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Supplemental Information

**Intrinsic Functional Connectivity of the Brain
in Adults with a Single Cerebral Hemisphere**

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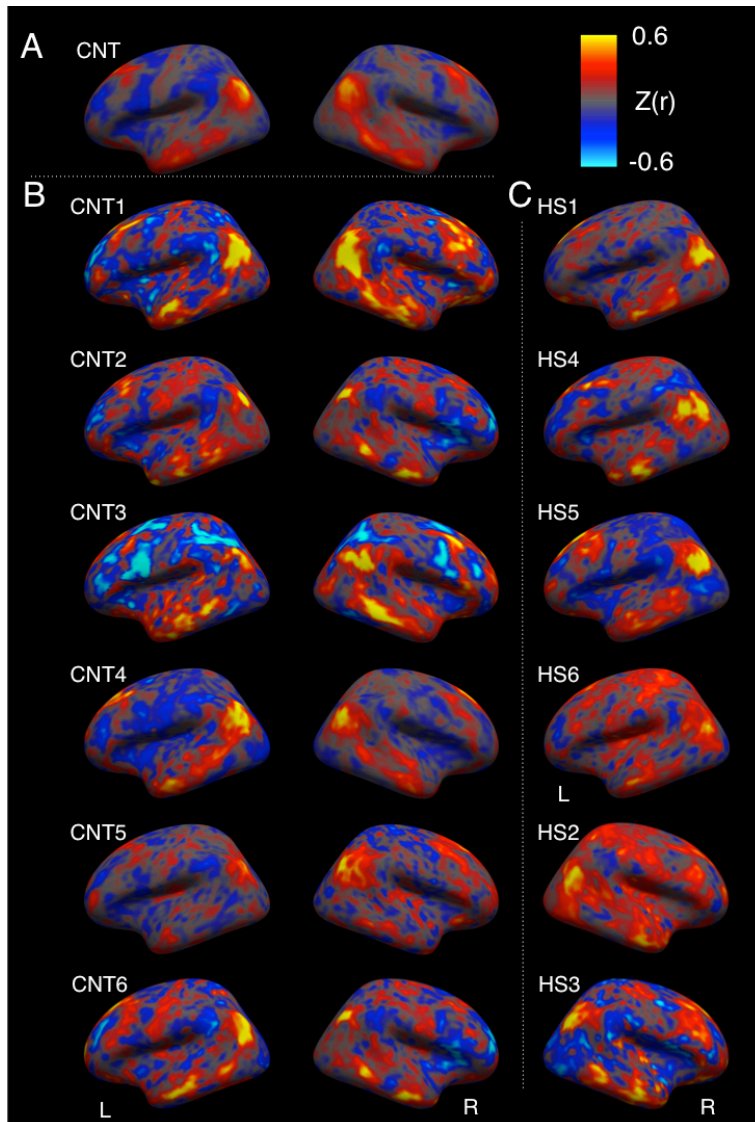


Figure S1. Seed region analysis of the default mode network displayed across the surface per hemisphere, related to **Figure 4A**. Connectivity of the precuneus cortex parcel (PCC) seed region per hemisphere averaged across CNT participants (A), and for each CNT (B) and HS (C) participant. *Abbreviations:* CNT, Caltech Control participant; HS1-6, Hemispherectomy participant; L, left; R, right; $Z(r)$, Fisher's r to z transformed correlation coefficient.

To visualize HS and CNT subjects' data in a common surface space, we performed additional analyses with similar preprocessing as the main analyses except that we registered individual functional data first to the `fsaverage6` template, smoothed the data ($\text{FWHM} = 6\text{mm}$) and then downsampled the resulting timeseries data onto the `fsaverage5` template (following preprocessing procedures described elsewhere (Kong et al., 2018, Schaefer et al., 2018)). Then for each hemisphere, we performed an exemplary seed region analysis across the whole hemisphere, using the PCC parcel of the default mode network parcellation (Yeo et al., 2011) as seed region.

<i>group</i>	<i>cond</i>	<i>mean</i>	<i>std</i>	<i>min</i>	<i>25%</i>	<i>50%</i>	<i>75%</i>	<i>90%</i>	<i>95%</i>	<i>max</i>
CNT	within	1.025	0.257	0.422	0.846	1.012	1.185	1.359	1.475	2.114
	inside	0.252	0.144	-0.182	0.152	0.247	0.345	0.432	0.493	0.786
	outside	0.009	0.050	-0.156	-0.021	0.011	0.043	0.070	0.086	0.171
GSP	within	1.051	0.249	0.198	0.873	1.031	1.210	1.385	1.493	2.339
	inside	0.241	0.142	-0.472	0.142	0.231	0.330	0.428	0.491	1.091
	outside	-0.011	0.048	-0.334	-0.037	-0.006	0.019	0.043	0.059	0.240
HS	within	1.037	0.268	0.284	0.840	1.020	1.213	1.394	1.499	1.923
	inside	0.287	0.156	-0.171	0.172	0.275	0.383	0.502	0.573	0.757
	outside	0.053	0.064	-0.148	0.011	0.054	0.099	0.134	0.156	0.230

