementary material

A. Individual variability in ITPC values (active-passive) at 3 Hz

In the section 3.5. of the main manuscript ('Comparison of children with and without dyslexia in auditory selective attention'), we found no significant differences between children with and without dyslexia in active-passive ITPC differences at 3 or 6 Hz ($p > 0.05$, FDR-corrected; **Table S1**). However, the topographic plots (**Figure 7**) were suggestive of potential between-group differences in active-passive ITPC at the attended frequency rate (3 Hz). By examining the distribution of values, we observed substantial within-group variability in the distribution of ITPC values (active-passive) at 3 Hz. The distribution of ITPC values (active-passive) at 3 Hz in a selection of fronto-central channels are displayed in **Figure S1**. Furthermore, Bayesian statistics revealed that the evidence for the null hypothesis in these comparisons ranges between 'anecdotal' and 'moderate' (Van Doorn et al., 2019) for each electrode site (**Table S1**).

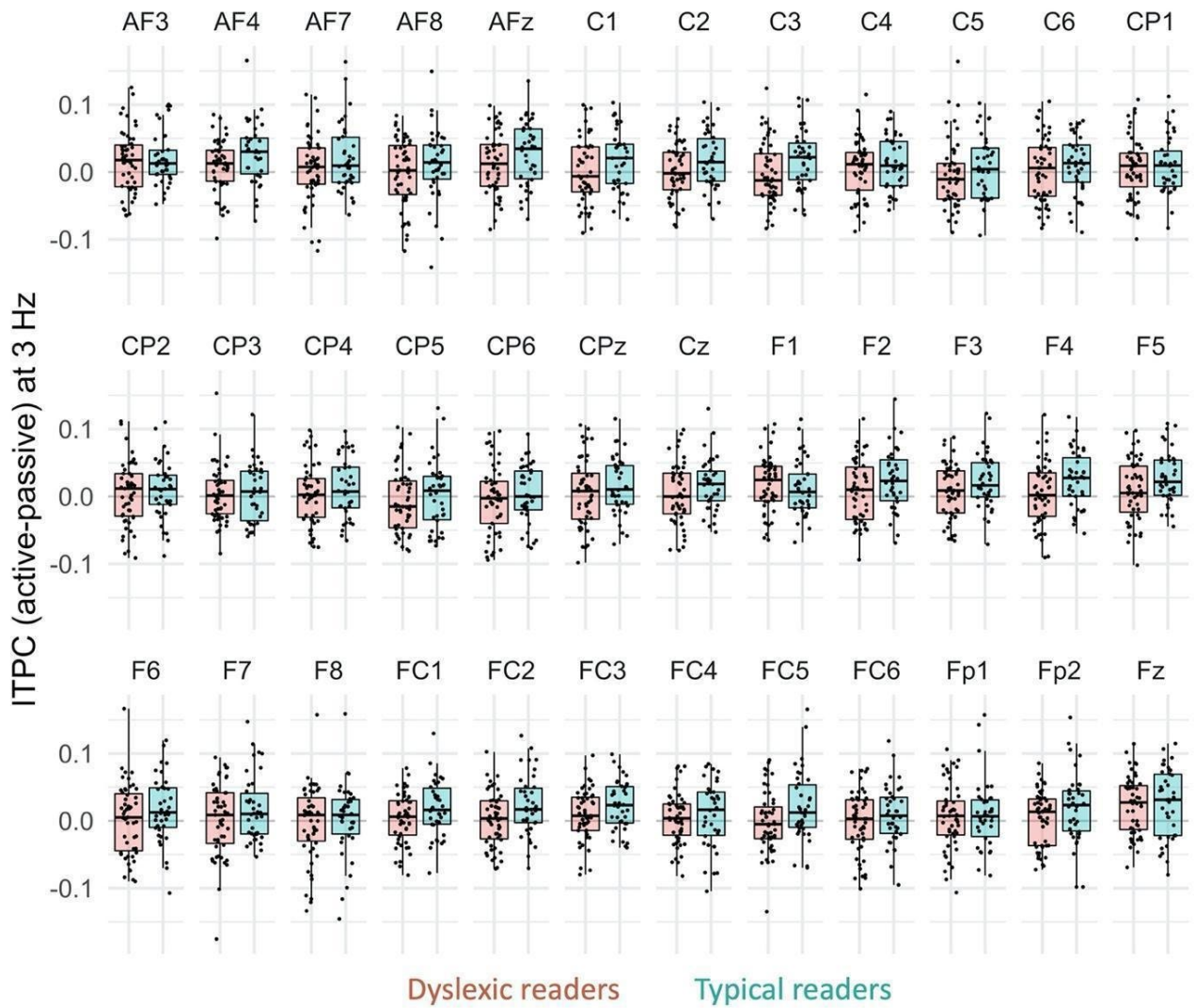


Figure S1. The distribution of ITPC difference values (active-passive) at 3 Hz for the group of children with and without dyslexia in a selection of fronto-central channels.

Table S1. Channel-wise group comparisons (dyslexic versus typical readers) of ITPC difference (active-passive) at 3 Hz and 6 Hz.

	3 Hz						6 Hz					
	Frequentist statistics			Bayesian statistics			Frequentist statistics			Bayesian statistics		
Channel	Z	p	FDR-corrected p	BF ₁₀	error %	Evidence	Z	p	FDR-corrected p	BF ₁₀	error %	Evidence
Fp1	-0.046	0.964	0.990	0.233	0.031	Moderate for H0	-0.618	0.537	0.961	0.316	0.032	Moderate for H0
Fz	-0.344	0.731	0.990	0.229	0.030	Moderate for H0	-0.245	0.807	0.990	0.258	0.032	Moderate for H0
F3	-1.447	0.148	0.660	0.835	0.013	Anecdotal for H0	-0.875	0.382	0.961	0.309	0.032	Moderate for H0
F7	-0.941	0.346	0.839	0.535	2.593e-4	Anecdotal for H0	-1.481	0.139	0.961	0.792	0.014	Anecdotal for H0
FT9	0.858	0.391	0.849	0.233	0.031	Moderate for H0	2.003	0.045	0.961	1.132	0.008	Anecdotal for H1
