

**Supporting Information Table I. FA-weighted local efficiency and the broad heritability of local efficiency at measurement 1 (M1) and measurement 2 (M2).**

Region	Local efficiency				Broad heritability of local efficiency			
	Left		Right		Left		Right	
	M 1	M 2	M 1	M 2	M 1	M 2	M 1	M 2
Precentral	0.41	0.42**	0.40	0.42**	<b>0.43</b>	<b>0.24</b>	<b>0.44</b>	<b>0.48</b>
Frontal_Sup	0.43	0.44**	0.42	0.43**	<b>0.25</b>	<b>0.39</b>	0.26	<b>0.29</b>
Frontal_Sup_Orb	0.41	0.42**	0.42	0.42*	0.25	<b>0.41</b>	0.03	0.22
Frontal_Mid	0.41	0.42**	0.38	0.39**	<b>0.52</b>	<b>0.37</b>	<b>0.38</b>	<b>0.25</b>
Frontal_Mid_Orb	0.39	0.41**	0.38	0.39**	0.23	0.16	0.01	0.08
Frontal_Inf_Oper	0.40	0.42**	0.37	0.39**	<b>0.64</b>	<b>0.38</b>	0.31	<b>0.33</b>
Frontal_Inf_Tri	0.40	0.41**	0.38	0.39**	0.14	0.20	<b>0.23</b>	<b>0.34</b>
Frontal_Inf_Orb	0.38	0.39**	0.37	0.37*	0.04	0.20	0.06	0.16
Rolandic_Oper	0.39	0.41**	0.36	0.38**	<b>0.74</b>	<b>0.32</b>	<b>0.35</b>	<b>0.49</b>
Supp_Motor_Area	0.46	0.47**	0.45	0.46**	<b>0.59</b>	<b>0.47</b>	<b>0.45</b>	<b>0.45</b>
Olfactory	0.39	0.39	0.39	0.38**	0.17	<b>0.37</b>	0.03	<b>0.29</b>
Frontal_Sup_Media	0.47	0.48*	0.46	0.46*	0.43	0.16	0.06	0.19
Frontal_Med_Orb	0.48	0.48	0.47	0.47	0.22	<b>0.26</b>	0.13	0.16
Rectus	0.41	0.41	0.42	0.41	0.09	0.20	0.33	0.31
Insula	0.38	0.40**	0.37	0.39**	<b>0.46</b>	<b>0.40</b>	<b>0.30</b>	<b>0.38</b>
Cingulum_Ant	0.47	0.48	0.48	0.48	0.27	0.18	0.27	<b>0.30</b>
Cingulum_Mid	0.45	0.46**	0.45	0.46**	<b>0.58</b>	<b>0.45</b>	<b>0.38</b>	<b>0.29</b>
Cingulum_Post	0.47	0.50**	0.48	0.50**	<b>0.39</b>	<b>0.30</b>	<b>0.23</b>	<b>0.46</b>
Hippocampus	0.39	0.41**	0.41	0.42**	<b>0.37</b>	<b>0.42</b>	<b>0.19</b>	<b>0.47</b>
ParaHippocampal	0.35	0.36**	0.36	0.37**	0.39	<b>0.40</b>	<b>0.21</b>	<b>0.57</b>
Amygdala	0.36	0.37**	0.36	0.37**	<b>0.54</b>	<b>0.47</b>	<b>0.38</b>	<b>0.33</b>