Table S1. Homogeneity, related to **Figure 3**. Within-parcel (within), inside-network (inside) and outside-network (outside) vertex-to-parcel timeseries correlation (Fisher r-to-z transformed strength of correlation) averaged across all networks per group (HS, GSP, CNT). *Abbreviations:* CNT, Caltech controls; GSP, Brain Genomic Superstruct controls; HS, hemispherectomy; cond, condition; min, minimum; max, maximum; std, standard deviation from the mean.

<i>ID</i>	<i>FD</i>	<i>DVARS</i>	<i>POI</i>	<i>VCI</i>	<i>Age</i>	<i>Sex</i>	<i>Handedness</i>
HS1	0.10	20.58	74	105	29	F	R
HS2	0.22	27.09	95	101	22	F	L
HS3	0.10	24.75	89	109	22	F	L
HS4	0.21	27.42	86	118	31	M	R
HS5	0.16	25.97	95	109	20	F	R
HS6	0.11	25.33	72	91	21	M	R
CNT1	0.08	22.56	94	106	28	F	L
CNT2	0.16	27.82	104	94	27	F	L
CNT3	0.10	26.82	87	95	34	F	R
CNT4	0.15	31.80	98	90	21	M	R
CNT5	0.09	28.13	92	100	26	M	R
CNT6	0.07	22.80	95	98	25	F	R

Table S2. Demographics, motion and intellectual functioning matching information for CNT and HS group, related to **Table 1**. *Abbreviations:* CNT, Caltech Controls; DVARS, variations in temporal derivatives of timecourse; F, female; FD, mean framewise displacement; FSIQ, full scale IQ; HS, hemispherectomy; ID, participant specific identification; L, left; M, male; POI, perceptual organization index; R, right; VCI, verbal comprehension index.

<i>ID</i>	<i>HS-age</i> (months)	<i>onset</i> (months)	<i>FSIQ</i>	<i>SRS-2</i>	<i>D-KEFS</i> <i>Trails</i>	<i>D-KEFS</i> <i>Tower</i>
HS1	96	72	84	61	1	6
HS2	75	36	95	64	10	10
HS3	96	60	91	56	2	10
HS4	142	130	99	54	4	7
HS5	48	60	96	56	12	9
HS6	3	0	80	45	13	13

Table S3. Neurological history and cognitive function information for hemispherectomy participants, related to **Table 1**. *Abbreviations:* D-KEFS, Delis-Kaplan Executive Function System; FSIQ, Full scale IQ as estimated by WAIS-III; HS, hemispherectomy; ID, participant specific identification; onset, age at epilepsy onset; SRS-2, Social Responsiveness Scale-2 Adult Form Self-Report; D-KEFS Tower: Tower Test of the D-KEFS; D-KEFS Trails: Trail Making Test of the D-KEFS.

	GSP	CNT	HS1	HS2	HS3	HS4	HS5	HS6
<i>mean</i>	0.30	0.35	0.43	0.45	0.35	0.30	0.43	0.41
<i>std</i>	0.13	0.12	0.12	0.15	0.12	0.11	0.17	0.10
<i>min</i>	-0.02	0.12	0.26	0.32	0.17	0.19	0.19	0.33
<i>50%</i>	0.29	0.34	0.45	0.38	0.34	0.28	0.50	0.39
<i>75%</i>	0.39	0.42	0.53	0.54	0.44	0.33	0.54	0.42
<i>90%</i>	0.47	0.50	0.56	0.66	0.47	0.40	0.59	0.51
<i>95%</i>	0.52	0.55	0.56	0.66	0.48	0.45	0.61	0.57
<i>max</i>	0.90	0.74	0.57	0.67	0.49	0.51	0.63	0.62

Table S4. Within-network connectivity values per control groups and hemispherectomy participants averaged across networks, related to **Figure 4A**. None of the hemispherectomy participants' mean values were above the 90th percentile of the control groups. *Abbreviations.* CNT, Caltech controls; GSP, Brain Genomic Superstruct controls; HS, hemispherectomy; max, maximum; min, minimum; std, standard deviation of the mean.