FC5	-2.177	0.029	0.633	2.065	0.002	Anecdotal for H1	-0.377	0.706	0.990	0.262	0.032	Anecdotal for H0
FC1	-1.663	0.096	0.651	0.976	0.010	Anecdotal for H0	0.203	0.839	0.990	0.225	0.030	Moderate for H0
C3	-2.401	0.016	0.633	2.108	0.002	Anecdotal for H1	0.568	0.570	0.961	0.257	0.031	Moderate for H0
T7	1.132	0.258	0.773	0.300	0.032	Moderate for H0	0.643	0.520	0.961	0.305	0.032	Moderate for H0
TP9	0.311	0.756	0.990	0.257	0.031	Moderate for H0	0.203	0.839	0.990	0.240	0.031	Moderate for H0
CP5	-0.668	0.504	0.908	0.244	0.031	Moderate for H0	0.635	0.526	0.961	0.338	0.031	Anecdotal for H0
CP1	-0.120	0.904	0.990	0.244	0.031	Moderate for H0	0.535	0.593	0.961	0.301	0.032	Moderate for H0

Pz	0.095	0.924	0.990	0.226	0.030	Moderate for H0	0.867	0.386	0.961	0.348	0.031	Anecdotal for H0
P3	0.137	0.891	0.990	0.231	0.030	Moderate for H0	0.635	0.526	0.961	0.318	0.031	Moderate for H0
P7	0.012	0.990	0.990	0.254	0.031	Moderate for H0	0.784	0.433	0.961	0.301	0.032	Moderate for H0
O1	-0.129	0.898	0.990	0.224	0.030	Moderate for H0	0.966	0.334	0.961	0.436	0.027	Anecdotal for H0
Oz	0.261	0.794	0.990	0.226	0.030	Moderate for H0	1.580	0.114	0.961	0.664	0.018	Anecdotal for H0
O2	0.311	0.756	0.990	0.226	0.030	Moderate for H0	0.361	0.718	0.990	0.278	0.032	Moderate for H0
P4	-0.618	0.537	0.939	0.277	0.032	Moderate for H0	0.187	0.852	0.990	0.269	0.032	Moderate for H0
P8	-0.278	0.781	0.990	0.245	0.031	Moderate for H0	0.012	0.990	0.990	0.247	0.031	Moderate for H0
TP10	-0.178	0.858	0.990	0.239	0.031	Moderate for H0	0.369	0.712	0.990	0.235	0.031	Moderate for H0
CP6	-0.734	0.463	0.905	0.290	0.032	Moderate for H0	- 1.423	0.155	0.961	0.325	0.031	Moderate for H0
CP2	-0.469	0.639	0.990	0.260	0.032	Moderate for H0	0.021	0.983	0.990	0.227	0.030	Moderate for H0
Cz	-1.340	0.180	0.660	0.601	2.426e-4	Anecdotal for H0	- 0.552	0.581	0.961	0.243	0.031	Moderate for H0
C4	-0.751	0.453	0.905	0.323	0.031	Moderate for H0	- 0.825	0.409	0.961	0.408	0.029	Anecdotal for H0
T8	-1.381	0.167	0.660	0.571	2.496e-4	Anecdotal for H0	- 1.024	0.306	0.961	0.368	0.030	Anecdotal for H0
FT10	-1.248	0.212	0.703	0.442	0.027	Anecdotal for H0	- 0.751	0.453	0.961	0.351	0.031	Anecdotal for H0

