Supplemental Materials

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Composite ROI	Abbreviation
Cerebellar peduncles	CBP
Corpus callosum	CC
Corticospinal tract	CST
Medial lemniscus	ML
Cerebral peduncles	CP
Internal capsule	IC
Corona radiata	CR
Sagittal striatum	SS
External capsule	EC
Cingulum	CING
Stria terminalis	ST
Superior longitudinal fasciculus	SLF
Superior fronto-occipital fasciculus	SFO
Uncinate fasciculus	UF
Medial longitudinal fasciculus	MLF
Posterior thalamic radiation	PTR
Anterior commissure	AC
Fornix	FX

Supplemental Table 1. Abbreviations for each of the composite 18 WM ROIs. (From Aggarwal et al., 2021).

ROI	Abbreviation
Middle Cerebellar Peduncle	MCP
Genu of Corpus Callosum	GCC
Body of Corpus Callosum	BCC
Splenium of Corpus Callosum	SCC
Fornix	FX
Corticospinal Tract - Right	CST-R
Corticospinal Tract - Left	CST-L
Medial Lemniscus - Right	ML-R
Medial Lemniscus - Left	ML-L
Inferior Cerebellar Peduncle - Right	ICP-R
Inferior Cerebellar Peduncle - Left	ICP-L
Superior Cerebellar Peduncle - Right	SCP-R
Superior Cerebellar Peduncle - Left	SCP-L
Cerebral Peduncle - Right	CP-R
Cerebral Peduncle - Left	CP-L
Anterior Limb of the Internal Capsule - Right	ALIC-R
Anterior Limb of the Internal Capsule - Left	ALIC-L
Posterior Limb of the Internal Capsule - Right	PLIC-R
Posterior Limb of the Internal Capsule - Left	PLIC-L
Retrolenticular Limb of the Internal Capsule - Right	RLIC-R
Retrolenticular Limb of the Internal Capsule - Left	RLIC-L
Anterior Corona Radiata - Right	ACR-R
Anterior Corona Radiata - Left	ACR-L
Superior Corona Radiata - Right	SCR-R
Superior Corona Radiata - Left	SCR-L
Posterior Corona Radiata - Right	PCR-R
Posterior Corona Radiata - Left	PCR-L
Posterior Thalamic Radiation - Right	PTR-R
Posterior Thalamic Radiation - Left	PTR-L
Sagittal Striatum - Right	SS-R
Sagittal Striatum - Left	SS-L
External Capsule - Right	EC-R
External Capsule - Left	EC-L
Superior Cingulum - Right	CgC-R
Superior Cingulum - Left	CgC-L
Perihippocampal Cingulum - Right	CgH-R
Perihippocampal Cingulum - Left	CgH-L
Stria Terminalis - Right	ST-R
Stria Terminalis - Left	ST-L
Superior Longitudinal Fasciculus - Right	SLF-R
Superior Longitudinal Fasciculus - Left	SLF-L
Superior Fronto-Occipital Fasciculus - Right	SFO-R
Superior Fronto-Occipital Fasciculus - Left	SFO-L
Uncinate Fasciculus - Right	UF-R
Uncinate Fasciculus - Left	UF-L
Anterior Commissure	AC
Dorsal Posterior Corona Radiata - Right	DPCR-R
Dorsal Posterior Corona Radiata - Left	DPCR-L
Medial Longitudinal Fasciculus - Right	MLF-R
Medial Longitudinal Fasciculus - Left	MLF-L
Anterior Cingulum WM - Right	ACg-WM-R
Anterior Cingulum WM - Left	ACg-WM-L

Supplemental Table 2. Abbreviations for each of the 52 WM ROIs. (From Aggarwal et al., 2021).

ROI	Constituent ROIs
CBP	MCP
	ICP-R
	ICP-L
	SCP-R
	SCP-L
CC	GCC
	BCC
	SCC
CST	CST-R
	CST-L
ML	ML-R
	ML-L
CP	CP-R
	CP-L
IC	ALIC-R
	ALIC-L
	PLIC-R
	PLIC-L
	RLIC-R
	RLIC-L
CR	ACR-R
	ACR-L
	SCR-R
	SCR-L
	PCR-R
	PCR-L
	DPCR-R
	DPCR-L
SS	SS-R
	SS-R
EC	EC-R
	EC-L
CING	CgC-R
	CgC-L
	CgH-R
	CgH-L
	ACg-WM-R
	ACg-WM-L
ST	ST-R
	ST-L
SLF	SLF-R
	SLF-L
SFO	SFO-R
	SFO-L
UF	UF-R
	UF-L
MLF	MLF-R
	MLF-L
PTR	PTR-R
	PTR-L
AC	AC
FX	FX

Supplemental Table 3. Constituent ROIs for each of the 18 WM ROIs. (From Aggarwal et al., 2021)

Non-Linear qR_1 Age Trajectories in Global White Matter					
Metric	$A(GestAge) + B$	$A(GestAge^2) + B(GestAge) + C$	$Aln(GestAge) + B$	$A + Be^{C*GestAge}$	$Ae^{Be^{C}*GestAge}$
AIC	-3421.83	-3638.60	**-3657.11**	-3627.64	-3222.02
BIC	-3415.52	-3629.12	**-3650.79**	-3618.16	-3212.54
SSE	4.90E-07	1.39E-07	**1.49E-07**	1.48E-07	1.53E-06

Supplemental Table 4. The proposed qR_1 trajectory models in global white matter (GWM). Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and Sum of Squared Error (SSE) values are shown. The metrics with the lowest values are bolded, indicating that the logarithmic model provides the best fit.

ROI	Intercept	GestAge	P-value	Sex	P-value	GestAge:Sex	P-value
FX	7.91E-04	1.27E-04	**<0.001**	1.25E-05	0.218	5.95E-06	0.640
AC	9.51E-04	2.58E-04	**<0.001**	4.19E-06	0.700	-1.57E-06	0.957
CBP	1.11E-03	1.60E-04	**<0.001**	6.90E-06	0.287	-1.13E-05	0.423
CC	9.86E-04	3.38E-04	**<0.001**	1.19E-05	0.301	-4.66E-06	0.878
CST	1.10E-03	2.20E-04	**<0.001**	1.09E-05	0.170	-3.77E-06	0.850
ML	1.04E-03	1.87E-04	**<0.001**	4.67E-06	0.566	-5.38E-06	0.731
CP	1.09E-03	1.81E-04	**<0.001**	4.93E-06	0.642	-5.69E-06	0.786
IC	1.07E-03	2.45E-04	**<0.001**	7.62E-06	0.426	-2.84E-06	0.900
CR	9.90E-04	2.75E-04	**<0.001**	7.78E-06	0.343	-3.01E-06	0.890
SS	1.01E-03	2.78E-04	**<0.001**	1.46E-05	0.112	-1.91E-07	0.994
EC	8.68E-04	2.02E-04	**<0.001**	9.80E-06	0.135	2.39E-06	0.885
CING	7.94E-04	1.28E-04	**<0.001**	4.82E-06	0.305	3.35E-06	0.753
ST	9.81E-04	1.73E-04	**<0.001**	4.12E-06	0.585	-5.63E-06	0.748
SLF	9.91E-04	2.79E-04	**<0.001**	1.15E-05	0.181	9.12E-07	0.968
SFO	9.91E-04	2.01E-04	**<0.001**	8.15E-06	0.275	3.90E-06	0.828
UF	7.55E-04	1.47E-04	**<0.001**	4.83E-06	0.312	3.24E-06	0.778
MLF	1.00E-03	1.47E-04	**<0.001**	5.78E-07	0.933	-3.37E-06	0.807
PTR	1.11E-03	3.49E-04	**<0.001**	3.53E-06	0.745	-6.86E-06	0.805