Calcarine	0.46	0.49**	0.46	0.49**	<b>0.53</b>	<b>0.50</b>	0.23	0.20
Cuneus	0.48	0.51**	0.47	0.49**	<b>0.46</b>	<b>0.35</b>	0.27	<b>0.33</b>
Lingual	0.43	0.45**	0.43	0.45**	<b>0.46</b>	<b>0.48</b>	<b>0.30</b>	<b>0.26</b>
Occipital_Sup	0.46	0.49**	0.45	0.48**	<b>0.34</b>	<b>0.37</b>	0.26	0.14
Occipital_Mid	0.43	0.46**	0.41	0.43**	0.26	0.35	<b>0.36</b>	0.21
Occipital_Inf	0.42	0.45**	0.43	0.45**	0.20	<b>0.31</b>	0.09	0.27
Fusiform	0.38	0.40**	0.39	0.41**	<b>0.34</b>	<b>0.31</b>	<b>0.39</b>	<b>0.43</b>
Postcentral	0.39	0.41**	0.40	0.42**	<b>0.22</b>	<b>0.43</b>	<b>0.44</b>	<b>0.34</b>
Parietal_Sup	0.42	0.45**	0.42	0.43**	<b>0.48</b>	<b>0.43</b>	<b>0.42</b>	<b>0.47</b>
Parietal_Inf	0.39	0.41**	0.40	0.41**	<b>0.56</b>	<b>0.22</b>	<b>0.35</b>	<b>0.35</b>
SupraMarginal	0.38	0.41**	0.38	0.40**	<b>0.25</b>	<b>0.35</b>	<b>0.53</b>	<b>0.50</b>
Angular	0.38	0.41**	0.39	0.41**	<b>0.33</b>	<b>0.46</b>	<b>0.37</b>	<b>0.34</b>
Precuneus	0.43	0.46**	0.45	0.47**	<b>0.40</b>	<b>0.41</b>	<b>0.50</b>	<b>0.49</b>
Paracentral_Lobule	0.44	0.46**	0.45	0.47**	0.31	0.26	0.24	<b>0.33</b>
Caudate	0.39	0.39	0.39	0.39	<b>0.32</b>	<b>0.31</b>	<b>0.30</b>	<b>0.45</b>
Putamen	0.40	0.41**	0.39	0.40**	<b>0.32</b>	<b>0.27</b>	<b>0.22</b>	<b>0.33</b>
Pallidum	0.41	0.43**	0.41	0.42**	<b>0.31</b>	0.14	<b>0.28</b>	0.19
Thalamus	0.41	0.42**	0.41	0.42**	<b>0.46</b>	<b>0.36</b>	0.32	0.34
Heschl	0.39	0.41**	0.37	0.40**	<b>0.67</b>	<b>0.29</b>	<b>0.45</b>	<b>0.45</b>
Temporal_Sup	0.40	0.42**	0.38	0.40**	0.28	<b>0.33</b>	0.13	<b>0.38</b>
Temporal_Pole_Sup	0.37	0.38**	0.35	0.37**	<b>0.70</b>	<b>0.31</b>	<b>0.35</b>	<b>0.32</b>
Temporal_Mid	0.39	0.41**	0.39	0.41**	0.23	0.28	<b>0.26</b>	<b>0.46</b>
Temporal_Pole_Mid	0.38	0.39**	0.37	0.39**	<b>0.62</b>	<b>0.54</b>	<b>0.35</b>	<b>0.58</b>
Temporal_Inf	0.39	0.40**	0.39	0.40**	<b>0.43</b>	<b>0.24</b>	<b>0.44</b>	<b>0.48</b>

