

Early cortical surface plasticity relates to basic mathematical learning

Running title: Early cortical plasticity relates to math learning

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Supplementary Table S1. Definition of cortical regions of interest.

Regions of interest	Atlas labels ^a
left / right intraparietal sulcus (IPS)	L_IPS1_ROI, L_MIP_ROI /, R_IPS1_ROI, R_MIP_ROI
left / right supramarginal gyrus (SMG)	L_PFop_ROI, L_PF_ROI, L_PFm_ROI / R_PFop_ROI, R_PF_ROI, R_PFm_ROI /
Left / right angular gyrus (AG)	L_PGp_ROI, L_PGi_ROI, L_PGs_ROI / R_PGp_ROI, R_PGi_ROI, R_PGs_ROI /
left / right hippocampus	L_H_ROI / R_H_ROI
left / right dorso-lateral prefrontal cortex (DLPFC)	L_9p_ROI, L_p9-46v_ROI, L_46_ROI, L_a9-46v_ROI, L_9-46d_ROI, L_9a_ROI / R_9p_ROI, R_p9-46v_ROI, R_46_ROI, R_a9-46v_ROI, R_9-46d_ROI, R_9a_ROI
left / right ventral temporal-occipital cortex (VTOC)	L_TE1p_ROI / R_TE1p_ROI
left / right visual word form area (VWFA)	L_VVC_ROI / R_VVC_ROI

BA=Brodmann area; ^a Glasser et al. (2016), *retrieved 09/01/2016 from <https://balsa.wustl.edu/study/show/RVVG>*; if several areas are given, they were combined to form the final region of interest.

Supplementary Table S2. Correlations between covariates for time point 1. Note that none of the correlations reaches significance after adjusting for multiple comparisons with alpha = 0.05.

	Sex	Handedness	Maternal education	Familial risk of developmental dyslexia	IQ at time point 1
Age at time point 1	r= -0.36; p= 0.0555	r= 0.13; p=0.5050	r= 0.06; p=0.7755	R= -0.16; p=0.4274	r= -0.05; p=0.7985
Sex		r= -0.05; p=0.8133	r= -0.02; p=0.9066	r= 0.13; p=0.5200	r= -0.13; p=0.4988
Handedness			r= -0.14; p=0.4906	r= -0.02; p=0.9190	r= 0.00; p=0.9986
Maternal education				r= 0.29; p=0.1310	r= 0.36; p=0.0622
Familial risk of developmental dyslexia					r= 0.32; p=0.0957

Supplementary Table S3. Correlations between covariates for time point 2. Note that none of the correlations reaches significance after adjusting for multiple comparisons with alpha = 0.05.

	Sex	Handed-ness	Maternal education	Familial risk of dyslexia	IQ at time point 2	Spelling accuracy	Reading speed	Arithmetic abilities	Visuo-spatial abilities
Age at time point 2	r=-0.13 p= 0.5246	r=0.14; p= 0.4624	r=0.14; p= 0.4806	r=-0.38; p= 0.0476	r= 0.10; p= 0.6097	r=-0.24; p= 0.2279	r=0.16 p= 0.4089	r=-0.27; p= 0.1581	r=0.05 p= 0.8159
Sex		r= -0.05; p=0.8133	r= -0.02; p=0.9066	r= 0.13; p=0.5200	r= 0.18; p=0.3566	r= 0.02; p=0.9263	r= -0.43; p=0.0208	r= -0.18; p=0.3555	r= -0.02; p=0.9348
Handed-ness			r= -0.14; p=0.4906	r= -0.02; p=0.9190	r= 0.17; p=0.3984	r= -0.15; p=0.4333	r= 0.06; p=0.7797	r= 0.30; p=0.1224	r= 0.07; p=0.7287
Maternal education				r= 0.29; p=0.1310	r= 0.27; p=0.1673	r= 0.16; p=0.4164	r= 0.26; p=0.1878	r= 0.23; p=0.2448	r= 0.51; p=0.0057
Familial risk of dyslexia					r= 0.23; p=0.2463	r= 0.01; p=0.9691	r= -0.28; p=0.1470	r= 0.39; p=0.0424	r= 0.55; p=0.0023
IQ at time point 2						r= -0.14; p=0.4892	r= -0.11; p=0.5911	r= 0.17; p=0.3930	r= 0.24; p=0.2254
Spelling accuracy							r= 0.31; p=0.1114	r= 0.47; p=0.0114	r= 0.19; p=0.3264
Reading speed								r= 0.25; p=0.1926	r= 0.23; p=0.2422
Arithmetic abilities									r= 0.55; p=0.0023

Supplementary Table S4. Correlations across time. Significant correlations ($\alpha < 0.05$) are marked in bold font and with *.