Supplemental Table 5. Model parameters for logarithmic modeling of qR_1 in 18 WM ROIs. Models control for Sex and the interaction between GestAge and Sex. Note that GestAge is significant in all 18 models after Bonferroni correction.

ROI	Gestational Age at Scan partial-R^2	Cohen's f^2
FX	0.685	2.175
AC	0.683	2.155
CBP	0.764	3.237
CC	0.770	3.348
CST	0.763	3.219
ML	0.775	3.444
CP	0.641	1.786
IC	0.754	3.065
CR	0.814	4.376
SS	0.786	3.673
EC	0.799	3.975
CING	0.785	3.651
ST	0.714	2.497
SLF	0.806	4.155
SFO	0.768	3.310
UF	0.810	4.263
MLF	0.733	2.745
PTR	0.808	4.208

Supplemental Table 6. Effect sizes for ln(GestAge) term in the primary logarithmic model (partial-R^2 and Cohen's f^2) in 18 WM ROIs. Data correspond to model detailed in Supplemental Table 5. As noted in Supplemental Table 5, GestAge is significant in all 18 models after Bonferroni correction.

FA ~ qR_1										
	3 weeks		**7 weeks**		**13 weeks**		**25 weeks**		**53 weeks**	
ROI	R^2	*P*-value	R^2	*P*-value	R^2	*P*-value	R^2	*P*-value	R^2	*P*-value
FX	0.021	0.417	0.029	0.346	0.101	0.071	0.051	0.213	0.067	0.147
AC	0.007	0.636	0.019	0.438	0.058	0.177	**0.297**	0.001	**0.276**	0.002
CBP	0.085	0.099	0.008	0.611	0.001	0.856	0.017	0.479	0.001	0.866
CC	0.144	0.030	0.084	0.101	0.124	0.045	0.116	0.057	0.039	0.271
CST	0.109	0.060	0.007	0.652	0.011	0.559	0.104	0.072	0.000	0.954
ML	0.068	0.143	0.014	0.509	0.003	0.772	0.085	0.105	0.054	0.195
CP	0.083	0.103	0.047	0.228	0.060	0.169	0.113	0.060	0.053	0.199
IC	0.180	0.014	0.135	0.035	0.188	0.012	0.139	0.036	0.011	0.570
CR	**0.286**	0.001	0.091	0.089	0.137	0.034	0.076	0.126	0.019	0.445
SS	0.137	0.034	0.152	0.025	0.200	0.009	0.216	0.007	0.018	0.451
EC	0.099	0.074	0.150	0.026	0.073	0.130	0.008	0.617	0.031	0.324
CING	0.003	0.764	0.042	0.252	0.164	0.020	0.076	0.126	0.110	0.059
ST	0.010	0.571	0.029	0.347	0.010	0.588	0.094	0.087	0.003	0.781
SLF	0.229	0.005	0.082	0.105	0.222	0.006	0.180	0.016	0.067	0.147
SFO	0.078	0.115	0.094	0.082	0.121	0.048	0.039	0.276	0.000	0.969
UF	0.002	0.796	0.088	0.093	0.154	0.024	0.159	0.024	0.022	0.412
MLF	0.049	0.216	0.002	0.819	0.067	0.145	0.156	0.025	0.009	0.599
PTR	0.174	0.016	0.040	0.267	0.117	0.051	0.109	0.066	0.113	0.056

MD ~ qR_1										
	3 weeks		**7 weeks**		**13 weeks**		**25 weeks**		**53 weeks**	
ROI	R^2	*P*-value	R^2	*P*-value	R^2	*P*-value	R^2	*P*-value	R^2	*P*-value
FX	0.200	0.009	**0.280**	0.002	**0.511**	<0.001	**0.278**	0.002	**0.467**	<0.001
AC	0.001	0.888	0.061	0.167	0.021	0.416	0.095	0.086	0.106	0.064
CBP	0.074	0.125	0.024	0.388	0.001	0.897	0.107	0.068	0.006	0.669
CC	**0.318**	0.001	0.208	0.008	0.162	0.020	**0.347**	<0.001	0.232	0.005
CST	0.003	0.744	0.086	0.097	0.023	0.395	0.000	0.945	0.092	0.085
ML	0.001	0.896	0.008	0.612	0.000	0.968	0.037	0.293	0.107	0.064
CP	0.085	0.100	0.125	0.044	0.036	0.288	0.158	0.024	0.000	0.935
IC	0.101	0.072	0.086	0.098	0.012	0.542	0.073	0.134	0.008	0.628
CR	**0.358**	<0.001	0.188	0.012	0.095	0.081	0.078	0.121	0.083	0.104
SS	0.103	0.069	0.218	0.006	0.113	0.056	0.105	0.071	0.025	0.380
EC	0.152	0.025	0.141	0.031	0.099	0.074	0.146	0.031	0.024	0.390
CING	0.055	0.190	0.052	0.202	0.031	0.327	0.015	0.508	0.060	0.168
ST	0.093	0.085	0.124	0.044	0.000	0.920	0.218	0.007	0.007	0.649
SLF	**0.280**	0.002	0.237	0.004	0.089	0.092	0.074	0.132	0.119	0.049
SFO	0.091	0.087	0.104	0.067	0.069	0.140	0.094	0.088	0.005	0.710
UF	**0.286**	0.001	0.190	0.011	0.008	0.632	**0.285**	0.002	0.065	0.151
MLF	0.118	0.051	0.003	0.744	0.038	0.279	0.122	0.050	0.002	0.827
PTR	0.247	0.003	0.171	0.017	0.011	0.566	0.009	0.608	0.010	0.574

