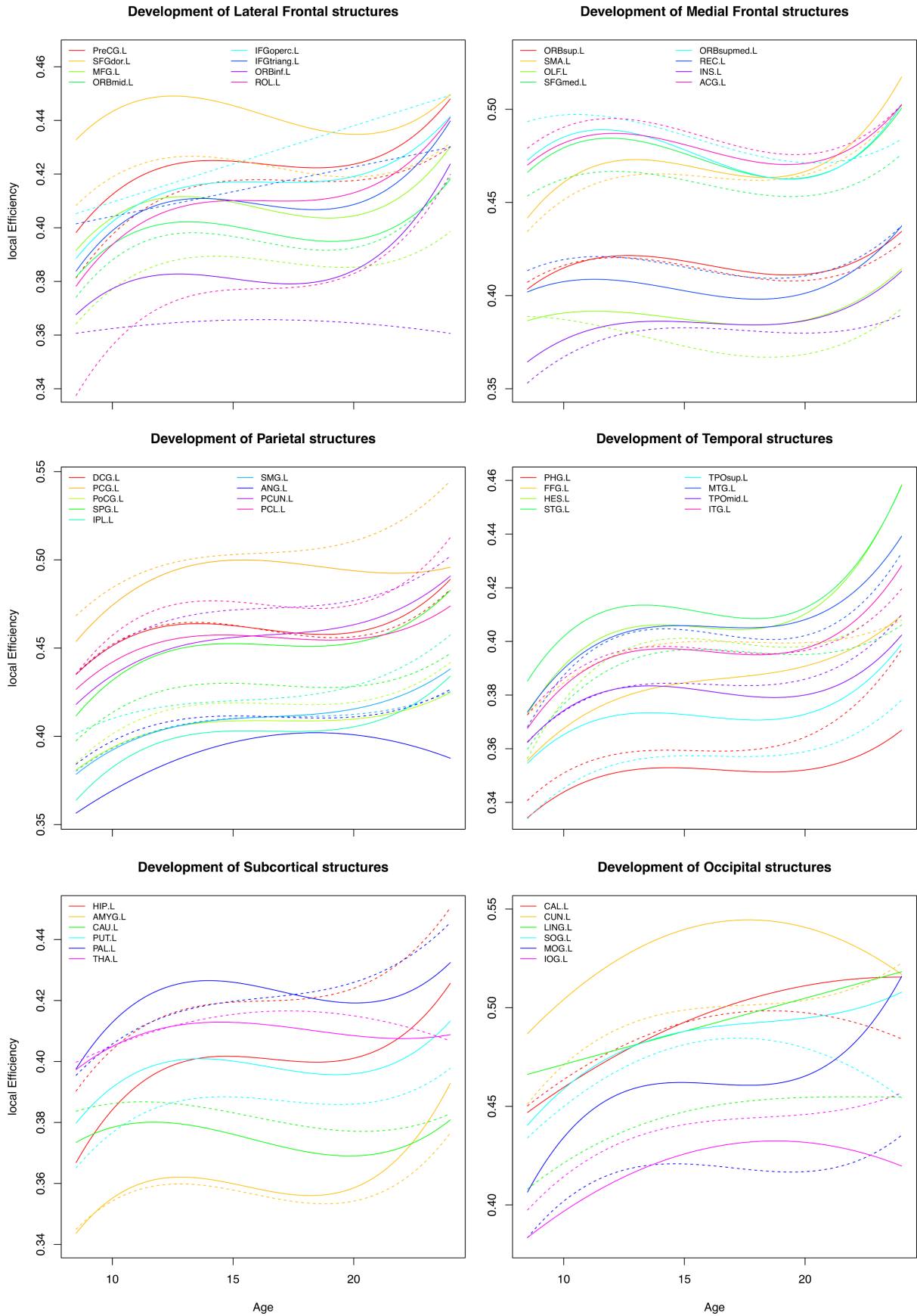**SUPPLEMENTAL MATERIAL**

Supplemental Figure S1 – Development of FA-weighted local efficiency during adolescence. All 90 AAL regions are grouped in 6 large cortical and subcortical brain regions. Left and right hemispheres have the same color; dashed lines represent trajectory of local efficiency of regions in the right hemisphere, continuous lines represent left hemispheric regions.
