Supplementary Table 1. Search strategy, written for PubMed, and adapted for other databases.

1. “traumatic brain injury” [MeSH]
2. “TBI” [tw]
3. “mild TBI” [tw]
4. “mild traumatic brain injury” [tw]
5. “mTBI” [tw]
6. “brain concussion” [MeSH]
7. “concussion” [tw]
8. 1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7
9. “functional magnetic resonance imaging” [MeSH]
10. “rs-fMRI” [tw]
11. “resting state fMRI” [tw]
12. “functional MRI” [tw]
13. “fMRI” [tw]
14. 9 OR 10 OR 11 OR 12 OR 13
15. 8 AND 14

Supplementary Table 2. Summary of demographic, technical, and statistical data from included papers.

Author, Year	# of Subjects: HC, mTBI	Mean Age: HC, mTBI	% female (HC, mTBI)	Echo/ Repetition Time (ms)	rs-fMRI duration (minutes)	Scanner Field Strength	Processing Software	Atlas	Statistical Test	Multiple Comparison?
Bittencourt et. al., 2022[11]	20, 25	67.00, 68.00	45%, 36%	22.1/2000	10.0	3T	SPM12, GIFT	MNI	t-test	Yes
Kim et. al., 2022[12]	29, 29	42.80, 43.30	52%, 52%	30/3500	6.8	3T	FSL	MNI	t-test	No
Li et. al., 2022[13]	85, 88	39.20, 40.20	55%, 51%	30/2000	N/A	3T	SPM12, DPABI, GRETNA	MNI	t-test	Yes
Li et. al., 2022[14]	55, 55	40.70, 41.10	58%, 51%	30/2000	8.2	3T	SPM8, GRETNA	MNI	t-test, AUC	Yes
Lu et. al., 2022[15]	70, 76	45.60, 43.80	46%, 57%	30/2000	7.7	3T	GRETNA	MNI	t-test, Mann-Whitney	Yes
Amir et. al., 2021[16]	26, 27	43.20, 43.90	69%, 70%	30/2250	8.0	3T	CONN (SPM12)	MNI	t-test, nonparametric voxel-wise	Yes
Bajaj et. al., 2021[17]	41, 28	26.07, 21.50	61%, 54%	30/2000	6.0	3T	CONN (SPM12)	MNI	Baysian GLM (Posterior Probability Analysis)	No
Bittencourt-Villalpando et. al., 2021[18]	20, 54	30.00, 35.00	30%, 33%	20/2000	10.0	3T	SPM12, GIFT	MNI	t-test, MANCOVA	Yes
Jia et. al., 2021[19]	42, 92	40.50, 40.30	55%, 52%	30/2500	7.5	3T	SPM, DPABI	MNI	t-test, Mann-Whitney	Yes
Shi et. al., 2021[20]	50, 50	24.10, 24.30	50%, 50%	N/A	N/A	3T	AFNI	MNI	t-test	No
Sun et. al., 2021[21]	41, 60	37.60, 36.10	51%, 42%	30/2500	7.5	3T	SPM8, GRETNA	MNI	t-test, Mann-Whitney	Yes
Vedaei et. al., 2021[8]	40, 64	40.30, 46.00	47%, 61%	30/2000	6.0	3T	SPM12	MNI	t-test	Yes
Wang et. al., 2021[74]	37, 30	37.90, 40.50	46%, 40%	40/2000	16.0	1.5T	ASL	MNI, AAL	t-test, Mann-Whitney	Yes

