

Supplementary Material

Nr	Age	Gender	Handed- ness	Anatomy	SR	LPM	VG	
HP1	6.10	f	R	1	1	n/a	n/a	
HP2	6.15	f	R	1	n/a	1	n/a	
HP3	6.35	f	L	1	1	1	1**	
HP4	6.70	f	R	1	1	n/a	n/a	
HP5	6.78	f	R	1	1	1	1	
HP6	6.83	m	R	1	1	1	1	
HP7	6.89	f	R	1	1	1	n/a	
HP8	7.34	f	R	1	1	n/a	1	
HP9	7.63	f	L	1	n/a	1	1	
HP10	7.64	m	L	1	n/a	1	n/a	
HP11	7.70	f	R	1	1	1	1	
HP12	7.93	m	R	1	1	n/a	1	
HP13	8.18	m	R	1	n/a	1	1**	
HP14	8.24	f	R	1	1	n/a	1	
HP15	8.52	m	R	1	1	1	1	
HP16	8.61	f	R	1	1	1	n/a	
HP17	8.71	m	R	1	1	1	1	
HP18	8.96	m	L	1	1	1	1	
HP19	9.02	f	R	1	1*	1	1	
HP20	9.07	f	R	1	n/a	1	1	
HP21	9.19	f	R	1	1	1	1	
HP22	9.35	m	R	1	1	1	1**	
HP23	9.39	f	R	1	1	1	1	
HP24	9.62	m	R	1	1	1	1	
HP25	9.65	m	R	1	1	1	1	
HP26	9.72	m	L	1	1	n/a	1	
HP27	10.21	f	R	1	n/a	1	1	
HP28	10.40	m	R	1	1	n/a	1	
HP29	10.70	m	R	1	1	1	1	
HP30	10.95	m	R	1	n/a	1	1	
		16f/14m	25R/5L			20R/3L	19R/4L	20R/4L

*Supplementary Table 1. Demographics and acquired scans per healthy participant. Left handed participants are indicated by grey shading. 1=task/scan acquired, n/a = task/scan not acquired, *2/3 of the task was acquired, **slow version of VG task, see methods section for details.*

Number	Age	Percentage scans removed			Proportion variance remaining scans		
		SR	LPM	VG	SR	LPM	VG
1	6.10	12.6			0.88	-	-
2	6.15	-	68.4		-	0.30**	-
3	6.35	45.5	9.9	61.2	0.54	0.90	0.38**
4	6.70	5.8	-	-	0.94	-	-
5	6.78	21.6	8.2	5.6	0.76	0.92	0.95
6	6.83	4.0	6.5	1.9	0.97	0.93	0.98
7	6.89	10.1	14.0	-	0.89	0.86	-
8	7.34	0.0*	-	0.2	1*	-	1.00
9	7.63	-	14.3	2.1	-	0.85	0.98
10	7.64	-	27.5	-	-	0.73	-
11	7.70	11.0	4.0	4.4	0.90	0.96	0.94
12	7.93	7.6	-	11.1	0.94	-	0.90
13	8.18	-	62.0	44.6	-	0.39**	0.56
14	8.24	9.5	-	7.0	0.89	-	0.93
15	8.52	18.2	6.6	11.4	0.80	0.94	0.86
16	8.61	45.0	18.4	-	0.50	0.81	-
17	8.71	1.3	50.1	1.3	0.99	0.49	0.99
18	8.96	2.7	0.6	1.7	0.97	0.99	0.98
19	9.02	7.4	6.8	5.0	0.91	0.93	0.95
20	9.07	-	2.2	2.1	-	0.98	0.98
21	9.19	1.1	0.4	0.2	0.99	1.00	1.00
22	9.35	3.3	8.2	12.1	0.97	0.92	0.85
23	9.39	0.8	0.0*	0.0*	0.99	1*	1*
24	9.62	53.9	2.5	7.7	0.46	0.98	0.93
25	9.65	19.7	17.6	27.6	0.79	0.82	0.68
26	9.72	13.7	-	10.3	0.87	-	0.91
27	10.21	-	3.8	0.2	-	0.97	1.00
28	10.40	0.9	-	2.5	0.99	-	0.98
29	10.70	23.3	16.7	3.3	0.75	0.83	0.97
30	10.95	-	22.6	23.7	-	0.76	0.76