RD ~ qR_1										
	3 weeks		**7 weeks**		**13 weeks**		**25 weeks**		**53 weeks**	
ROI	R^2	*P*-value	R^2	*P*-value	R^2	*P*-value	R^2	*P*-value	R^2	*P*-value
FX	0.165	0.019	0.251	0.003	**0.525**	<0.001	**0.277**	0.002	**0.428**	<0.001
AC	0.003	0.753	0.001	0.901	0.053	0.198	**0.282**	0.002	0.249	0.003
CBP	0.100	0.073	0.019	0.446	0.000	0.931	0.069	0.146	0.004	0.726
CC	**0.319**	0.001	0.219	0.006	0.184	0.013	**0.306**	0.001	0.175	0.016
CST	0.014	0.516	0.057	0.179	0.024	0.389	0.021	0.428	0.058	0.179
ML	0.007	0.655	0.003	0.752	0.003	0.749	0.088	0.100	0.137	0.034
CP	0.126	0.043	0.132	0.038	0.073	0.127	0.169	0.019	0.018	0.451
IC	0.176	0.015	0.146	0.028	0.083	0.104	0.118	0.054	0.011	0.556
CR	**0.440**	<0.001	0.212	0.007	0.149	0.027	0.089	0.098	0.067	0.147
SS	0.173	0.016	**0.290**	0.001	0.219	0.006	0.177	0.017	0.030	0.335
EC	0.179	0.014	0.191	0.011	0.146	0.028	0.109	0.066	0.006	0.662
CING	0.042	0.251	0.067	0.147	0.085	0.101	0.048	0.228	0.103	0.069
ST	0.098	0.075	0.176	0.015	0.004	0.728	**0.272**	0.002	0.004	0.712
SLF	**0.365**	<0.001	**0.291**	0.001	0.189	0.012	0.124	0.048	0.122	0.047
SFO	0.110	0.060	0.132	0.037	0.088	0.093	0.076	0.127	0.001	0.893
UF	**0.265**	0.002	**0.295**	0.001	0.076	0.120	**0.377**	<0.001	0.048	0.221
MLF	0.116	0.052	0.002	0.789	0.008	0.614	0.169	0.019	0.000	0.981
PTR	**0.364**	<0.001	0.188	0.012	0.047	0.224	0.045	0.241	0.047	0.223
AD ~ qR_1										
	3 weeks		**7 weeks**		**13 weeks**		**25 weeks**		**53 weeks**	
ROI	R^2	*P*-value	R^2	*P*-value	R^2	*P*-value	R^2	*P*-value	R^2	*P*-value
FX	0.213	0.007	**0.271**	0.002	**0.396**	<0.001	**0.294**	0.001	0.240	0.004
AC	0.018	0.454	0.092	0.086	0.024	0.386	0.239	0.005	0.210	0.007
CBP	0.021	0.426	0.020	0.436	0.001	0.872	0.018	0.469	0.002	0.785
CC	0.235	0.004	0.137	0.034	0.071	0.134	0.202	0.010	0.240	0.004
CST	0.002	0.784	0.108	0.062	0.010	0.580	0.004	0.717	0.025	0.375
ML	0.005	0.701	0.012	0.538	0.003	0.766	0.002	0.799	0.001	0.843
CP	0.018	0.452	0.067	0.147	0.000	0.967	0.043	0.257	0.057	0.183
IC	0.011	0.567	0.011	0.564	0.028	0.354	0.045	0.243	0.000	0.947
CR	0.172	0.017	0.107	0.063	0.013	0.524	0.009	0.613	0.073	0.129
SS	0.023	0.401	0.081	0.108	0.017	0.474	0.020	0.435	0.009	0.607
EC	0.097	0.077	0.064	0.155	0.024	0.388	0.008	0.636	0.062	0.163
CING	0.068	0.144	0.021	0.421	0.004	0.735	0.002	0.802	0.001	0.867
ST	0.067	0.145	0.062	0.164	0.000	0.902	0.000	0.922	0.003	0.771
SLF	0.110	0.059	0.103	0.068	0.000	0.972	0.000	0.913	0.041	0.257
SFO	0.046	0.233	0.034	0.302	0.013	0.533	0.006	0.664	0.018	0.454
UF	0.176	0.015	0.036	0.291	0.014	0.506	0.008	0.626	0.017	0.473
MLF	0.109	0.061	0.005	0.692	0.104	0.067	0.007	0.643	0.001	0.859
PTR	0.098	0.077	0.105	0.066	0.001	0.852	0.012	0.548	0.006	0.674

Supplemental Table 7. R^2 values for between-subject (timepoint-specific) correlations between qR_1 vs. FA, MD, RD, and AD extracted from 18 WM ROIs. Significant R^2 values ($P_{corrected}$<0.05) are bolded.

	3 weeks		7 weeks		13 weeks		25 weeks		53 weeks	
ROI	R^2	*P*-value	R^2	*P*-value	R^2	*P*-value	R^2	*P*-value	R^2	*P*-value
FX	*0.354*	0.004	*0.164*	0.037	0.183	0.088	0.238	0.164	0.207	0.051
AC	**0.443**	<0.001	*0.181*	0.016	0.160	0.064	0.164	0.052	0.059	0.184
CBP	**0.527**	<0.001	0.133	0.147	0.160	0.301	*0.171*	0.049	0.048	0.296
CC	**0.682**	<0.001	**0.295**	0.001	*0.238*	0.027	0.257	0.055	0.084	0.139
CST	**0.485**	<0.001	0.114	0.108	0.098	0.271	*0.181*	0.042	0.109	0.299
ML	*0.298*	0.003	0.100	0.110	0.096	0.195	0.116	0.109	0.025	0.477
CP	**0.365**	0.001	0.085	0.113	0.096	0.313	0.232	0.132	0.044	0.302
IC	**0.584**	<0.001	*0.184*	0.015	0.161	0.105	0.192	0.068	0.070	0.234
CR	**0.636**	<0.001	*0.189*	0.013	*0.164*	0.044	*0.252*	0.021	0.068	0.243
SS	**0.541**	<0.001	*0.210*	0.017	0.213	0.374	0.256	0.232	0.056	0.436
EC	**0.589**	<0.001	*0.232*	0.006	*0.252*	0.026	*0.286*	0.018	0.134	0.096
CING	**0.473**	<0.001	*0.216*	0.008	0.121	0.545	*0.254*	0.032	0.099	0.196
ST	**0.590**	<0.001	*0.205*	0.010	0.115	0.207	0.174	0.135	0.057	0.264
SLF	**0.683**	<0.001	*0.257*	0.003	*0.206*	0.026	*0.251*	0.050	0.132	0.192
SFO	**0.455**	<0.001	0.084	0.107	0.160	0.079	*0.229*	0.049	0.070	0.702
UF	**0.431**	<0.001	*0.247*	0.006	*0.271*	0.026	*0.283*	0.016	0.117	0.071
MLF	*0.239*	0.007	0.115	0.150	0.092	0.173	0.071	0.935	0.005	0.787
PTR	**0.563**	<0.001	*0.208*	0.009	0.133	0.211	0.087	0.493	0.060	0.550