Wang et. al., 2021[22]	33, 25	35.80, 35.60	52%, 48%	30/2000	8.0	3T	SPM8	MNI	t-test	Yes
Wang et. al., 2021[23]	42, 42	38.00, 37.40	43%, 45%	40/2000	16.0	1.5T	SPM8, FSL	MNI	t-test, Mann-Whitney	Yes
Zhang et. al., 2021[24]	46, 46	35.90, 34.70	54%, 50%	30/2500	N/A	3T	SPM12	MNI	t-test	No
D'Souza et. al., 2020[25]	60, 60	30.82, 30.40	38%, 39%	30/2000	6.83	3T	FSL	MNI	TFCE	Yes
Li et. al., 2020[26]	32, 58	42.00, 37.70	50%, 48%	25/2000	8.1	3T	SPM8, REST	MNI	t-test	Yes
Li et. al., 2020[27]	43, 50	41.70, 43.80	56%, 52%	30/2000	8.1	3T	DPABI	MNI	t-test	Yes
Liu et. al., 2020[28]	37, 32	31.00, 30.00	57%, 63%	35/1500	5.4	3T	FSL, AFNI	MNI	t-test	Yes
Lu et. al., 2020[29]	37, 53	41.40, 38.00	65%, 49%	30/2000	8.1	3T	REST	MNI	t-test	Yes
Lu et. al., 2020[30]	43, 71	43.50, 40.70	60%, 56%	30/2000	8.1	3T	SPM8, REST	MNI	t-test, ANOVA	Yes
Shafi et. al., 2020[31]	31, 80	36.30, 32.30	41%, 45%	25/2500	N/A	3T	SPM8, AFNI	MNI	t-test	Yes
Chong et. al., 2019[32]	15, 15	39.10, 39.10	87%, 87%	27/2500	10.0	3T	SPM8	MNI	t-test	Yes
Hou et. al., 2019[33]	30, 47	40.20, 41.70	40%, 28%	30/2000	5.6	3T	SPM8, AFNI	Talairach	ANOVA, post-hoc t-test	No
Kuceyeski et. al., 2019[34]	34, 27	28.60, 29.10	26%, 22%	NA	7.0	3T	SPM12, FreeSurfer	MNI	t-test	Yes
Li et. al., 2019[35]	41, 55	43.20, 40.70	54%, 51%	30/2000	8.1	3T	SPM8, REST, DPABI	MNI	t-test, GCA	Yes
Lu et. al., 2019[36]	30, 58	42.50, 38.80	60%, 43%	30/2000	8.1	3T	SPM8, REST	AAL	t-test	Yes
Niu et. al., 2019[37]	46, 70	34.90, 34.70	50%, 36%	N/A	N/A	3T	FSL	MNI	t-test, Mann-Whitney	Yes
Dailey et. al., 2018[38]	14, 15	23.88, 21.86	71%, 73%	25/2000	10.0	3T	CONN (SPM12)	MNI, Shirer et al.	GLM analysis	Yes

Wang et. al., 2018[39]	34, 54	32.95, 35.50	50%, 50%	30/2000	N/A	3T	FSL	MNI	t-test, Mann-Whitney	No
Xu et. al., 2018[40]	35, 50	35.50, 37.20	60%, 40%	30/2500	7.5	3T	FSL	MNI, Brainnetome atlas	t-test	Yes
Dall'Acqua et. al., 2017[41]	49, 49	35.00, 34.90	63%, 63%	15.19/2220	5.19	3T	SPM8	MNI, AAL	Cohen's d	Yes
Palacios et. al., 2017[42]	47, 75	28.80, 32.20	N/A, N/A	28/2000	N/A	3T	FSL	MNI	GLM analysis	Yes
Rajesh et. al., 2017[43]	22, 22	36.20, 36.30	50%, 50%	25/2000	2.5	3T	FSL, AFNI	MNI	t-test	Yes
van der Horn et. al., 2017[44]	20, 54	[18-61], [19-64]	30%, 33%	20/2000	10.0	3T	SPM12	MNI	AUC	Yes
van der Horn et. al., 2017[45]	20, 49	[18-61], [19-62]	30%, 33%	20/2000	10.0	3T	SPM12	MNI	t-test, ANOVA	Yes
Vergara et. al., 2017[46]	50, 50	N/A, 27.90	50%, 50%	29/2000	5.0	3T	SPM6	MNI	t-test, MANOVA, ANOVA	No
Vergara et. al., 2017[47]	47, 47	N/A, 27.30	N/A, N/A	29/2000	5.0	3T	SPM	MNI	t-test	Yes
Yan et. al., 2017[48]	18, 18	38.70, 39.90	28%, 11%	24/1900	N/A	1.5T	SPM8, REST	MNI, AAL	t-test, Granger Causality analysis	No
Yan et. al., 2017[49]	17, 22	[20-59], [18-60]	24%, 23%	40/2000	6.2	1.5T	GRETNA	AAL90, Dosenbach160	t-test	No
Zhou et. al., 2017[50]	22, 24	37.00, 34.20	59%, 29%	30/2300	5.1	3T	FSL	MNI	t-test	No
Astafiev et. al., 2016[51]	20, 17	[18-60], [18-60]	50%, 57%	27/2000	4.3	3T	In-house	Talairach	t-test	Yes
Banks et. al., 2016[52]	11, 13	37.60, 39.30	36%, 31%	35/2000	10.0	3T	SPM8	MNI	t-test	Yes
Iraji et. al., 2016[53]	24, 16	28.00, 34.50	17%, 38%	30/2000	8.0	3T	FSL, MedINRIA	N/A	ANOVA, NBS	Yes