		Default	Control	Limbic	Sal/VAtn	DorsAttn	SomMot	Visual	All
GSP	<i>mean</i>	-0.05	4.7 e-3	0.01	0.04	0.04	1.2 e-3	-0.02	7.9 e-4
	<i>std</i>	0.03	0.03	0.02	0.02	0.02	0.03	0.03	0.04
	<i>0.75</i>	-0.03	0.01	0.03	0.06	0.05	0.02	0.00	0.03
	<i>0.90</i>	-0.02	0.03	0.04	0.07	0.06	0.03	0.01	0.05
	<i>0.95</i>	4.0 e-3	0.03	0.05	0.08	0.07	0.04	0.02	0.06
	<i>0.99</i>	0.04	0.10	0.11	0.15	0.17	0.12	0.07	0.18
CNT	<i>mean</i>	-0.03	-0.01	0.01	0.04	0.03	0.04	0.03	0.35
	<i>std</i>	0.03	0.03	0.02	0.03	0.04	0.03	0.03	0.02
	<i>0.75</i>	-0.02	0.01	0.02	0.05	0.06	0.05	0.05	0.04
	<i>0.90</i>	3.6 e-3	0.03	0.04	0.08	0.06	0.06	0.07	0.05
	<i>0.95</i>	0.02	0.03	0.05	0.09	0.07	0.08	0.09	0.06
	<i>max</i>	0.05	0.03	0.06	0.11	0.08	0.10	0.10	1.7
HS1	<i>mean</i>	0.09	0.17	0.12	0.15	0.18	0.12	0.15	0.14
HS2	<i>mean</i>	0.03	-0.01	0.08	0.07	0.08	0.12	0.09	0.07
HS3	<i>mean</i>	-0.03	-0.05	0.00	0.02	0.05	0.05	0.01	5.0 e-3
HS4	<i>mean</i>	0.03	0.07	0.03	0.09	0.09	0.07	0.03	0.06
HS5	<i>mean</i>	-0.01	0.02	0.04	0.08	0.12	0.12	0.11	0.07
HS6	<i>mean</i>	0.08	0.12	0.11	0.14	0.14	0.12	0.04	0.11

Table S5. Between-network connectivity values per control groups and hemispherectomy participants as a function of networks and averaged across networks (All), related to **Figure 4B**. *Abbreviations.* CNT, Caltech controls; DorsAttn, dorsal attention network; GSP, Brain Genomic Superstruct controls; HS, hemispherectomy; max, maximum; Sal/VAtn, salience and ventral attention network; SomMot, somatosensory/motor network; std, standard deviation of the mean.

<i>ID</i>	<i>Summary index</i>	<i>Default index</i>	<i>Control index</i>	<i>Limbic index</i>	<i>Sal/VAtn index</i>	<i>DorsAttn index</i>	<i>SomMot index</i>	<i>Visual index</i>
HS1	0.33	0.35	0.37	0.32	0.27	0.36	0.38	0.27
HS2	0.14	0.08	-0.04	0.22	0.16	0.26	0.18	0.14
HS3	0.00	-0.11	-0.21	0.01	0.03	0.13	0.11	0.03
HS4	0.20	0.15	0.22	0.12	0.27	0.19	0.31	0.16
HS5	0.15	-0.02	0.08	0.23	0.17	0.21	0.20	0.21
HS6	0.27	0.25	0.33	0.32	0.31	0.35	0.20	0.11

Table S6. Summary index (strength of average between-network connectivity divided by strength of average within-network connectivity) averaged across all networks and per network for hemispherectomy participants, related to **Figures 5 and 6**. *Abbreviations.* DorsAttn, dorsal attention network; HS, hemispherectomy; Sal/VAtn, salience and ventral attention network; SomMot, somatosensory/motor network.

group/ID	value	GE
GSP	<i>mean</i>	0.349
	<i>std</i>	0.043
	<i>min</i>	0.024
	50%	0.351
	75%	0.375
	90%	0.395
	95%	0.407
	<i>max</i>	0.467
CNT	<i>mean</i>	0.380
	<i>std</i>	0.027
	<i>min</i>	0.336
	50%	0.381
	75%	0.395
	90%	0.408
	95%	0.421
	<i>max</i>	0.436
HS1	<i>mean</i>	0.432
HS2	<i>mean</i>	0.451
HS3	<i>mean</i>	0.381
HS4	<i>mean</i>	0.349
HS5	<i>mean</i>	0.427
HS6	<i>mean</i>	0.437

Table S7. Global efficiency per control groups and hemispherectomy participants, related to **Figure 6A**.
Abbreviations. CNT, Caltech controls; GSP, Brain Genomic Superstruct controls; HS, hemispherectomy; max, maximum; min, minimum; std, standard deviation of the mean.