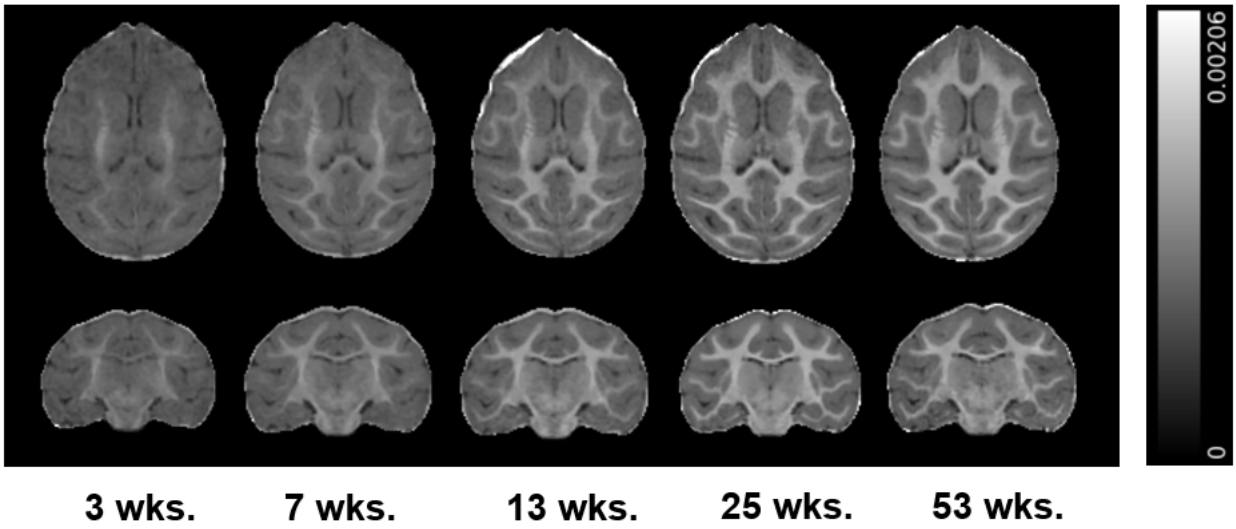
Supplemental Table 8. R^2 values for correlations between gestational age at birth (time *in utero*) and qR_1 at 3, 7, 13, 25, and 53 weeks of age extracted from 18 WM ROIs. R^2 values significant at the uncorrected level ($P_{uncorrected}<0.05$) are italicized. R^2 values significant at the Bonferroni-corrected level ($P_{corrected}<0.05$) are bolded.

	3 weeks		7 weeks		13 weeks		25 weeks		53 weeks	
ROI	GAB partial-R^2	Cohen's f^2	GAB partial-R^2	Cohen's f^2	GAB partial-R^2	Cohen's f^2	GAB partial-R^2	Cohen's f^2	GAB partial-R^2	Cohen's f^2
FX	0.242	0.320	0.137	0.159	0.094	0.104	0.066	0.070	0.121	0.138
AC	0.341	0.518	0.179	0.218	0.110	0.124	0.124	0.142	0.058	0.062
CBP	0.457	0.843	0.069	0.074	0.036	0.037	0.127	0.146	0.036	0.038
CC	0.531	1.131	0.293	0.414	0.154	0.181	0.121	0.138	0.072	0.077
CST	0.366	0.577	0.084	0.092	0.040	0.042	0.135	0.156	0.036	0.037
ML	0.260	0.351	0.083	0.091	0.055	0.059	0.086	0.094	0.017	0.017
CP	0.307	0.443	0.082	0.089	0.034	0.035	0.076	0.083	0.035	0.037
IC	0.489	0.957	0.183	0.224	0.085	0.093	0.111	0.124	0.047	0.049
CR	0.485	0.942	0.189	0.232	0.129	0.148	0.171	0.206	0.045	0.047
SS	0.389	0.637	0.176	0.213	0.026	0.027	0.049	0.051	0.020	0.021
EC	0.444	0.797	0.229	0.297	0.154	0.183	0.178	0.217	0.090	0.098
CING	0.402	0.671	0.213	0.271	0.012	0.012	0.150	0.176	0.055	0.058
ST	0.509	1.037	0.201	0.252	0.052	0.055	0.075	0.081	0.041	0.043
SLF	0.542	1.182	0.251	0.336	0.155	0.183	0.126	0.145	0.056	0.060
SFO	0.342	0.520	0.084	0.092	0.099	0.110	0.127	0.146	0.005	0.005
UF	0.398	0.662	0.227	0.294	0.156	0.184	0.185	0.227	0.104	0.117
MLF	0.220	0.283	0.068	0.073	0.061	0.065	0.000	0.000	0.002	0.002
PTR	0.452	0.825	0.205	0.258	0.052	0.054	0.016	0.017	0.012	0.012

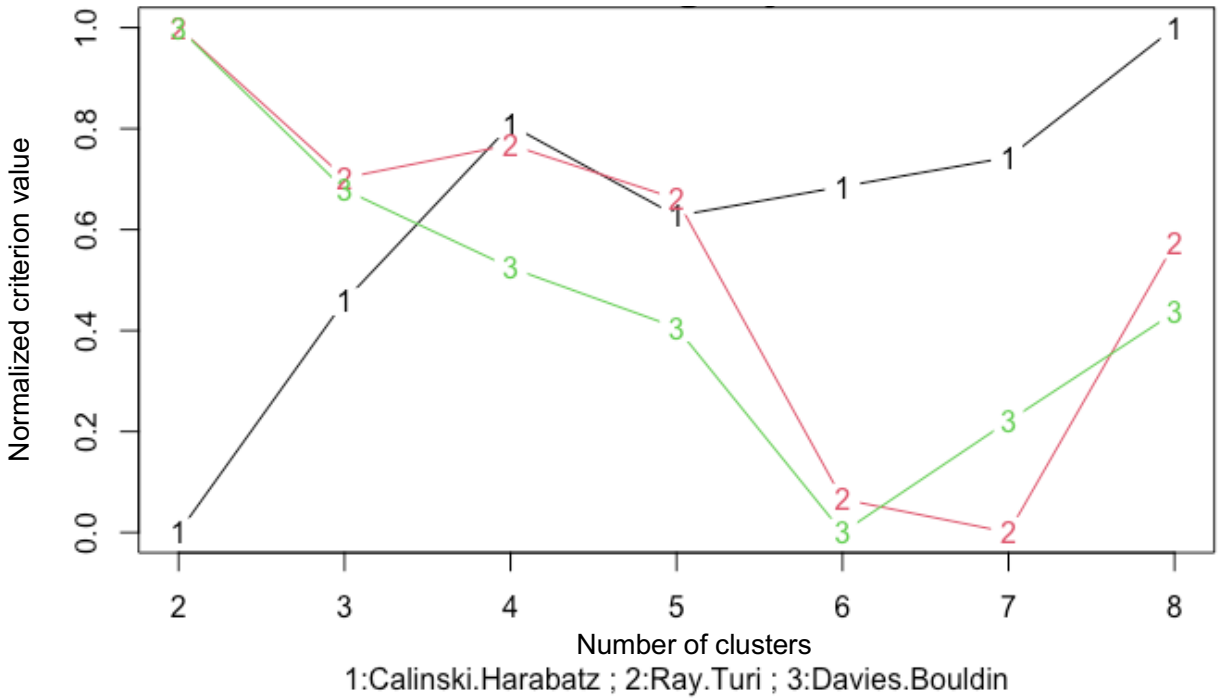
Supplemental Table 9. Effect sizes for Gestational Age at Birth (GAB) term (partial-R^2 and Cohen's f^2) in all 18 WM ROIs. Data correspond to analyses detailed in Supplemental Table 8, including corresponding P-values.