Nordin et. al., 2016[54]	10, 10	36.90, 37.50	50%, 50%	35/2000	8.0	3T	FSL, AFNI	MNI	ANOVA	No
van der Horn et. al., 2016[55]	20, 54	[18-45], [19-64]	30%, 33%	20/2000	10.0	3T	SPM12	MNI	t-test, ANOVA	Yes
Xiong et. al., 2016[56]	25, 25	31.50, 32.50	40%, 36%	29/2000	8.0	3T	SPM5	AAL	t-test	No
Yan et. al., 2016[57]	19, 19	36.60, 38.20	32%, 16%	24/2000	N/A	1.5T	SPM, FSL, REST	MNI, AAL	t-test, Granger Causality analysis	No
Bharath et. al., 2015[58]	20, 15	N/A, N/A	N/A, N/A	35/3000	9.0	3T	SPM8, FSL	MNI, ICA-based	t-test	No
Iraji et. al., 2015[59]	12, 16	33.00, 37.00	44%, 50%	30/2000	8.0	3T	FSL	MNI, ICA-based	t-test	Yes
Mayer et. al., 2015[60]	48, 48	27.90, 28.30	52%, 52%	29/2000	5.0	3T	N/A	MNI	ANCOVA	Yes
Sours et. al., 2015[61]	31, 32	37.30, 41.70	45%, 34%	30/2000	5.7	3T	AFNI	MNI	ANCOVA	Yes
Sours et. al., 2015[62]	35, 77	37.20, 44.00	46%, 23%	30/2000	5.7	3T	SPM8	MNI	t-test, ANCOVA	No
Sours et. al., 2015[63]	30, 41	38.70, 43.70	47%, 27%	30/2000	5.7	3T	SPM8	MNI	t-test, ANCOVA	Yes
Sours et. al., 2015[64]	28, 28	39.30, 38.90	43%, 36%	30/2000	5.7	3T	SPM8	MNI	t-test, ANCOVA	Yes
Vergara et. al., 2015[65]	50, 50	N/A, 27.90	50%, 50%	29/2000	5.0	3T	SPM5	MNI	t-test (assumed)	Yes
Zhan et. al., 2015[66]	15, 15	39.30, 38.50	60%, 60%	30/2000	8.0	3T	SPM8	MNI	t-test	Yes
Zhou et. al., 2014[67]	27, 27	35.40, 33.40	48%, 22%	30/2000	5.1	3T	FSL, AFNI	MNI	t-test	Yes
Messe et. al., 2013[68]	34, 55	36.80, 34.88	32%, 33%	30/2650	10.0	3T	SPM5	MNI, AAL	t-test, Mann-Whitney	Yes
Sours et. al., 2013[69]	14, 23	37.10, 39.50	43%, 52%	30/2000	5.7	3T	SPM8	MNI	t-test, ANOVA	Yes

