

Supplemental Digital Content

Supplementary Table 1. Characteristics of the 3 Scanners and Image Acquisition Protocols of the Multi-Dynamic Multi-Echo Sequence Used in Phantom Study

Scanner	Vendor	Site	Head Coil (Channels)	TR (ms)	TE (ms)	Matrix	FOV (mm)	Echo- Train Length	Bandwidth (Hz/pixel)	Acceleration factor	Slice thickness (mm)	Gap (mm)	Slice number	Acquisition time
α . Discovery 750w	GE Healthcare, Milwaukee, Wisconsin, USA	a	19	4000	16.9, 84.5	320 × 240 × 10 320 192	122	10	122	2	5	3.8	20	5 minutes 4 seconds
β . MAGNETOM Prisma	Siemens Healthcare, Erlangen, Germany	a	64	4250	22, 99	320 × 230 × 10 320 186	150	10	150	2	5	3.8	20	5 minutes 8 seconds
γ . Ingenia	Philips, Best, The Netherlands	b	32	3000	13, 100	336 × 230 × 10 336 190	216	10	216	1.8	5	3.8	20	4 minutes 55 seconds

The acceleration factor for scanner γ was reduced to 1.8 in the phantom study from 2.5, which was recommended by the manufacturer for brain scanning, because of aliasing artifacts. FOV, field of view; TE, echo time; TR, repetition time.

Supplementary Table 2. Characteristics of the 3 Scanners and Image Acquisition Protocols of the Multi-Dynamic Multi-Echo Sequence Used in Volunteer Study

Scanner	Vendor	Site	Head Coil (Channels)	TR (ms)	TE (ms)	Matrix	FOV (mm)	Echo- Train Length	Bandwidth (Hz/pixel)	Acceleration factor	Slice thickness (mm)	Gap (mm)	Slice number	Acquisition time
α . Discovery 750w	GE Healthcare, Milwaukee, Wisconsin, USA	a	19	4000	16.9,	320 ×	240 ×	10	122	2	4	1	30	6 minutes
					84.5	320	192							12 seconds
β . MAGNETOM Prisma	Siemens Healthcare, Erlangen, Germany	a	64	4250	22, 99	320 ×	230 ×	10	150	2	4	1	30	5 minutes
						320	186							8 seconds
γ . Ingenia	Philips, Best, The Netherlands	b	32	4500	13,	336 ×	230 ×	10	216	2.5	4	1	30	6 minutes
					100	336	190							11 seconds

FOV, field of view; TE, echo time; TR, repetition time.

Supplementary Table 3. Reference T1 and T2 Relaxation Times, and PD of the NIST/ISMRM Phantom

Sphere No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
T1 (ms)	367.0	509.1	725.8	998.3	1398	1838								
T2 (ms)	20.10	30.95	44.98	62.51	94.40	134.1	184.8	286.0	423.6	645.8				
PD (%)	5	10	15	20	25	30	35	40	50	60	70	80	90	100

PD = proton density.

Supplementary Table 4. Mean Values Based on the First Scan on 3 Scanners and Intra- and Inter-Scanner CV of T1, T2, PD, MVF for 3 Scanners Averaged