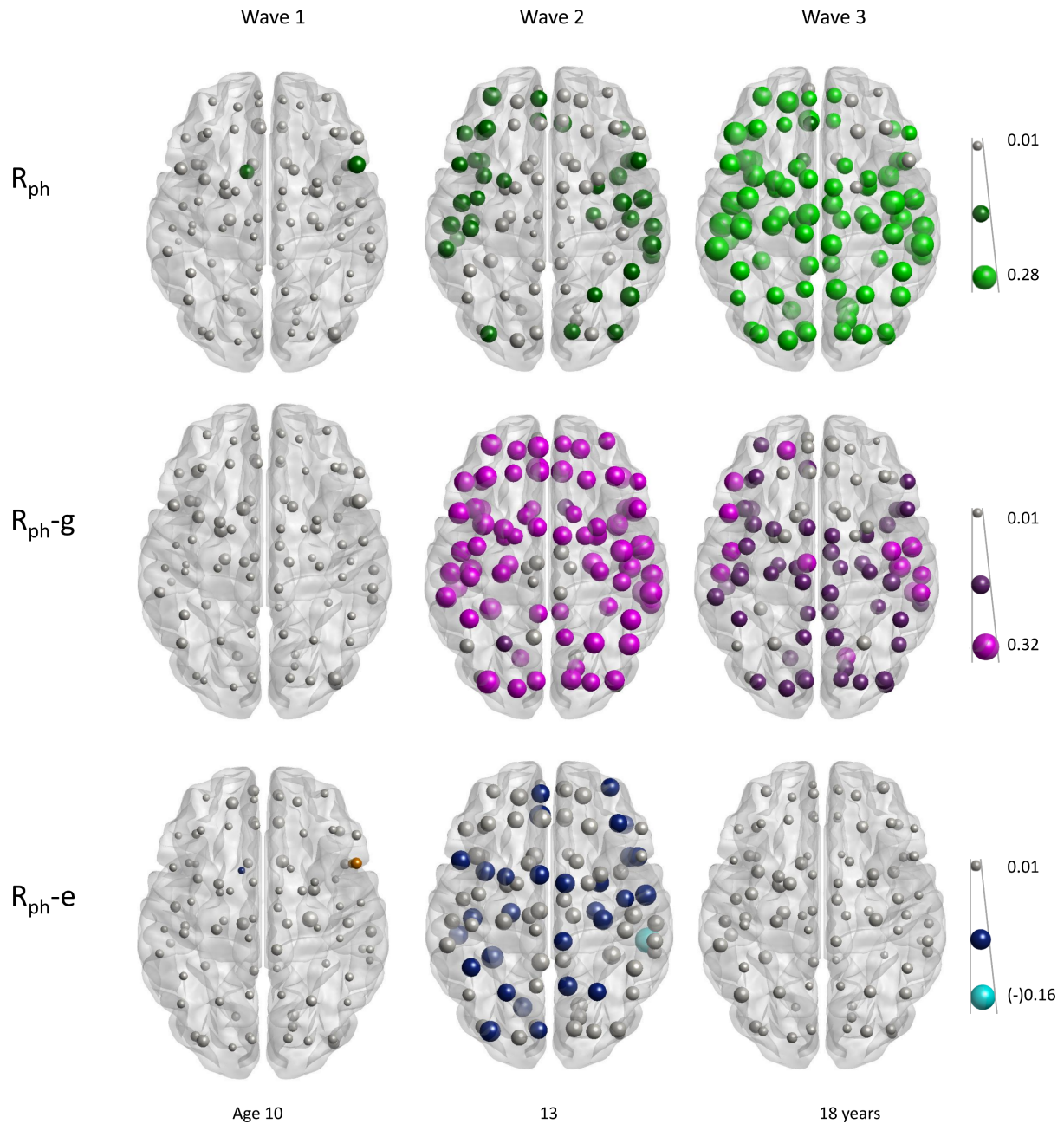
Supplemental Figure S2 – Presentation of the phenotypic (top, green), genetic (middle, pink), and unique environmental (bottom, blue) correlations between local efficiency and IQ at wave 1, 2, and 3. Dark colors indicate significance at $p < 0.05$; light colors indicate FDR-corrected significance. Size of the sphere is the absolute correlation strength; for the r_{ph}-e, the correlations are negative at wave 2, mainly positive at wave 3 (one region reached significance at $p < 0.05$; indicated in orange). Although there was a high genetic contribution to the correlation between IQ and local efficiency at age 13 (wave 2), the negative unique environmental influences led to a small phenotypic correlation. At age 18 (wave 3), the negative unique environmental correlation was not present, and the phenotypic correlation comes to bloom.