Shumskaya et. al., 2012[70]	35, 35	[19-59], [18-60]	37%, 37%	30/1350	6.0	3T	FSL	MNI	Mann-Whitney	No
Stevens et. al., 2012[2]	30, 30	28.90, 31.70	33%, 33%	28/1500	5.25	3T	SPM8	MNI	t-test	Yes
Zhou et. al., 2012[71]	18, 23	32.60, 37.80	N/A, 26%	30/2000	5.1	3T	FSL, AFNI	MNI	t-test	Yes
Mayer et. al., 2011[72]	26, 27	27.10, 27.20	58%, 56%	29/2000	5.0	3T	AFNI	Talairach	t-test	Yes
Tang et. al., 2011[73]	17, 24	35.20, 37.70	N/A, 29%	30/2000	5.1	3T	SPM2, FSL	MNI	t-test	Yes

Supplementary Table 3. Summary of studied regions-of-interest (ROIs) and networks studied in every included study, time between mTBI and fMRI, as well as functional connectivity (FC) analysis methods and results. -2 means that relative to healthy controls, only decreased FC changes were seen in mTBI patients. -1 means more areas of decreased FC change than areas of increased FC change were seen. 0 means no FC changes were seen. Equal means the same number of areas of decreased and increased FC were seen. 1 means more areas of increased FC change than areas of decreased FC change were seen. 2 means only areas of increased FC changes were seen.

*N/A = that analytic method was not applied in this study for that ROI or network.
*ICA = independent components analysis. f(ALFF) = fractional amplitude of low-frequency fluctuations. ReHo = regional homogeneity.
*Asym = no post-concussive symptoms at time of MRI; sym = post-concussive symptoms at time of MRI
*aDMN = anterior default mode network, AN = attention network, AUDN = auditory network, BGN = basal ganglia network, BN = brainstem network, CCN = cognitive-control network, CEN = central executive network, CLN = cognitive-language network, CN = cerebellum network, CON = cingulo-opercular network, DAN = dorsal attention network, DLPFC = dorsolateral prefrontal cortex, DMN = default mode network, DVS = dorsal and ventral stream, ECN = executive control network, EMN = emotion network, EN = executive network, FPC = fronto-parietal control network, FPN = fronto-parietal network, LFPN = left fronto-parietal network, LSN = lower somatomotor network, LVN = lateral visual network, MN = motor network, MTL = medial temporal lobe, MSN = motor-striatal network, MVN = medial visual network, OFN = orbitofrontal network, pDMN = posterior default mode network, OCN = orbito-cerebellar network, RFPN = right fronto-parietal network, SMC = sensory motor cortex, SMN = sensorimotor network, SN = salience network, SPN = superior parietal network, TPN = task positive network, TRN = task related network, USN = upper somatomotor network, VAN = ventral attention network, VMPFC = ventromedial prefrontal cortex, VN = visual network, VS = ventral stream

Author, Year	ROI/Network	Time Between mTBI and fMRI	Seed/ROI to Seed/ROI	Seed/ROI to Voxel	ICA	Graph Theory	Seed-based dynamic FC	ICA-based dynamic FC	f(ALFF)	ReHo
Bittencourt et. al., 2022[11]	CLN VN Whole brain	1-6 months 1-6 months 1-6 months	N/A	N/A	2 -2 Equal	N/A	N/A	N/A	N/A	N/A
Kim et. al., 2022[12]	Whole brain	<1 month	N/A	N/A	N/A	-1	N/A	N/A	N/A	N/A
Li et. al., 2022[13]	Whole brain	<1 month	N/A	N/A	N/A	2	N/A	N/A	N/A	N/A
Li et. al., 2022[14]	Whole brain	<1 month	N/A	N/A	N/A	1	N/A	N/A	N/A	N/A
Lu et. al., 2022[15]	AUDN AUDN dAN dAN DMN DMN LFPN LFPN RFPN RFPN SMN SMN SN SN vAN vAN VN VN Whole brain	<1 month <1 month <1 month <1 month <1 month <1 month <1 month <1 month <1 month <1 month <1 month <1 month <1 month <1 month <1 month <1 month <1 month <1 month <1 month	N/A	N/A	-2 N/A 0 N/A Equal N/A 0 N/A 0 N/A Equal N/A 2 N/A -1 N/A Equal N/A -1	N/A	N/A	N/A -2 N/A -2 N/A Equal N/A 0 N/A 0 N/A Equal N/A -2 N/A -2 N/A -2 -2	N/A	N/A
Amir et. al., 2021[16]	DMN SN TPN Whole brain	>6 months >6 months >6 months >6 months	0 0 0 N/A	-1 -1 0 N/A	N/A N/A N/A 1	N/A	N/A	N/A	N/A	N/A