\* significant change over time ( $P < 0.05$ )

\*\* significant change over time ( $P < 0.05/90$ )

Bold: significant broad heritability ( $P < 0.05$ )

**Supporting Information Table II. Streamline based efficiency at measurement 1 and 2**

Region <sup>seffect</sup>	Left		Right	
	M 1	M 2	M 1	M 2
Precentral <sup>R</sup>	840	692**	788	717**
Frontal_Sup <sup>L</sup>	867	830	788	778
Frontal_Sup_Orb	301	355**	334	398**
Frontal_Mid <sup>LR</sup>	514	503	402	410
Frontal_Mid_Orb <sup>R</sup>	283	346**	266	293
Frontal_Inf_Oper <sup>LR</sup>	506	482*	467	417**
Frontal_Inf_Tri <sup>LR</sup>	469	443*	422	419*
Frontal_Inf_Orb <sup>LR</sup>	275	268	285	249*
Rolandic_Oper <sup>LR</sup>	403	394*	324	287
Supp_Motor_Area	1088	962**	1024	868**
Olfactory <sup>LR</sup>	178	166	175	142**
Frontal_Sup_Medial <sup>L</sup>	810	793	679	703
Frontal_Med_Orb	322	328	384	414
Rectus	183	168	194	165**
Insula <sup>LR</sup>	330	345	289	331
Cingulum_Ant	650	774**	765	894**
Cingulum_Mid	958	790**	1214	1022**
Cingulum_Post	507	547*	590	618
Hippocampus <sup>R</sup>	279	282	331	318
ParaHippocampal <sup>LR</sup>	256	211**	263	236*
Amygdala <sup>LR</sup>	295	262**	336	296**
Calcarine	374	383	428	436
Cuneus <sup>R</sup>	487	508	517	548
Lingual	289	285	297	286*
Occipital_Sup	523	540	495	525
Occipital_Mid <sup>LR</sup>	324	370**	317	346
Occipital_Inf <sup>R</sup>	242	256	278	263*
Fusiform <sup>TR</sup>	290	236**	348	294**
Postcentral <sup>LR</sup>	548	446**	659	590**
Parietal_Sup	529	441**	540	489**
Parietal_Inf <sup>LR</sup>	519	438**	538	514
SupraMarginal <sup>LR</sup>	640	612	573	527*
Angular <sup>LR</sup>	411	397	521	505
Precuneus <sup>R</sup>	619	615	698	671
Paracentral_Lobule <sup>R</sup>	928	727**	828	707**
Caudate <sup>LR</sup>	348	287**	380	309**
Putamen <sup>LR</sup>	555	541	490	484*
Pallidum <sup>LR</sup>	465	474	471	481
Thalamus <sup>LR</sup>	534	499*	517	462**
Heschl	194	207	181	215**
Temporal_Sup <sup>LR</sup>	351	358	298	315
Temporal_Pole_Sup	287	297	260	286
Temporal_Mid <sup>LR</sup>	358	360	374	366*
Temporal_Pole_Mid <sup>LR</sup>	279	276	304	313
Temporal_Inf <sup>LR</sup>	355	306**	348	285**

\*significant change over time ( $P < 0.05$ )

\*\*significant change over time ( $P < 0.05/90$ )

<sup>L/R</sup>Significant effect of sex for left (L) and/or right (R) region: boys > girls in all cases.

**Supporting Information Table III. Broad heritability of streamline count based local efficiency at measurement 1 and 2, and the broad heritability of change in local efficiency.**