FC6	-0.867	0.386	0.849	0.409	0.028	Anecdotal for H0	0.112	0.911	0.990	0.224	0.030	Moderate for H0
FC2	-1.912	0.056	0.633	2.175	0.002	Anecdotal for H1	-0.286	0.775	0.990	0.224	0.030	Moderate for H0
F4	-2.069	0.039	0.633	1.825	0.003	Anecdotal for H1	-0.618	0.537	0.961	0.241	0.031	Moderate for H0
F8	-0.435	0.663	0.990	0.252	0.031	Moderate for H0	-0.021	0.983	0.990	0.227	0.030	Moderate for H0
Fp2	-1.497	0.134	0.651	0.728	0.016	Anecdotal for H0	-0.991	0.322	0.961	0.337	0.031	Anecdotal for H0
AF7	-0.966	0.334	0.839	0.598	2.433e-4	Anecdotal for H0	-1.431	0.152	0.961	0.882	0.012	Anecdotal for H0
AF3	-0.145	0.885	0.990	0.250	0.031	Moderate for H0	-0.054	0.957	0.990	0.272	0.032	Moderate for H0
AFz	-1.215	0.224	0.707	0.457	0.026	Anecdotal for H0	-1.315	0.189	0.961	0.492	2.719e-4	Anecdotal for H0
F1	0.917	0.359	0.839	0.268	0.032	Moderate for H0	-0.883	0.377	0.961	0.379	0.030	Anecdotal for H0
F5	-1.879	0.060	0.633	1.644	0.004	Anecdotal for H1	-0.411	0.681	0.990	0.366	0.030	Anecdotal for H0
FT7	-0.178	0.858	0.990	0.244	0.031	Moderate for H0	-1.472	0.141	0.961	0.540	2.579e-4	Anecdotal for H0
FC3	-1.630	0.103	0.651	0.925	0.011	Anecdotal for H0	0.294	0.768	0.990	0.225	0.030	Moderate for H0
C1	-1.539	0.124	0.651	0.712	0.017	Anecdotal for H0	0.245	0.807	0.990	0.224	0.030	Moderate for H0
C5	-1.315	0.189	0.660	0.354	0.031	Anecdotal for H0	-0.071	0.944	0.990	0.231	0.030	Moderate for H0
TP7	0.693	0.489	0.905	0.274	0.032	Moderate for H0	0.311	0.756	0.990	0.225	0.030	Moderate for H0