Supplemental Table SI – Phenotypic correlations between mean IQ and local efficiency at all three measurements (M1, M2, M3).

	Left			Right		
	Rph M1	Rph M2	Rph M3	Rph M1	Rph M2	Rph M3
Precentral	0.02	<u>0.15**</u>	**0.24***	0.03	<u>0.18**</u>	**0.27****
Frontal_Sup	0.04	0.11**	**0.15**	0.01	0.13**	0.14
Frontal_Sup_Orb	0.03	0.13**	**0.24****	0.01	0.14**	0.12
Frontal_Mid	0.04	<u>0.18**</u>	**0.19***	-0.04	0.13**	0.14
Frontal_Mid_Orb	0.03	<u>0.19**</u>	**0.20***	-0.04	0.09**	0.06
Frontal_Inf_Oper	0.09	<u>0.16**</u>	**0.22****	<u>0.16</u>	0.16**	0.13*
Frontal_Inf_Tri	0.04	<u>0.16**</u>	**0.25****	0.11	0.13**	**0.15***
Frontal_Inf_Orb	0.07	<u>0.17**</u>	**0.18***	0.11	<u>0.16**</u>	**0.17**
Rolandic_Oper	0.03	<u>0.18**</u>	**0.26****	0.06	<u>0.20**</u>	**0.23****
Supp_Motor_Area	0.01	0.12**	**0.20***	0.02	0.11**	**0.19***
Olfactory	0.09	0.09**	<u>0.14</u>	0.08	0.13*	0.11
Frontal_Sup_Medial	0.01	<u>0.16**</u>	**0.15**	-0.00	0.13**	**0.14**
Frontal_Med_Orb	0.03	0.07	0.12	0.03	0.06	0.12
Rectus	0.12	<u>0.16**</u>	**0.23***	0.06	<u>0.18**</u>	0.10
Insula	0.08	<u>0.16**</u>	**0.24***	0.04	<u>0.19**</u>	**0.23***
Cingulum_Ant	0.09	0.13**	<u>0.14</u>	0.02	0.12**	**0.15**
Cingulum_Mid	0.03	0.07	**0.25****	0.03	0.09	**0.22***
Cingulum_Post	-0.00	0.11**	**0.20***	0.00	0.12**	**0.18***
Hippocampus	-0.01	0.13**	**0.22***	-0.03	0.10**	**0.23***
ParaHippocampal	0.09	0.12**	**0.22***	0.08	<u>0.15**</u>	**0.2***
Amygdala	0.11	0.11**	**0.18**	0.12	<u>0.15**</u>	**0.19***
Calcarine	-0.00	0.06	**0.20***	0.01	0.12**	**0.21***
Cuneus	0.03	0.13**	**0.19***	-0.02	<u>0.16**</u>	**0.18***
Lingual	0.04	0.09**	**0.19***	0.02	0.06	**0.24****
Occipital_Sup	0.00	0.14**	**0.21***	-0.03	0.13**	**0.21***
Occipital_Mid	-0.05	<u>0.17**</u>	**0.19***	-0.10	<u>0.15**</u>	**0.17***
Occipital_Inf	-0.03	0.08	**0.16**	-0.08	0.12	**0.16***