	Age at time point 2		IQ at time point2
Age at time point 1	r= 0.51; p= 0.0054*	IQ at time point1	r= 0.33; p= 0.0827

Supplementary Table S5. Results of the ROI analyses. Significant effects are marked in italic and bold. To control for multiple comparisons, only results with a $p < 0.0018$ (corrected for 14 ROIs and 2 math test subscales) are considered significant. TE1p = VTOC

	Arithmetic abilities		Visuo-spatial abilities			Arithmetic abilities		Visuo-spatial abilities	
	R ²	P	R ²	P		R ²	P	R ²	P
<i>R_{CT}</i>									
L IPS	0.06	0.3273	0.01	0.6751	R IPS	0.00	0.9574	0.05	0.3703
L HIPP	0.00	0.9674	0.09	0.2165	R HIPP	0.00	0.9937	0.01	0.6859
L DLPFC	0.00	0.9390	0.00	0.8517	R DLPFC	0.00	0.9516	0.02	0.5986
L VTOC	0.05	0.3639	0.00	0.8709	R VTOC	0.02	0.5922	0.06	0.3405
L VWFA	0.00	0.8960	0.06	0.3168	R VWFA	0.02	0.5826	0.11	0.1870
L SMG	0.00	0.8414	0.05	0.3880	R SMG	0.03	0.5263	0.08	0.2477
L AG	0.00	0.9302	0.03	0.4867	R AG	0.01	0.7384	0.06	0.3217
<i>R_{CC}</i>									
L IPS	0.08	0.2598	0.08	0.2659	<i>R IPS</i>	<i>0.55</i>	<i>0.0004</i>	0.00	0.9913
L HIPP	0.07	0.2964	0.00	0.7900	R HIPP	0.37	0.0070	0.04	0.4290
L DLPFC	0.09	0.2247	0.01	0.6798	R DLPFC	0.05	0.3659	0.00	0.9862
L VTOC	0.09	0.2138	0.01	0.6345	R VTOC	0.07	0.2917	0.00	0.9913
L VWFA	0.05	0.3594	0.08	0.2461	R VWFA	0.03	0.4802	0.07	0.2844
L SMG	0.01	0.7741	0.01	0.7311	R SMG	0.02	0.6273	0.02	0.5849
L AG	0.03	0.4983	0.00	0.9903	R AG	0.15	0.1152	0.07	0.2968
<i>R_{GI}</i>									
L IPS	0.11	0.1863	0.00	0.8486	R IPS	0.03	0.5195	0.03	0.4820
L HIPP	0.07	0.2866	0.02	0.5509	R HIPP	0.01	0.7183	0.01	0.7698
L DLPFC	0.07	0.3042	0.00	0.9460	R DLPFC	0.11	0.1752	0.03	0.4769
L VTOC	0.26	0.0307	0.03	0.5010	R VTOC	0.00	0.8141	0.10	0.2132
L VWFA	0.04	0.4444	0.00	0.8855	R VWFA	0.10	0.2008	0.01	0.7156
L SMG	0.13	0.1396	0.01	0.7301	R SMG	0.03	0.4974	0.00	0.8224
L AG	0.05	0.3563	0.07	0.2810	R AG	0.04	0.4414	0.00	0.8115
<i>R_{SD}</i>									
L IPS	0.06	0.3369	0.01	0.6912	R IPS	0.15	0.1090	0.05	0.3709
L HIPP	0.15	0.1165	0.01	0.6868	R HIPP	0.08	0.2451	0.04	0.4159
L DLPFC	0.01	0.7443	0.00	0.9886	R DLPFC	0.15	0.1105	0.13	0.1474
L VTOC	0.00	0.8179	0.02	0.5908	R VTOC	0.07	0.2919	0.00	0.9768
L VWFA	0.11	0.1867	0.01	0.7767	R VWFA	0.01	0.6585	0.01	0.7106
L SMG	0.04	0.4560	0.05	0.3763	R SMG	0.01	0.7248	0.07	0.3068
L AG	0.00	0.9240	0.06	0.3408	R AG	0.01	0.7139	0.01	0.7195

R_{CT} = change in cortical thickness; *R_{CC}* = change in cortical folding regularity; *R_{GI}* = change in gyrification; *R_{SD}* = change in sulcus depth; L = left hemisphere; R = right hemisphere; IPS = intraparietal sulcus; HIPP = hippocampus; DLPFC = dorso-lateral prefrontal cortex; VTOC = ventral temporal-occipital cortex; VWFA = visual word form area; SGM = supramarginal gyrus; AG = angular gyrus; R² = determinant of covariation.