CP3	-0.336	0.737	0.990	0.230	0.030	Moderate for H0	0.975	0.330	0.961	0.395	0.029	Anecdotal for H0
P1	-0.046	0.964	0.990	0.226	0.030	Moderate for H0	0.759	0.448	0.961	0.324	0.031	Moderate for H0
P5	-0.402	0.687	0.990	0.225	0.030	Moderate for H0	0.659	0.510	0.961	0.330	0.031	Moderate for H0
PO7	-0.054	0.957	0.990	0.228	0.030	Moderate for H0	0.784	0.433	0.961	0.344	0.031	Anecdotal for H0
PO3	0.319	0.749	0.990	0.226	0.030	Moderate for H0	0.792	0.428	0.961	0.395	0.029	Anecdotal for H0
POz	0.494	0.622	0.990	0.244	0.031	Moderate for H0	1.497	0.134	0.961	0.698	0.017	Anecdotal for H0
PO4	-0.245	0.807	0.990	0.227	0.030	Moderate for H0	0.601	0.548	0.961	0.313	0.032	Moderate for H0
PO8	0.353	0.724	0.990	0.224	0.030	Moderate for H0	0.212	0.832	0.990	0.297	0.032	Moderate for H0
P6	-0.435	0.663	0.990	0.250	0.031	Moderate for H0	- 0.120	0.904	0.990	0.249	0.031	Moderate for H0
P2	-0.029	0.977	0.990	0.231	0.030	Moderate for H0	0.510	0.610	0.961	0.271	0.032	Moderate for H0
CPz	-1.024	0.306	0.839	0.383	0.030	Anecdotal for H0	0.054	0.957	0.990	0.246	0.031	Moderate for H0
CP4	-0.709	0.478	0.905	0.317	0.032	Moderate for H0	- 0.742	0.458	0.961	0.246	0.031	Moderate for H0
TP8	-0.560	0.576	0.980	0.251	0.031	Moderate for H0	- 0.510	0.610	0.961	0.255	0.031	Moderate for H0
C6	-0.966	0.334	0.839	0.311	0.032	Moderate for H0	- 1.016	0.310	0.961	0.496	2.706e -4	Anecdotal for H0
C2	-1.597	0.110	0.651	1.022	0.010	Anecdotal for H1	- 0.543	0.587	0.961	0.316	0.032	Moderate for H0

FC4	-0.817	0.414	0.869	0.255	0.031	Moderate for H0	0.319	0.749	0.990	0.236	0.031	Moderate for H0
FT8	-1.555	0.120	0.651	0.802	0.014	Anecdotal for H0	-0.817	0.414	0.961	0.385	0.029	Anecdotal for H0
F6	-1.364	0.172	0.660	0.545	2.563e-4	Anecdotal for H0	-0.079	0.937	0.990	0.231	0.030	Moderate for H0
AF8	-1.016	0.310	0.839	0.387	0.029	Moderate for H0	-0.709	0.478	0.961	0.342	0.031	Anecdotal for H0
AF4	-1.920	0.055	0.633	1.494	0.005	Anecdotal for H1	-0.784	0.433	0.961	0.260	0.032	Moderate for H0
F2	-1.522	0.128	0.651	0.772	0.015	Anecdotal for H0	-0.867	0.386	0.961	0.256	0.031	Moderate for H0

References

van Doorn, J., van den Bergh, D., Böhm, U., Dablander, F., Derks, K., Draws, T., ... & Wagenmakers, E. J. (2021). The JASP guidelines for conducting and reporting a Bayesian analysis. *Psychonomic Bulletin & Review*, 28(3), 813-826.

B. Non-selective entrainment to sound at low frequencies in children with and without dyslexia

According to the temporal sampling theory (Goswami, 2011), impaired auditory entrainment at lower frequencies (< 10 Hz) in individuals with dyslexia would cause difficulties in encoding the prosodic and syllabic structure of speech, and in turn, reading impairments (Goswami, 2011; Power, Mead, Barnes, & Goswami, 2013; Soltész, Szucs, Leong, White, & Goswami, 2013). To exclude the possibility that the results of analyses investigating the influence of dyslexia diagnosis on neural correlates of sustained selective attention (i.e. group comparison of ITPC difference at 3 Hz and 6 Hz between active and passive conditions) were confounded by group differences in the more general ability to entrain neural activity to sounds at low frequencies, we compared ITPC at 3 Hz and 6 Hz in each condition (attend high band, attend low band and passive listening) between dyslexic and typical readers. We did not observe any significant difference between groups in ITPC at 3 Hz or at 6 Hz in any conditions (**Figure S2**). To test whether despite the lack of group differences, the general ability to entrain neural activity to sounds at low frequencies is associated with reading(-related) abilities, we carried out Spearman correlation analyses between ITPC values at 3 and 6 Hz in the passive condition with phonological awareness and reading fluency abilities. ITPC at 3 or 6 Hz were not correlated with reading fluency or phonological awareness abilities at any electrode (FDR-corrected $p > 0.05$).

Thus, these findings do not provide support for the hypothesis of impaired auditory phase-locking (to non-speech sounds) in dyslexic readers (Goswami, 2011). However, as noted in

Goswami (2019), the use of speech stimuli may elicit different results and clarify the link between putative phase-locking impairments and speech processing deficits.