Fusiform	0.02	0.13**	**0.19**	-0.01	0.12**	**0.17***
Postcentral	0.02	<u>0.17**</u>	**0.24***	0.02	0.12**	**0.22***
Parietal_Sup	0.00	0.07*	**0.18**	-0.01	<u>0.15**</u>	**0.19**
Parietal_Inf	-0.05	0.12**	**0.20***	-0.00	<u>0.16**</u>	**0.2***
SupraMarginal	-0.06	<u>0.15**</u>	**0.26***	0.06	<u>0.20**</u>	**0.25****
Angular	-0.06	0.10	**0.15**	-0.03	<u>0.20**</u>	**0.21***
Precuneus	0.01	0.10	**0.17***	0.02	0.08**	**0.22***
Paracentral_Lobule	-0.02	0.04	**0.19***	0.01	0.03	**0.23***
Caudate	0.12	0.12**	**0.18**	0.07	0.12**	**0.16**
Putamen	0.05	<u>0.15**</u>	**0.22***	0.05	0.13**	**0.17**
Pallidum	0.03	0.11**	**0.19**	-0.01	0.13**	0.11
Thalamus	0.00	0.04	**0.19***	0.03	0.04	**0.19***
Heschl	0.02	<u>0.16**</u>	**0.21***	-0.04	<u>0.18**</u>	**0.24****
Temporal_Sup	-0.01	<u>0.19**</u>	**0.28****	-0.02	<u>0.19**</u>	**0.24****
Temporal_Pole_Sup	0.07	<u>0.16**</u>	**0.23***	<u>0.11</u>	<u>0.20**</u>	**0.19***
Temporal_Mid	-0.03	<u>0.20**</u>	**0.24***	-0.05	<u>0.18**</u>	**0.22***
Temporal_Pole_Mid	0.05	<u>0.17**</u>	**0.24***	0.07	<u>0.14**</u>	**0.19***
Temporal_Inf	0.00	<u>0.16**</u>	**0.25***	0.02	<u>0.14**</u>	**0.24****

Underlined: significant correlations ($p < 0.05$) between local efficiency and mean IQ

Bold: FDR corrected significant correlations between local efficiency and mean IQ

* significant r_{ph}-g ($p < 0.05$)

** FDR corrected significant r_{ph}-g

Supplemental Table SII – Heritabilities of local efficiency at all three measurements (M1, M2, M3); and the genetic correlation between local efficiency of measurements 1 and 2 (M1-2), and measurements 2 and 3 (M2-3).

	Left					Right				
	Broad heritability			Rg		Broad heritability			Rg	
	M1	M2	M3	M1-2	M2-3	M1	M2	M3	M1-2	M2-3
Precentral	0.43	0.21	0.44	**0.72**	**0.88**	0.34	0.26	0.47	**0.83**	_0.70_