Bajaj et. al., 2021[17]	DMN	>6 months	-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bittencourt-Villalpando et. al., 2021[18]	AUDN CCN CN DMN SMN VN Whole brain	1-6 months	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A
Jia et. al., 2021[19]	White matter White matter	<1 month >6 months	2 0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Shi et. al., 2021[20]	Whole brain	<1 month	N/A	N/A	N/A	-1	N/A	N/A	2	-2
Sun et. al., 2021[21]	DMN DMN EN EN SN SN	<1 month 1-6 months <1 month 1-6 months <1 month 1-6 months	N/A	N/A	N/A	-2 -2 -2 -2 -2 -2	N/A	N/A	N/A	N/A
Vedaei et. al., 2021[8]	Whole brain	>6 months	N/A	2	N/A	N/A	N/A	N/A	2	2
Wang et. al., 2021[74]	Whole brain	<1 month 1-6 months >6 months	N/A	N/A	N/A	0 0 0	N/A	N/A	N/A	N/A
Wang et. al., 2021[22]	R inferior frontal gyrus R superior temporal gyrus	<1 month <1 month	N/A	-1 -1	N/A	N/A	N/A	N/A	N/A	N/A
Wang et. al., 2021[23]	Whole brain Whole brain Whole brain	<1 month 1-6 months >6 months	-1 -2 -2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Zhang et. al., 2021[24]	DMN	<1 month	N/A	-2	N/A	N/A	N/A	N/A	N/A	N/A
D'Souza et. al., 2020[25]	aDMN	<1 month			-2					

	aDMN	>6 months			-2					
	AUDN	<1 month			-2					
	AUDN	>6 months			-2					
	CEN	<1 month			-2					
	CEN	>6 months			2					
	CN	<1 month			-2					
	CN	>6 months			-2					
	DMN	<1 month			0					
	DMN	>6 months			0					
	EMN	<1 month			-2					
	EMN	>6 months	N/A	N/A	-2	N/A	N/A	N/A	N/A	N/A
	LFPN	<1 month			0					
	LFPN	>6 months			0					
	LVN	<1 month			0					
	LVN	>6 months			0					
	MVN	<1 month			0					
	MVN	>6 months			0					
	pDMN	<1 month			0					
	pDMN	>6 months			0					
	RFPN	<1 month			0					
	RFPN	>6 months			0					
	SMN	<1 month			-2					
	SMN	>6 months			2					
	Whole brain	<1 month			-2					
	Whole brain	>6 months			-1					
Li et. al., 2020[26]	Insula	<1 month	N/A	Equal	N/A	N/A	N/A	N/A	N/A	N/A
	AN	<1 month			-2					
	CN	<1 month			-2					
Li et. al., 2020[27]	DMN	<1 month	N/A	N/A	2	N/A	N/A	N/A	N/A	N/A
	ECN	<1 month			-2					
	SMN	<1 month			-2					

	SN	<1 month			-2					
	VN	<1 month			-2					
	Whole brain	<1 month			-1					
Liu et. al., 2020[28]	CEN	<1 month	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A
	CEN	<1 month			N/A	0				N/A
	DMN	<1 month			2	N/A				N/A
	DMN	<1 month			N/A	0				N/A
	SN	<1 month			2	N/A				N/A
	SN	<1 month			N/A	0				N/A
	Whole brain	<1 month			2	N/A				-1
Lu et. al., 2020[29]	Insula	<1 month	N/A	-2	N/A	N/A	N/A	N/A	N/A	N/A
Lu et. al., 2020[30]	Hypothalamus	>6 months	N/A	-2	N/A	N/A	N/A	N/A	N/A	N/A
Shafi et. al., 2020[31]	DMN	>6 months	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	FPN	>6 months	0							
	SN	>6 months	1							
Chong et. al., 2019[32]	Amygdala	<1 month	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Amygdala	1-6 months	0							
	Anterior cingulate	<1 month	0							
	Anterior cingulate	1-6 months	0							
	Anterior insula	<1 month	0							
	Anterior insula	1-6 months	0							
	Caudate	<1 month	0							
	Caudate	1-6 months	0							
	Cuneus	<1 month	0							
	Cuneus	1-6 months	0							
	DLPFC	<1 month	0							
	DLPFC	1-6 months	0							
	Fusiform gyrus	<1 month	0							
	Fusiform gyrus	1-6 months	0							
	Hypothalamus	<1 month	0							
	Hypothalamus	1-6 months	0							