	MD		RD		AD	
ROI	R^2	*P*-value	R^2	*P*-value	R^2	*P*-value
FX	0.032	0.700	0.057	0.935	0.126	0.352
AC	0.169	0.260	0.245	0.112	0.044	0.496
CBP	0.280	0.839	0.391	0.547	0.084	0.648
CC	0.128	0.444	0.186	0.436	0.047	0.514
CST	0.343	0.100	0.373	0.116	0.248	0.111
ML	0.220	0.534	0.291	0.592	0.092	0.501
CP	0.291	0.648	0.380	0.391	0.110	0.855
IC	0.200	0.047	0.323	0.020	0.036	0.301
CR	0.331	0.011	0.378	0.012	0.207	0.022
SS	0.152	0.182	0.276	0.150	0.040	0.300
EC	0.170	0.135	0.228	0.128	0.093	0.175
CING	0.249	0.526	0.280	0.674	0.158	0.335
ST	0.154	0.269	0.267	0.146	0.039	0.572
SLF	0.310	0.017	0.408	0.011	0.133	0.067
SFO	0.222	0.087	0.257	0.070	0.123	0.192
UF	0.037	0.336	0.107	0.456	0.126	0.314
MLF	0.201	0.757	0.210	0.699	0.182	0.869
PTR	0.032	0.581	0.087	0.311	0.001	0.945

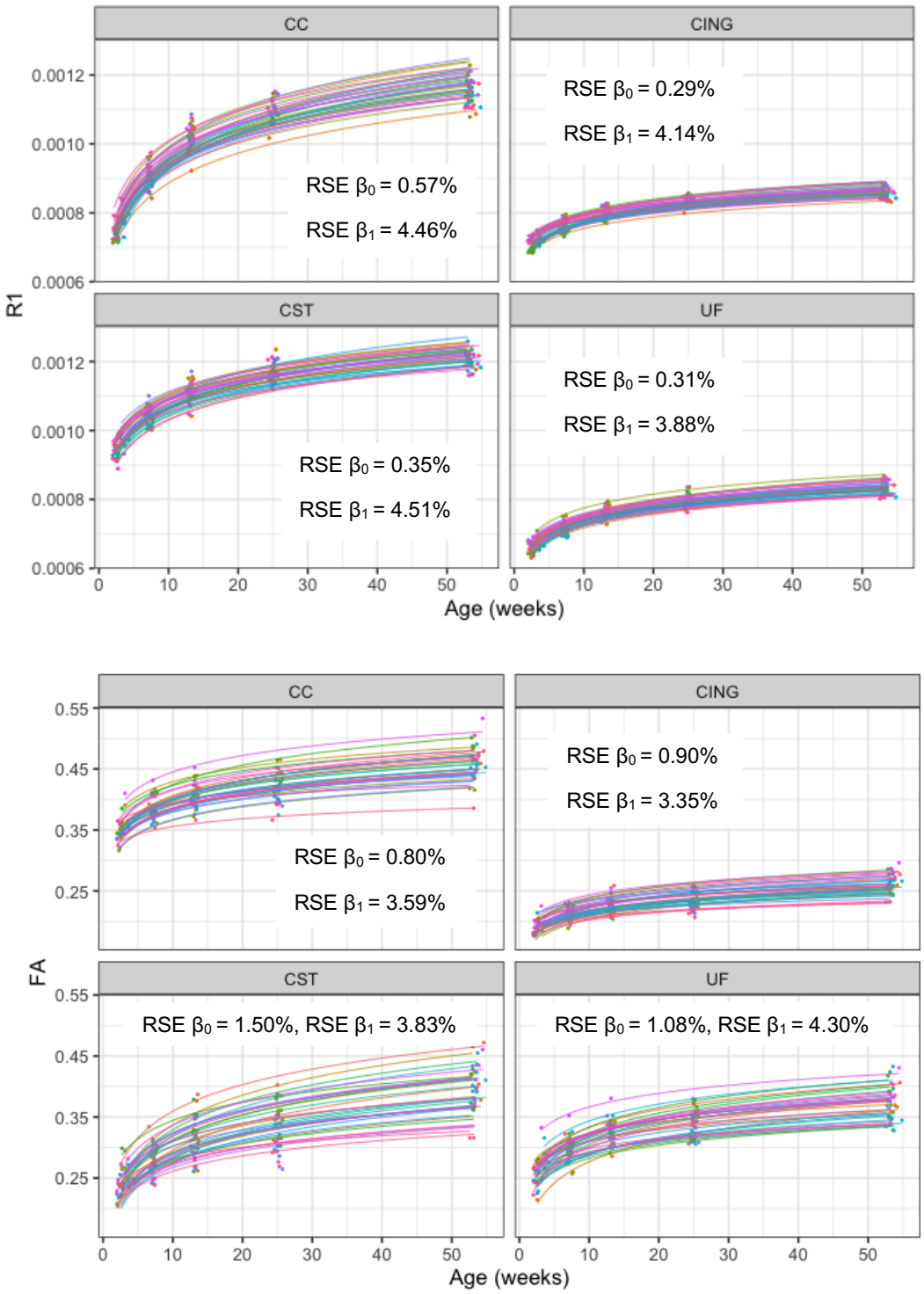
Supplemental Table 10. R^2 values for correlations between gestational age at birth (i.e., time *in utero*) and MD, RD, and AD at 3 weeks of age extracted from 18 WM ROIs, along with corresponding *P*-values. No R^2 values were significant after Bonferroni-correction ($P_{corrected}<0.05$).