Frontal_Sup	0.30	0.25	0.52	**0.87**	_0.68_	0.30	0.20	0.46	_0.76_	_0.79_
Frontal_Sup_Orb	0.24	0.19	0.45	0.64	0.50	0.16	0.17	0.43	0.35	0.47
Frontal_Mid	0.40	0.19	0.40	_0.70_	0.54	0.31	0.17	0.38	0.60	_0.77_
Frontal_Mid_Orb	0.29	0.21	0.38	0.67	_0.75_	0.18	0.16a	0.20	0.63	_0.94_
Frontal_Inf_Oper	0.55	0.22	0.40	_0.61_	_0.66_	0.32	0.15	0.33	0.60	0.49
Frontal_Inf_Tri	0.22	0.11a	0.34	0.49	0.52	0.25	0.14a	0.21	0.53	0.49
Frontal_Inf_Orb	0.13a	0.09a	0.24	0.10	0.40	0.13	0.12a	0.23	0.21	0.30
Rolandic_Oper	0.54	0.26	0.42	**0.65**	_0.79_	0.33	0.23	0.52	0.61	_0.66_
Supp_Motor_Area	0.42	0.21	0.44	**0.77**	_0.85_	0.35	0.29	0.47	**0.83**	_0.64_
Olfactory	0.24	0.10a	0.30	0.47	0.31	0.23	0.19a	0.37	0.08	0.10
Frontal_Sup_Medial	0.26	0.27	0.53	_0.63_	_0.65_	0.23	0.16	0.49	0.53	_0.67_
Frontal_Med_Orb	0.15	0.16	0.36	0.69	0.65	0.17	0.06a	0.45	0.25	0.34
Rectus	0.24	0.20	0.39	0.61	0.60	0.12a	0.12a	0.24	-0.12	-0.05
Insula	0.32	0.19	0.36	0.57	0.54	0.31	0.24	0.45	**0.75**	0.56
Cingulum_Ant	0.20	0.17	0.43	0.47	0.25	0.19	0.21	0.49	0.60	0.46
Cingulum_Mid	0.36	0.26	0.42	**0.87**	0.49	0.41	0.28	0.46	**0.90**	_0.60_
Cingulum_Post	0.28	0.25	0.46	**0.83**	0.49	0.38	0.42	0.54	**0.83**	_0.51_
Hippocampus	0.32	0.28	0.37	_0.76_	0.50	0.39	0.30	0.59	0.52	_0.59_
ParaHippocampal	0.30	0.17	0.22	0.14	0.40	0.12	0.18a	0.46	0.54	0.62
Amygdala	0.35	0.09a	0.20	0.24	0.47	0.14	0.29	0.48	0.58	0.37
Calcarine	0.39	0.37	0.37	**0.84**	0.49	0.43	0.31	0.41	**0.74**	_0.65_
Cuneus	0.37	0.40	0.38	**0.86**	_0.7_	0.43	0.25	0.37	**0.78**	0.56
Lingual	0.29	0.28	0.42	**0.86**	_0.65_	0.34	0.34	0.46	**0.86**	_0.68_
Occipital_Sup	0.42	0.40	0.33	**0.77**	_0.65_	0.30	0.34	0.33	**0.93**	_0.67_
Occipital_Mid	0.30	0.38	0.44	_0.60_	_0.61_	0.44	0.29	0.63	0.49	_0.78_
Occipital_Inf	0.18	0.26	0.29	0.52	0.60	0.31	0.13a	0.26	0.50	0.62
Fusiform	0.33	0.15	0.29	0.42	0.58	0.35	0.15	0.56	0.67	0.60