	Inferior lateral parietal	<1 month	0							
	Inferior lateral parietal	1-6 months	0							
	Lingual gyrus	<1 month	0							
	Lingual gyrus	1-6 months	0							
	Middle cingulate	<1 month	-2							
	Middle cingulate	1-6 months	-2							
	Middle frontal	<1 month	0							
	Middle frontal	1-6 months	0							
	Middle occipital	<1 month	-2							
	Middle occipital	1-6 months	-2							
	Middle temporal	<1 month	0							
	Middle temporal	1-6 months	0							
	Parieto-occipital	<1 month	0							
	Parieto-occipital	1-6 months	0							
	Posterior cingulate	<1 month	0							
	Posterior cingulate	1-6 months	0							
	Posterior insula	<1 month	-2							
	Posterior insula	1-6 months	-2							
	Precuneus	<1 month	-2							
	Precuneus	1-6 months	-2							
	Precentral	<1 month	0							
	Precentral	1-6 months	0							
	Primary somatosensory	<1 month	0							
	Primary somatosensory	1-6 months	0							
	Pulvinar	<1 month	-2							
	Pulvinar	1-6 months	-2							
	Secondary somatosensory	<1 month	0							
	Secondary somatosensory	1-6 months	0							
	Somatomotor	<1 month	0							
	Somatomotor	1-6 months	0							
	Spinal trigeminal nucleus	<1 month	-2							

	Spinal trigeminal nucleus Superior parietal lobule Superior parietal lobule Supramarginal gyrus Supramarginal gyrus Temporal pole Temporal pole Thalamus Thalamus VMPFC VMPFC	1-6 months <1 month 1-6 months <1 month 1-6 months <1 month 1-6 months <1 month 1-6 months <1 month 1-6 months	-2 0 0 0 0 0 0 0 0 0 0							
Hou et. al., 2019[33]	Whole brain	<1 month	N/A	N/A	N/A	Equal	N/A	N/A	N/A	N/A
Kuceyeski et. al., 2019[34]	Whole brain Whole brain	1-6 months >6 months	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A
Li et. al., 2019[35]	Left middle frontal gyrus Whole brain	<1 month <1 month	N/A	-1 N/A	N/A	N/A -2	N/A	N/A	N/A	N/A
Lu et. al., 2019[36]	SN	<1 month	N/A	-1	N/A	N/A	N/A	N/A	N/A	N/A
Niu et. al., 2019[37]	Periaqueductal gray (asym) Periaqueductal gray (sym)	<1 month <1 month	N/A	0 -1	N/A	N/A	N/A	N/A	N/A	N/A
Dailey et. al., 2018[38]	DMN	>6 months	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wang et. al., 2018[39]	CN (women) CN (men) DMN (women) DMN (men) EN (women) EN (men) MN (women) MN (men) MTL (women) MTL (men)	<1 month	N/A	N/A	0 0 0 0 0 0 0 2 0 0	N/A	N/A	N/A	N/A	N/A