*Supplementary Table 2. Percentage of removed scans (by motion filter, due to above-threshold motion) and proportion of statistical power (PSP) remaining after removal of the contribution of volumes with above-threshold motion. *0% scans excluded from analyses, **PSP lower than 0.4, dataset removed from further analysis.*

Lateralization Index				
Number	Age	SR	LPM	VG
1	6.10	0.51	-	-
2	6.15	-	Excl	-
3	6.35	0.12	0.23	Excl
4	6.70	0.90	-	-
5	6.78	0.69	0.19	0.64
6	6.83	0.65	0.76	0.82
7	6.89	0.13	0.64	-
8	7.34	0.82	-	0.73
9	7.63	-	-0.51	-0.82
10	7.64	-	0.47	-
11	7.70	0.33	0.14	0.76
12	7.93	0.79	-	0.65
13	8.18	-	Excl	0.16
14	8.24	0.37	-	0.41
15	8.52	0.44	0.66	0.73
16	8.61	0.31	0.02	-
17	8.71	0.75	0.37	0.92
18	8.96	0.36	0.63	0.73
19	9.02	0.31	0.29	0.86
20	9.07		0.14	0.44
21	9.19	0.39	0.75	0.83
22	9.35	0.52	0.34	0.46
23	9.39	0.77	0.56	0.77
24	9.62	0.85	0.43	0.42
25	9.65	0.50	0.67	0.60
26	9.72	0.54	-	0.65
27	10.21	-	0.39	0.94
28	10.40	0.09	-	0.79
29	10.70	0.14	-0.14	0.55
30	10.95	-	0.16	0.55
		n=23	n=23	n=24
		0 excl	2 excl	1 excl

Supplementary Table 3. Lateralization indices of all healthy participants and all language tasks. Excl = dataset excluded from analysis because of excessive movement (PSP value <0.4). At the bottom, the total number of datasets per task is given, and the number thereof that was excluded due to excessive motion.

Nr	Age	Gender	Handed-ness	Seizure focus	MRI results	Clinical Language Lateralization	Anatomy	SR	LPM	VG
EP1	7.51	f	R	R temporo-occipital	Suspected multilobar type 1 dysplasia R	L (fTCD)	1	1	n/a	1***
EP2	7.99	m	R	R temporal	Negative (pathology: hippocampal sclerosis)	L (fTCD)	1	1	n/a	1**
EP3	8.12	m	R	L parietal	L parietal focal	n/a	1	1	1	n/a*
EP4	8.63	m	L	L central	L central ischemic injury	L (ECS)	1	1	1	n/a*
EP5	8.88	m	R	R precentral	R precentral focal cortical dysplasia	n/a	1	1	1	1**
EP6	10.65	m	L	Bilateral temporal	Normal	L (wada)	1	1	1	1
EP7	11.10	f	R	R frontotemporal	Large R middle cerebral artery infarct	n/a	1	1* **	1	1***

*Supplementary Table 4. Demographics and acquired scans per epilepsy participant. Left handed participants are indicated by grey shading. 1 = task/scan acquired, n/a = task/scan not acquired, fTCD = functional transcranial doppler, ECS = electrocortical stimulation, *the participant was unable to perform the normal or fast version of the VG task, **slow version of VG task, see methods section for details, ***task suspended prematurely on participant request (task at least 85% complete).*

Lateralization Index				
Number	Age	SR	LPM	VG
EP1	7.51	0,81	-	0,25
EP2	7.99	0,14	-	0,31
EP3	8.12	0,62	0,31	-
EP4	8.63	0,40	-0,13	-
EP5	8.88	-0,15	0,35	0,19
EP6	10.65	0,21	0,46	0,23
EP7	11.10	0,39	0,41	0,73
		n=7	n=5	n=5
		0 excl	0 excl	0 excl

Supplementary Table 5. Lateralization indices of all epilepsy participants and all language tasks. At the bottom, the total number of datasets per task is given, and the number thereof that was excluded (excl) due to excessive motion.