Postcentral	0.34	0.21	0.37	**0.78**	_0.71_	0.39	0.23	0.57	**0.83**	_0.66_
Parietal_Sup	0.27	0.32	0.49	**0.71**	0.41	0.40	0.22	0.59	**0.79**	_0.55_
Parietal_Inf	0.43	0.17	0.47	0.65	0.59	0.41	0.33	0.59	**0.85**	_0.65_
SupraMarginal	0.43	0.22	0.43	**0.60**	_0.58_	0.43	0.29	0.68	**0.85**	**0.79**
Angular	0.37	0.31	0.50	**0.78**	_0.50_	0.41	0.34	0.66	**0.77**	**0.62**
Precuneus	0.36	0.33	0.37	**0.79**	_0.61_	0.40	0.27	0.56	**0.87**	_0.66_
Paracentral_Lobule	0.44	0.28	0.37	**0.95**	**0.88**	0.51	0.37	0.50	**0.95**	_0.76_
Caudate	0.34	0.11a	0.27	0.23	0.51	0.36	0.15	0.45	0.71	_0.90_
Putamen	0.40	0.14	0.39	0.66	0.74	0.36	0.22	0.48	**0.89**	_0.76_
Pallidum	0.40	0.21	0.39	**0.85**	_0.81_	0.33	0.30	0.53	**0.81**	_0.69_
Thalamus	0.38	0.20	0.29	**0.91**	0.67	0.40	0.25	0.36	**0.94**	0.62
Heschl	0.38	0.15	0.35	0.43	0.59	0.39	0.28	0.51	0.42	0.53
Temporal_Sup	0.51	0.20	0.46	_0.64_	0.58	0.44	0.27	0.61	**0.70**	_0.69_
Temporal_Pole_Sup	0.31	0.14	0.32	0.43	0.55	0.16	0.20	0.37	0.39	0.59
Temporal_Mid	0.47	0.23	0.52	_0.61_	_0.68_	0.45	0.24	0.60	**0.79**	_0.68_
Temporal_Pole_Mid	0.22	0.10	0.29	0.08	0.41	0.15	0.27	0.45	0.50	_0.71_
Temporal_Inf	0.44	0.19	0.44	0.58	_0.73_	0.36	0.35	0.62	**0.80**	**0.80**

a broad heritability of these regions were not significantly larger than zero (lower bound of 95% CI < 0.005)
Underlined: Rg is significantly ($p < 0.05$) different from zero
Bold: Rg is FDR corrected significantly different from zero
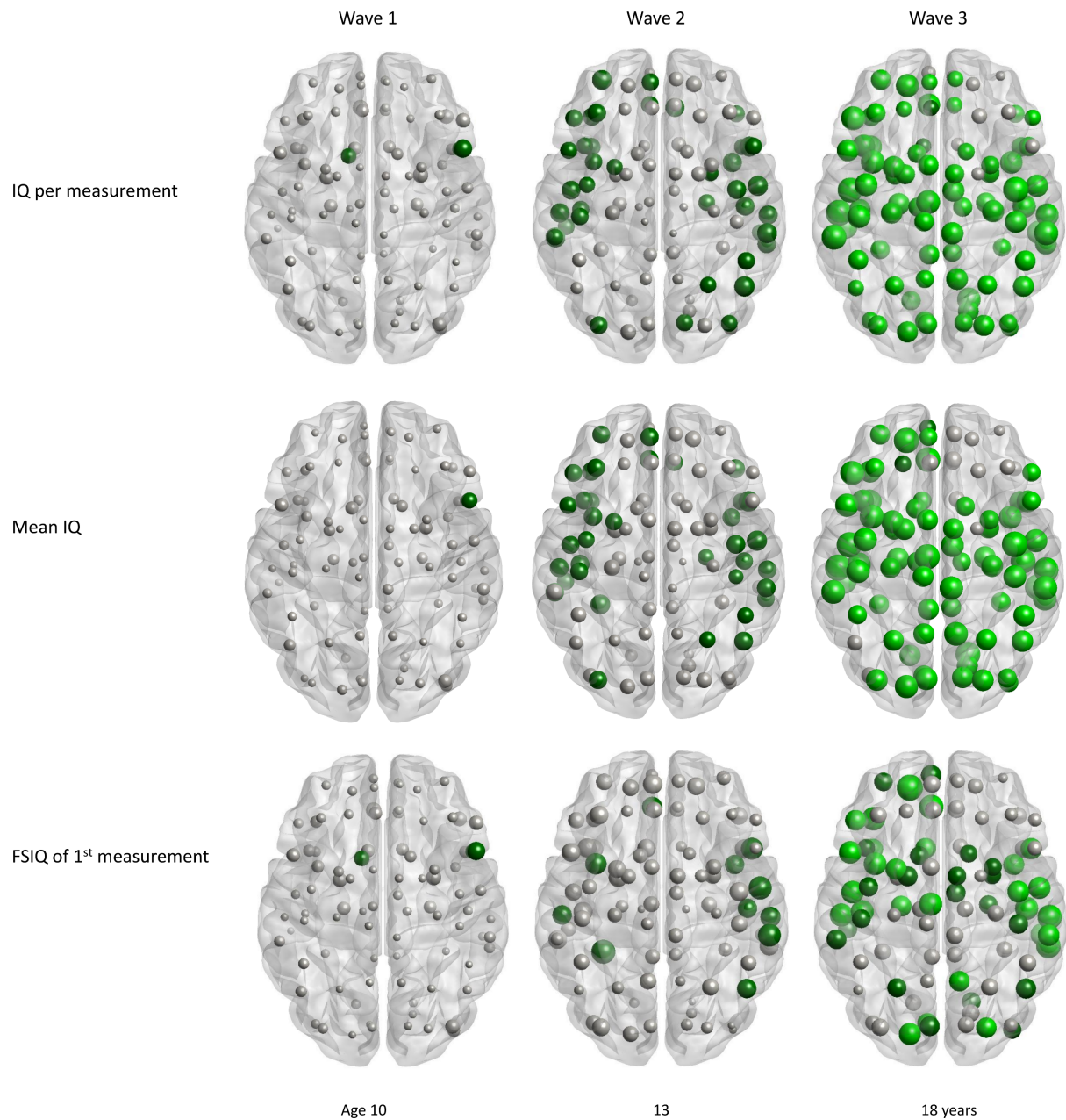
Supplemental Figure S3 – Effect of choice of IQ measurement on the correlation between IQ and local efficiency. Presentation of the phenotypic correlations between local efficiency and IQ at wave 1, 2, and 3. Size of the sphere is the absolute correlation strength, dark green nodes indicate significance at $p < 0.05$; light green nodes indicate FDR-corrected significance.