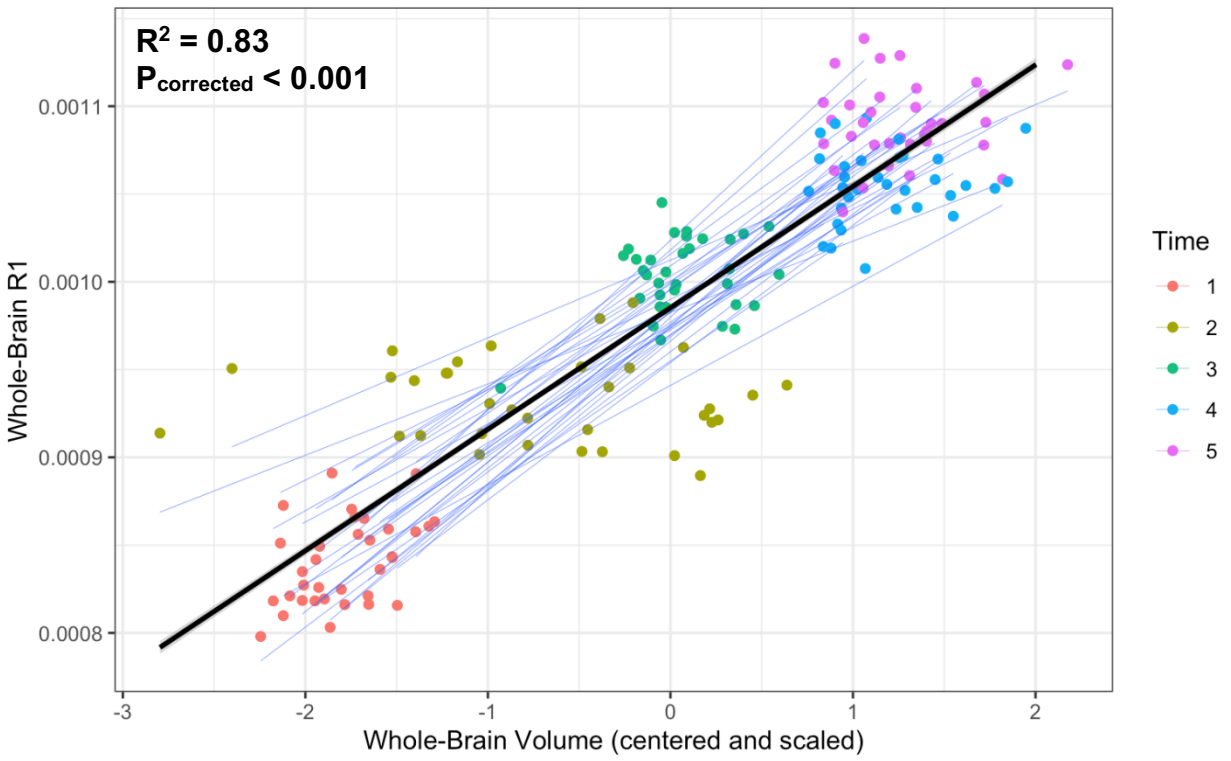
Supplemental Figure 1. Axial (top) and coronal (bottom) views of a qR_1 map (ms^{-1}) for an infant female rhesus monkey at each age in population template space. Note the increasing contrast and complexity of the WM over the first year of life, especially in the frontal lobes.



Supplemental Figure 2. Plot of normalized k-means clustering criteria for 1 through 8 possible clusters of raw qR_1 trajectories. The black curve (1) represents the Calinski-Harabatz index for each number of clusters; red (2) is the Ray-Turi index; green (3) is the Davies-Bouldin index. Calinski-Harabatz and Ray-Turi indices decline considerably with greater than 4 clusters. Additionally, the Davies-Bouldin index drops sharply with more than 4-5 clusters. Together, they suggest 4 clusters as a reasonable partition of the data. Note that all metrics have been normalized between 0 and 1 to allow for direct comparison, where higher values indicate better separation between clusters.

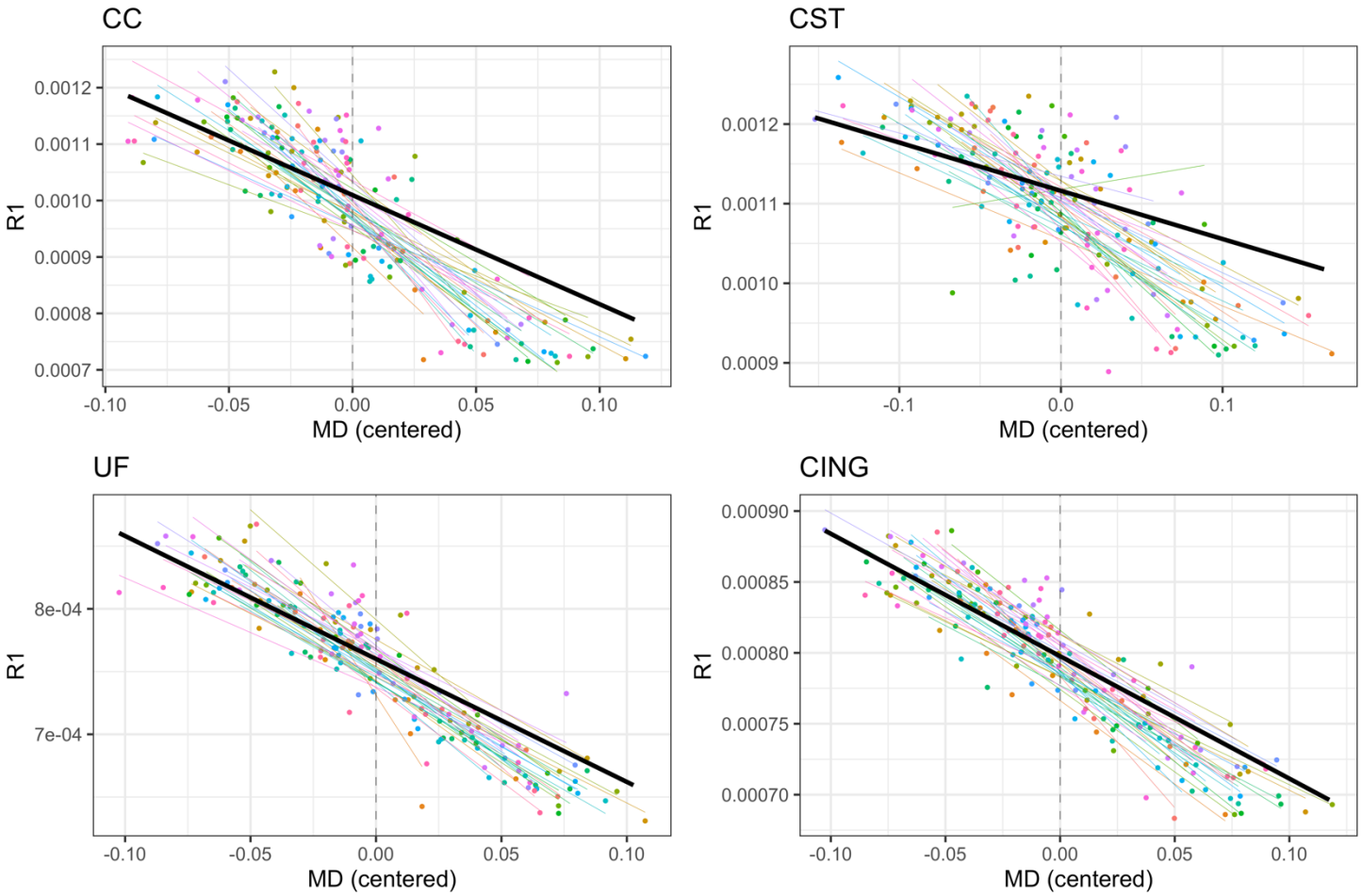


Supplemental Figure 3. Individual-level qR_1 (top) and FA (bottom) trajectories extracted from 4 WM ROIs. In each panel, each line represents the logarithmic trajectory of a single subject for the given ROI. Corresponding relative standard errors (RSE) of LME model parameters (β_0 and β_1) are listed in each panel.