Region	<u>Left</u>		<u>Right</u>		<u>Left</u>	<u>Right</u>
	M 1	M 2	M 1	M 2	Change	Change
Precentral	0.25	<b>0.36</b>	<b>0.33</b>	<b>0.46</b>	0.15	0.11
Frontal_Sup	0.27	<b>0.35</b>	<b>0.34</b>	<b>0.31</b>	0.28	0.11
Frontal_Sup_Orb	0.31	<b>0.47</b>	<b>0.40</b>	<b>0.35</b>	<b>0.46</b>	<b>0.45</b>
Frontal_Mid	<b>0.56</b>	0.02	0.24	0.01	<b>0.24</b>	0.15
Frontal_Mid_Orb	0.18	0.34	0.09	<b>0.40</b>	0.15	<b>0.27</b>
Frontal_Inf_Oper	0.30	0.24	0.12	0.00	0.28	0.13
Frontal_Inf_Tri	0.25	0.24	0.01	0.11	0.00	0.07
Frontal_Inf_Orb	0.07	0.00	0.18	0.11	0.04	0.04
Rolandic_Oper	<b>0.34</b>	<b>0.24</b>	<b>0.44</b>	0.26	0.02	<b>0.40</b>
Supp_Motor_Area	0.20	0.19	<b>0.43</b>	<b>0.29</b>	<b>0.30</b>	0.20
Olfactory	<b>0.39</b>	<b>0.43</b>	<b>0.37</b>	0.19	0.18	0.33
Frontal_Sup_Medial	0.21	<b>0.48</b>	<b>0.31</b>	0.24	0.22	0.24
Frontal_Med_Orb	0.13	<b>0.39</b>	<b>0.40</b>	<b>0.64</b>	0.26	0.19
Rectus	<b>0.44</b>	<b>0.30</b>	0.09	0.24	0.16	0.04
Insula	0.21	0.02	0.24	<b>0.31</b>	0.06	0.26
Cingulum_Ant	<b>0.49</b>	<b>0.48</b>	<b>0.32</b>	<b>0.54</b>	<b>0.54</b>	<b>0.32</b>
Cingulum_Mid	<b>0.47</b>	<b>0.42</b>	<b>0.41</b>	<b>0.29</b>	<b>0.32</b>	<b>0.39</b>
Cingulum_Post	<b>0.43</b>	<b>0.34</b>	<b>0.55</b>	<b>0.37</b>	0.09	0.22
Hippocampus	<b>0.39</b>	<b>0.27</b>	<b>0.50</b>	<b>0.21</b>	0.01	0.18
ParaHippocampal	<b>0.33</b>	0.08	<b>0.33</b>	0.10	0.10	0.09
Amygdala	<b>0.53</b>	<b>0.29</b>	0.15	0.00	0.06	0.09
Calcarine	<b>0.36</b>	<b>0.37</b>	<b>0.64</b>	<b>0.36</b>	0.11	0.18
Cuneus	<b>0.45</b>	0.16	<b>0.42</b>	<b>0.22</b>	0.16	0.02
Lingual	<b>0.43</b>	<b>0.58</b>	<b>0.43</b>	0.26	0.20	0.32
Occipital_Sup	<b>0.46</b>	<b>0.33</b>	<b>0.39</b>	<b>0.27</b>	0.14	0.01
Occipital_Mid	<b>0.29</b>	<b>0.46</b>	<b>0.31</b>	<b>0.24</b>	0.28	0.00
Occipital_Inf	<b>0.38</b>	<b>0.24</b>	<b>0.56</b>	<b>0.36</b>	0.02	0.31
Fusiform	<b>0.60</b>	0.13	<b>0.30</b>	<b>0.25</b>	<b>0.20</b>	0.02
Postcentral	<b>0.61</b>	<b>0.18</b>	<b>0.46</b>	0.15	<b>0.27</b>	0.28
Parietal_Sup	<b>0.56</b>	<b>0.41</b>	<b>0.35</b>	0.22	0.26	0.17
Parietal_Inf	<b>0.51</b>	0.10	<b>0.45</b>	<b>0.33</b>	<b>0.54</b>	0.04
SupraMarginal	<b>0.54</b>	<b>0.39</b>	<b>0.41</b>	<b>0.24</b>	0.22	0.06
Angular	<b>0.24</b>	0.14	<b>0.31</b>	0.16	0.02	0.05
Precuneus	<b>0.41</b>	<b>0.34</b>	<b>0.39</b>	<b>0.31</b>	0.01	0.01
Paracentral_Lobule	<b>0.27</b>	<b>0.39</b>	<b>0.35</b>	0.22	<b>0.33</b>	<b>0.43</b>
Caudate	<b>0.45</b>	0.20	0.22	0.00	0.26	0.17
Putamen	<b>0.40</b>	<b>0.18</b>	<b>0.53</b>	<b>0.21</b>	0.03	0.17
Pallidum	<b>0.40</b>	<b>0.26</b>	<b>0.42</b>	<b>0.26</b>	0.05	0.09
Thalamus	<b>0.51</b>	<b>0.41</b>	0.32	0.02	0.07	0.24
Heschl	0.02	0.07	0.12	0.24	0.07	0.12
Temporal_Sup	0.11	<b>0.39</b>	0.24	0.32	<b>0.48</b>	0.33
Temporal_Pole_Sup	0.17	0.01	0.34	0.00	0.09	0.30
Temporal_Mid	0.25	0.22	0.21	<b>0.37</b>	0.14	0.08
Temporal_Pole_Mid	0.31	0.06	0.31	0.06	0.05	0.08
Temporal_Inf	<b>0.45</b>	0.05	<b>0.53</b>	<b>0.22</b>	0.18	0.13

Bold: significant broad heritability ( $P < 0.05$ )

**Supporting Information Table IV. Significant phenotypic correlations (Rph) between change in streamline-based local efficiency and change in IQ.**

<u>Region</u>	<u>Rph</u>
Frontal_Inf_Orb_R	-0.21
Frontal_Med_Orb_R	-0.18
Rectus_R	-0.16
Cingulum_Ant_L	-0.17
Cingulum_Ant_R	-0.18
Cingulum_Post_R	-0.15
Calcarine_R	-0.18
Occipital_Mid_L	-0.19
Occipital_Inf_L	-0.17
SupraMarginal_R	-0.16
Caudate_L	-0.19

Significance at  $P < 0.05$