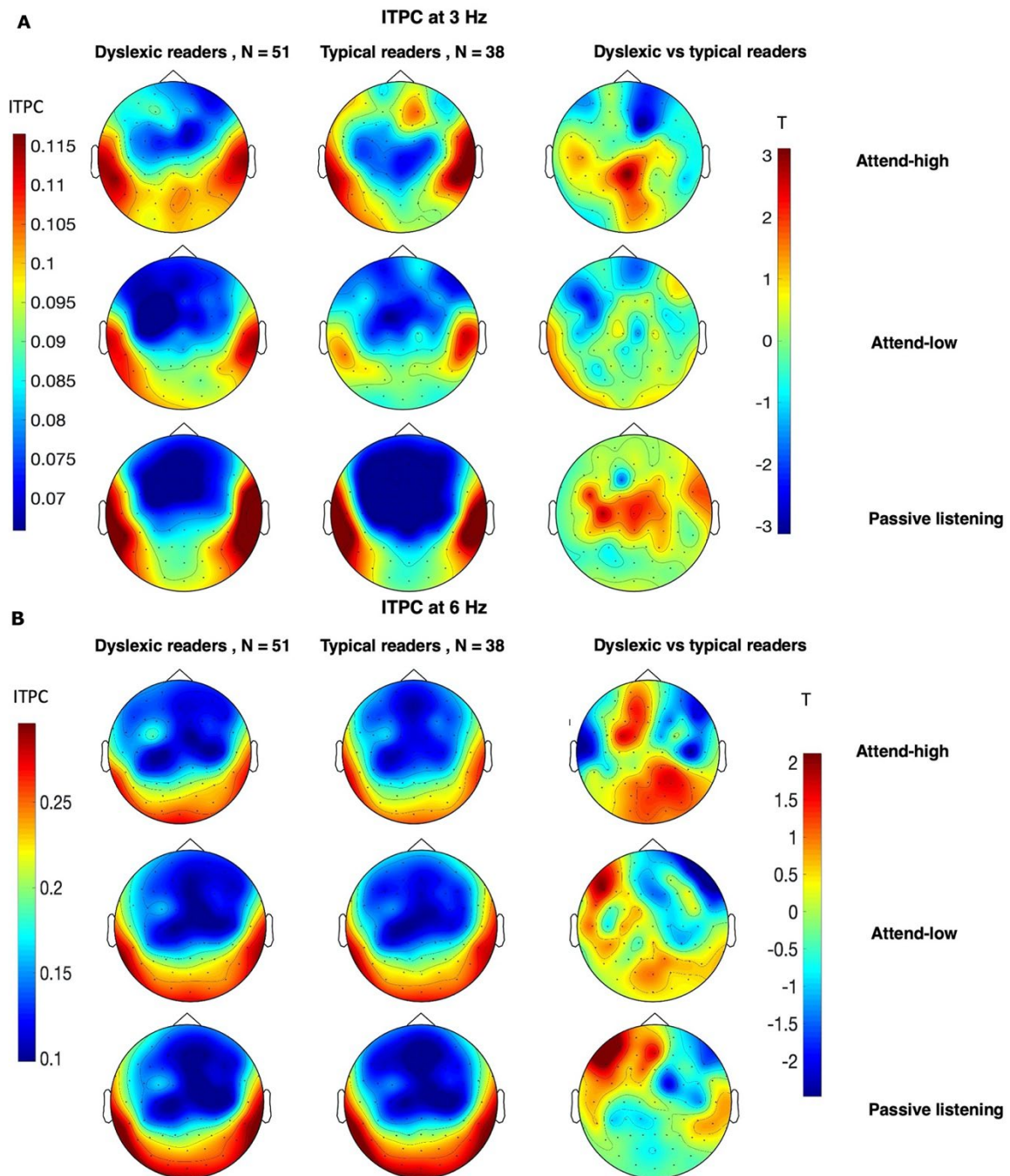


Figure S2. ITPC at A) 3 Hz and B) 6 Hz of each condition for the group of children with and without dyslexia and the t values of the pairwise comparisons. No significant group differences were found at any channels after FDR-correction was applied.

C. Age distribution of dyslexic and typical readers