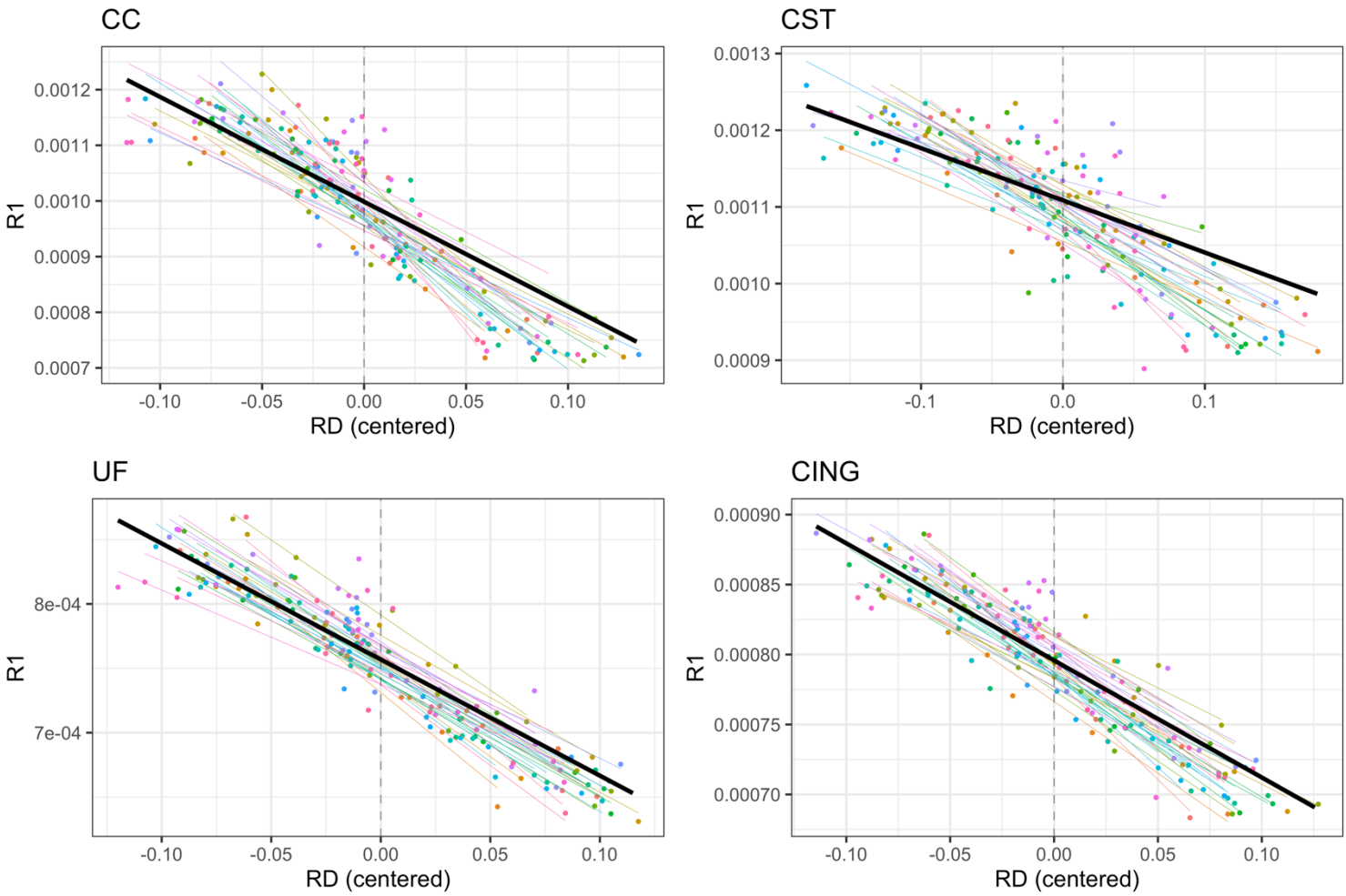


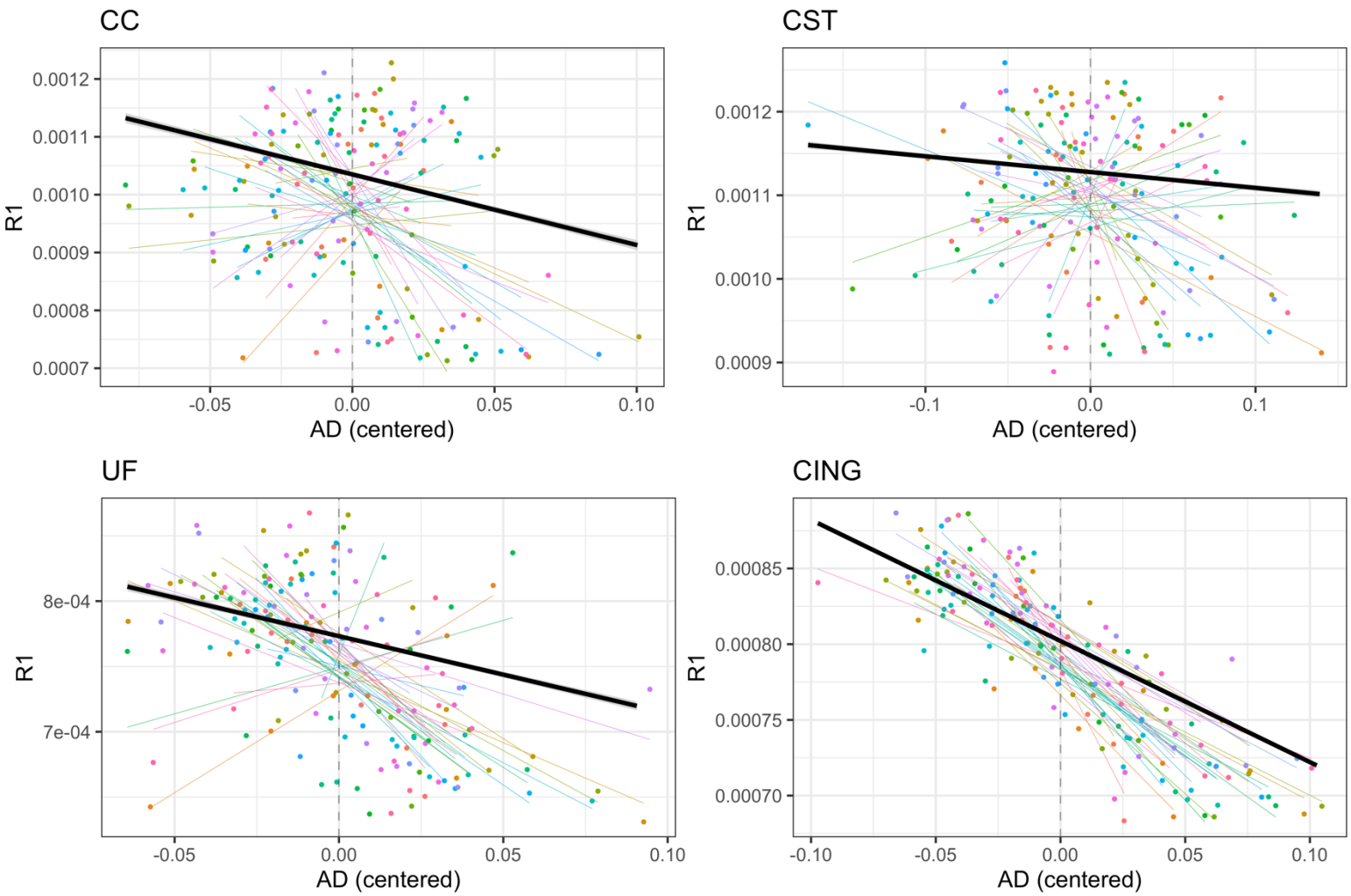
Supplemental Figure 4. Within-subject correlation of whole-brain volume with whole-brain WM qR_1. Blue lines represent individual subject regressions; the black line represents the average within-subject association, while controlling for gestational age at scan. Whole-brain volumes, measured in mm^3, were first scaled by dividing by 10,000 and then centered within-subject (to obtain the within-subject estimate in an LME).

MD ~ qR1

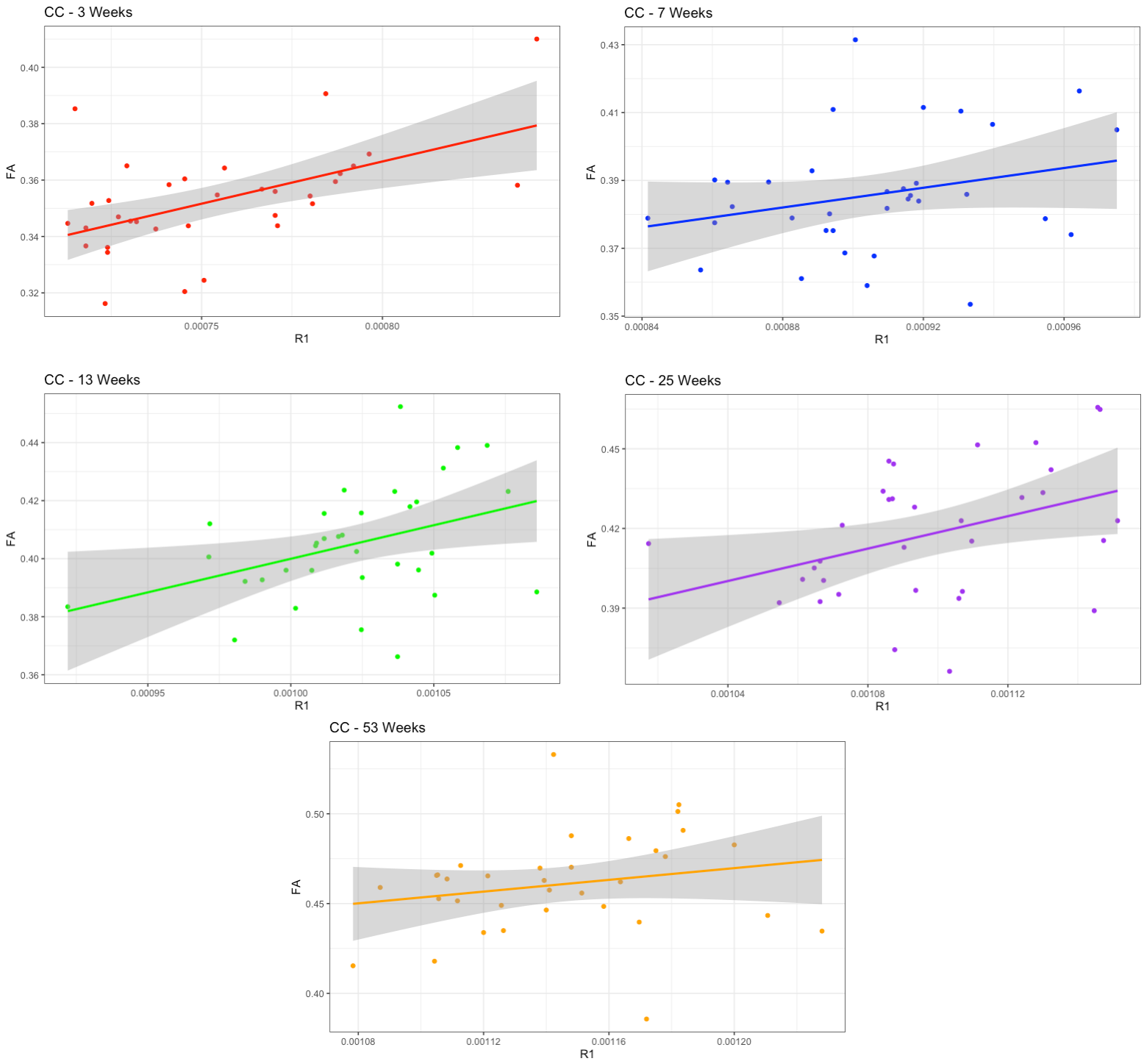


RD ~ qR1





Supplemental Figure 5. Within-subject relations between qR_1 and MD, RD, and AD in 4 WM ROIs (CC, CST, UF, and CING). In each graph, each colored line represents a subject-specific regression line predicting qR_1 from within-subject centered MD, RD, or AD values, while controlling for gestational age at scan. Each point represents an individual scan, color-coded by subject. The bolded black line depicts the average within-subject relation of qR_1 and MD, RD, or AD.



Supplemental Figure 6. Between-subject relations between qR_1 and FA in the corpus callosum (CC) at each of five study timepoints (3, 7, 13, 25, and 53 weeks of postnatal age). In each graph, each line represents the between-subject relationship between FA and qR_1, while controlling for gestational age at scan. Each point represents an individual subject scan at the given timepoint.