		Default	Control	Limbic	SalVAttn	DorsAttn	SomMot	Visual
GSP	<i>mean</i>	3.245	3.219	3.171	3.384	3.268	3.213	3.258
	<i>std</i>	1.317	1.270	1.403	1.411	1.443	1.557	1.651
	<i>min</i>	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	<i>50%</i>	3.045	2.957	2.974	3.231	3.040	2.974	3.000
	<i>75%</i>	3.864	3.783	3.865	4.154	3.955	4.075	4.000
	<i>90%</i>	4.800	4.870	4.885	5.154	5.160	5.250	5.290
	<i>95%</i>	5.667	5.733	5.692	5.923	6.045	6.027	6.323
	<i>max</i>	17.267	10.217	15.615	10.692	12.409	11.000	14.367
CNT	<i>mean</i>	2.891	2.880	2.827	2.672	2.957	3.117	3.029
	<i>std</i>	0.845	1.049	0.652	1.003	1.470	0.946	1.021
	<i>min</i>	1.359	1.300	2.154	1.520	1.478	1.324	1.767
	<i>50%</i>	2.952	2.767	2.692	2.183	2.761	3.038	2.650
	<i>75%</i>	3.428	3.877	3.173	3.505	3.696	3.888	3.808
	<i>90%</i>	3.673	3.950	3.669	3.772	4.517	4.360	4.506
	<i>95%</i>	3.993	4.215	3.865	4.258	5.411	4.427	4.581
	<i>max</i>	4.385	4.533	4.077	4.818	6.391	4.460	4.581
HS1	<i>mean</i>	5.1538	4.833	4.692	2.840	2.348	3.275	1.433
HS2	<i>mean</i>	3.4231	2.864	1.769	1.546	2.522	1.838	2.065
HS3	<i>mean</i>	3.75	3.455	3.000	2.136	3.000	2.135	1.387
HS4	<i>mean</i>	3.6154	2.767	3.539	3.160	3.000	2.325	4.367
HS5	<i>mean</i>	1.2821	2.633	2.231	2.800	3.826	2.325	3.067
HS6	<i>mean</i>	1.359	2.400	2.077	2.480	3.391	2.325	3.900

Table S8. Modularity per network and control sample and hemispherectomy participant, related to **Figure 6B**. *Abbreviations.* CNT, Caltech controls; DorsAttn, dorsal attention network; GSP, Brain Genomic Superstruct controls; HS, hemispherectomy; Sal/VAttn, salience and ventral attention network; SomMot, somatosensory/motor network; max, maximum; min, minimum; std, standard deviation of the mean.

	SRS-2	FSIQ	D-KEFS Tower	D-KEFS Trails
Default Mode	$r_s(5) = -0.12$	-	-	-
Limbic	$r_s(5) = -0.17$	-	-	-
Sal/VAttn	-	$r_s(5) = -0.2$	-	-
DorsAttn	-	$r_s(5) = -0.6$	-	-
Control	-	-	$r_s(5) = -0.41$	$r_s(5) = -0.02$
SomMot	-	-	$r_s(5) = -0.64$	-

Table S9 related to **Figure 4B**. Exploratory analyses of brain-behavior relationships between network-specific connectivity (summary index) and cognitive abilities. We a priori decided to explore only those associations for

which there are entries in the table. The SRS-2, a measure of social cognition, showed only very weak to weak negative correlations with increased between-network connectivity (relative to within-network connectivity) within the default mode as well as the limbic networks. Full-scale IQ was only weakly negatively correlated with network-specific connectivity in the ventral attention network, but showed a strong negative correlation with connectivity in the dorsal attention network. For executive control, there was a moderate negative correlation between connectivity in the control network with the D-KEFS Tower Test (measuring spatial planning, rule learning, inhibition and ability to maintain and establish instructional set). The D-KEFS Trail Making Test (a visual-motor sequencing task that indexes flexibility of thinking) revealed no substantial correlation with connectivity of the control network. Since the Tower Test also involves the motor system (psychomotor processing speed), we additionally investigated its possible correlation with connectivity in the somatosensory/motor network and found indeed a strong negative association. These exploratory analyses will require future *a priori* tests in additional samples to establish their reliability. Nonetheless, it is striking that all correlations we found were of negative direction. While exploratory and preliminary, this overall pattern of results might suggest that greater between-network connectivity is associated with more impaired cognitive abilities. This needs to be validated in future studies and larger populations. Given the small sample size we refrain from reporting any p-values since no inference of statistical significance is justified.

Abbreviations. D-KEFS, Delis-Kaplan Executive Function System; DorsAttn, dorsal attention network; FSIQ, Full scale IQ as estimated by WAIS-III; HS, hemispherectomy; ID, participant specific identification; onset, age at epilepsy onset; r_s , Spearman's rank correlation; Sal/VAttn, salience and ventral attention network; SomMot, somatosensory/motor network; SRS-2, Social Responsiveness Scale-2 Adult Form Self-Report; D-KEFS Tower: Tower Test of the D-KEFS; D-KEFS Trails: Trail Making Test of the D-KEFS.