Across 10 Subjects

		T1				T2				PD				MVF				Size of VOI (cm ³)					
VOI		Mean	Scanner	Scanner	Scanner	Mean	Scanner	Scanner	Scanner	Mean	Scanner	Scanner	Scanner	Mean	Scanner	Scanner	Scanner						
		± SD (ms)	α Intra-scanner CV (%)	β Intra-scanner CV (%)	γ Intra-scanner CV (%)	± Inter-scanner CV (%)	α Intra-scanner CV (%)	β Intra-scanner CV (%)	γ Intra-scanner CV (%)	± Inter-scanner CV (%)	± SD (%)	α Intra-scanner CV (%)	β Intra-scanner CV (%)	γ Intra-scanner CV (%)	± Inter-scanner CV (%)	±SD (%)	α Intra-scanner CV (%)	β Intra-scanner CV (%)	γ Intra-scanner CV (%)	± Inter-scanner CV (%)			
GM VOIs	Frontal GM	1226 ± 19.5	0.71 ± 0.69	0.37 ± 0.35	0.43 ± 0.31	1.06 ± 0.44	78.8 ± 3.32	0.87 ± 0.78	0.25 ± 0.14	0.84 ± 0.83	4.45 ± 0.48	82.7 ± 1.06	0.30 ± 0.25	0.16 ± 0.17	0.15 ± 0.07	0.90 ± 0.29	7.32 ± 0.94	2.03 ± 1.59	1.33 ± 1.19	1.50 ± 1.23	9.85 ± 1.99	84.8 ± 4.53	
	Parietal GM	1218 ± 18.1	0.60 ± 0.44	0.24 ± 0.19	0.43 ± 0.37	1.37 ± 0.50	76.0 ± 2.83	0.58 ± 0.34	0.30 ± 0.20	0.82 ± 0.77	4.02 ± 0.42	83.0 ± 0.86	0.22 ± 0.10	0.12 ± 0.09	0.14 ± 0.13	0.76 ± 0.25	7.00 ± 0.76	1.61 ± 1.62	1.08 ± 0.78	2.27 ± 2.15	8.92 ± 1.56	71.2 ± 6.3	
	Temporal GM	1280 ± 19.9	0.72 ± 0.58	0.21 ± 0.14	0.41 ± 0.31	1.19 ± 0.46	79.3 ± 2.75	0.89 ± 0.39	0.27 ± 0.22	0.68 ± 0.57	3.61 ± 0.52	84.8 ± 0.77	0.23 ± 0.19	0.12 ± 0.08	0.13 ± 0.10	0.71 ± 0.25	6.37 ± 0.66	1.93 ± 1.71	1.18 ± 0.68	0.94 ± 0.64	7.23 ± 2.20	51.0 ± 3.1	
	Occipital GM	1229 ± 22.1	0.59 ± 0.51	0.32 ± 0.24	0.47 ± 0.43	1.53 ± 0.60	73.2 ± 2.64	0.87 ± 0.45	0.37 ± 0.21	0.43 ± 0.41	3.86 ± 0.89	83.8 ± 0.90	0.32 ± 0.28	0.22 ± 0.16	0.25 ± 0.24	0.68 ± 0.29	6.69 ± 0.61	3.52 ± 2.58	2.46 ± 1.20	3.82 ± 3.56	6.53 ± 2.44	15.4 ± 2.6	
	Insular cortex	1237 ± 20.2	0.77 ± 0.54	0.41 ± 0.20	0.53 ± 0.27	1.60 ± 0.46	79.6 ± 2.92	0.85 ± 0.52	0.35 ± 0.39	0.29 ± 0.18	4.11 ± 0.60	83.2 ± 0.64	0.29 ± 0.20	0.27 ± 0.20	0.18 ± 0.18	0.69 ± 0.30	6.44 ± 0.53	3.25 ± 2.01	2.96 ± 1.63	4.05 ± 2.92	7.19 ± 3.45	8.6 ± 0.9	
	Caudate	1063 ± 31.4	0.91 ± 0.68	1.25 ± 0.66	0.70 ± 1.11	2.47 ± 0.79	67.1 ± 3.38	0.76 ± 0.60	0.72 ± 0.34	0.39 ± 0.32	5.28 ± 0.40	80.2 ± 1.28	0.31 ± 0.22	0.41 ± 0.37	0.52 ± 0.51	1.45 ± 0.51	9.16 ± 1.56	2.26 ± 2.28	4.56 ± 3.47	3.78 ± 4.57	14.60 ± 4.91	5.1 ± 0.6	
	Putamen	979 ± 27.6	0.78 ± 0.81	0.65 ± 0.71	1.27 ± 0.80	2.64 ± 1.04	61.9 ± 3.15	0.81 ± 0.61	0.43 ± 0.35	0.37 ± 0.29	4.70 ± 0.72	78.3 ± 0.81	0.33 ± 0.33	0.47 ± 0.36	0.53 ± 0.36	0.95 ± 0.28	11.6 ± 1.03	3.44 ± 2.63	4.26 ± 3.21	4.43 ± 3.00	8.49 ± 2.64	8.8 ± 1.0	
	Thalamus	906 ± 23.1	0.94 ± 0.99	0.68 ± 0.60	1.12 ± 0.71	2.17 ± 0.91	65.6 ± 2.91	0.75 ± 0.35	0.65 ± 0.41	0.43 ± 0.36	4.96 ± 0.49	74.0 ± 1.14	0.37 ± 0.34	0.34 ± 0.19	0.51 ± 0.35	1.27 ± 0.45	18.5 ± 1.70	2.39 ± 2.11	1.97 ± 1.54	2.83 ± 1.82	7.61 ± 2.84	12.6 ± 0.8	
	Aggregate GM ROIs	1062 ± 23.3	0.51 ± 0.57	0.30 ± 0.24	0.43 ± 0.31	1.33 ± 0.54	73.3 ± 2.80	0.57 ± 0.43	0.20 ± 0.11	0.60 ± 0.64	4.15 ± 0.36	77.2 ± 1.13	0.15 ± 0.17	0.12 ± 0.09	0.12 ± 0.11	1.20 ± 0.30	16.4 ± 1.54	0.68 ± 0.60	0.63 ± 0.50	0.76 ± 0.44	5.76 ± 1.13	492 ± 41.1	
	WM VOIs	Frontal WM	724 ± 22.4	0.72 ± 0.82	0.54 ± 0.37	0.52 ± 0.53	2.17 ± 0.71	68.2 ± 2.96	0.54 ± 0.37	0.37 ± 0.17	0.59 ± 0.54	4.73 ± 0.31	63.3 ± 1.41	0.38 ± 0.43	0.33 ± 0.22	0.31 ± 0.31	2.02 ± 0.43	33.8 ± 2.15	1.24 ± 1.45	0.95 ± 0.60	0.80 ± 0.79	5.76 ± 1.08	87.3 ± 9.0
		Parietal WM	727 ± 21.0	0.60 ± 0.50	0.41 ± 0.24	0.59 ± 0.56	1.54 ± 0.66	70.6 ± 2.95	0.58 ± 0.45	0.27 ± 0.13	0.35 ± 0.29	4.45 ± 0.31	63.3 ± 1.13	0.34 ± 0.30	0.24 ± 0.12	0.34 ± 0.27	1.21 ± 0.36	33.9 ± 1.73	1.02 ± 0.97	0.68 ± 0.34	0.91 ± 0.69	3.55 ± 0.93	75.6 ± 10.3
		Temporal WM	729 ± 27.5	0.96 ± 0.94	0.35 ± 0.23	0.57 ± 0.61	2.49 ± 0.87	67.3 ± 3.22	0.46 ± 0.40	0.38 ± 0.30	0.38 ± 0.27	5.09 ± 0.55	63.6 ± 1.44	0.56 ± 0.45	0.26 ± 0.18	0.40 ± 0.37	1.60 ± 0.44	33.4 ± 2.20	1.73 ± 1.48	0.72 ± 0.52	1.07 ± 1.00	4.68 ± 1.08	22.5 ± 2.0
		Occipital WM	759 ± 23.9	0.74 ± 0.40	0.49 ± 0.48	0.47 ± 0.34	1.71 ± 0.76	71.9 ± 2.97	0.62 ± 0.43	0.13 ± 0.10	0.43 ± 0.31	4.35 ± 0.69	64.3 ± 1.18	0.45 ± 0.22	0.32 ± 0.31	0.37 ± 0.26	0.76 ± 0.36	32.2 ± 1.78	1.31 ± 0.69	0.96 ± 0.98	1.06 ± 0.76	2.53 ± 1.19	13.1 ± 2.3
		Genu of the corpus callosum	645 ± 24.7	0.73 ± 0.57	0.65 ± 0.59	0.81 ± 0.97	3.15 ± 0.81	63.5 ± 3.20	0.56 ± 0.45	0.38 ± 0.28	0.46 ± 0.44	5.60 ± 0.62	58.9 ± 2.01	0.41 ± 0.29	0.35 ± 0.24	0.65 ± 0.57	3.21 ± 0.54	40.2 ± 2.86	1.05 ± 0.82	0.71 ± 0.58	0.92 ± 0.84	6.67 ± 1.14	4.9 ± 1.0
Splenium of the corpus callosum		671 ± 27.2	0.89 ± 0.67	0.65 ± 0.39	0.87 ± 0.87	2.77 ± 0.68	69.0 ± 3.75	0.79 ± 0.42	0.36 ± 0.35	0.53 ± 0.31	5.76 ± 0.46	60.0 ± 1.53	0.44 ± 0.28	0.30 ± 0.26	0.74 ± 0.60	1.90 ± 0.47	38.7 ± 2.33	1.19 ± 0.71	0.68 ± 0.53	1.43 ± 1.26	4.50 ± 1.00	7.2 ± 1.1	
Internal capsule		720 ± 20.8	0.89 ± 0.50	0.84 ± 0.56	1.33 ± 1.18	1.66 ± 0.65	67.4 ± 2.88	0.56 ± 0.51	0.79 ± 0.56	0.45 ± 0.21	4.58 ± 0.58	62.0 ± 1.23	0.51 ± 0.33	0.49 ± 0.37	0.77 ± 0.66	1.59 ± 0.44	35.7 ± 1.85	1.33 ± 0.92	1.34 ± 0.98	1.80 ± 1.47	4.24 ± 1.16	6.0 ± 0.6	
Middle cerebellar peduncle		813 ± 28.8	0.88 ± 0.73	0.35 ± 0.30	0.92 ± 0.56	1.55 ± 1.05	74.0 ± 2.70	0.76 ± 0.60	0.58 ± 0.58	0.48 ± 0.31	3.82 ± 0.68	67.5 ± 1.17	0.39 ± 0.27	0.35 ± 0.24	0.35 ± 0.29	0.91 ± 0.56	27.5 ± 1.74	1.39 ± 1.04	1.16 ± 0.71	1.33 ± 1.06	3.25 ± 1.86	9.3 ± 1.3	
Aggregate WM ROIs		725 ± 21.8	0.67 ± 0.62	0.38 ± 0.23	0.52 ± 0.53	1.89 ± 0.62	69.0 ± 2.94	0.52 ± 0.40	0.26 ± 0.12	0.37 ± 0.29	4.63 ± 0.31	63.3 ± 1.25	0.36 ± 0.32	0.22 ± 0.10	0.32 ± 0.29	1.55 ± 0.32	33.9 ± 1.91	1.11 ± 1.07	0.64 ± 0.30	0.81 ± 0.75	4.46 ± 0.82	240 ± 26.8	

Values are mean ± SD. Size of the VOIs are also shown in the last column. CV = coefficient of variation; GM = gray matter; PD = proton density; SD = standard deviation; VOI = volume of interest; WM = white matter.