	VN (women) VN (men) VS (women) VS (men) Whole brain (women) Whole brain (men)				0 -2 0 2 0 1					
Xu et. al., 2018[40]	Caudate	<1 month	N/A	-2	N/A	N/A	N/A	N/A	N/A	N/A
Dall'Acqua et. al., 2017[41]	Whole brain Whole brain	<1 month >6 months	-2 -2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Palacios et. al., 2017[42]	AUDN BGN CEN CN CON DAN DMN DVS LFPN LSN OCN OFN pDMN RPFN SPN SN USN VAN VN Whole brain	<1 month	N/A	N/A	0 0 0 0 0 -2 -2 0 0 0 0 -2 0 -2 0 0 0 0 2 -1	N/A	N/A	N/A	N/A	N/A
Rajesh et. al., 2017[43]	DMN	>6 months	N/A	-2	N/A	N/A	N/A	N/A	N/A	N/A

van der Horn et. al., 2017[44]	Whole brain	1-6 months	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A
van der Horn et. al., 2017[45]	DMN DMN EN EN SN SN Whole brain Whole brain	<1 month 1-6 months <1 month 1-6 months <1 month 1-6 months <1 month 1-6 months	N/A	N/A	0 0 0 0 0 0 0 0	N/A	N/A	N/A	N/A	N/A
Vergara et. al., 2017[46]	Whole brain	>6 months	N/A	N/A	N/A	N/A	N/A	2	N/A	N/A
Vergara et. al., 2017[47]	Whole brain	<1 month	N/A	N/A	2	N/A	N/A	N/A	N/A	N/A
Yan et. al., 2017[48]	Left hippocampus Left hippocampus	<1 month 1-6 months	N/A	1 2	N/A	N/A	N/A	N/A	N/A	N/A
Yan et. al., 2017[49]	Whole brain	<1 month	N/A	N/A	N/A	2	N/A	N/A	N/A	N/A
Zhou et. al., 2017[50]	Hypothalamus	1-6 months	N/A	-1	N/A	N/A	N/A	N/A	N/A	N/A
Astafiev et. al., 2016[51]	Whole brain	>6 months	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
Banks et. al., 2016[52]	DAN DAN FPC FPC	<1 month 1-6 months <1 month 1-6 months	-1 -1 -1 -1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iraji et. al., 2016[53]	Specific DICCCOLs	1-6 months	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nordin et. al., 2016[54]	Whole brain	>6 months	N/A	-2	N/A	N/A	N/A	N/A	N/A	N/A
van der Horn et. al., 2016[55]	DMN (asym) DMN (sym) EN (asym) EN (sym) SN (asym)	1-6 months 1-6 months 1-6 months 1-6 months 1-6 months	N/A	N/A	0 0 0 0 0	N/A	N/A	N/A	N/A	N/A

	SN (sym) Whole brain (asym) Whole brain (sym)	1-6 months 1-6 months 1-6 months			0 0 0					
Xiong et. al., 2016[56]	Whole brain	1-6 months	-2	N/A	N/A	N/A	N/A	N/A	-1	N/A
Yan et. al., 2016[57]	Left hippocampus	1-6 months >6 months	N/A	2 2	N/A	N/A	N/A	N/A	N/A	N/A
Bharath et. al., 2015[58]	Whole brain Whole brain Whole brain	<1 month 1-6 months >6 months	-1 -1 -1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iraji et. al., 2015[59]	Amygdala BGN DMN Hippocampus Whole brain	<1 month <1 month <1 month <1 month <1 month	-1 0 -2 1 N/A	N/A	N/A 0 -2 N/A -2	N/A	N/A	N/A	N/A	N/A
Mayer et. al., 2015[60]	DMN Subcortical Whole brain	<1 month <1 month <1 month	N/A	N/A	0 0 0	N/A	N/A	0 0 0	N/A	N/A
Sours et. al., 2015[61]	DMN (asym) DMN (asym) DMN (sym) DMN (sym)	<1 month >6 months <1 month >6 months	1 1 -1 -1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sours et. al., 2015[62]	Thalamus	<1 month	2	2	N/A	N/A	N/A	N/A	N/A	N/A
Sours et. al., 2015[63]	DLPFC (asym) DLPFC (asym) DLPFC (sym) DLPFC (sym) Lateral parietal (asym) Lateral parietal (asym) Lateral parietal (sym) Lateral parietal (sym) MTL (asym)	<1 month 1-6 months <1 month 1-6 months <1 month 1-6 months <1 month 1-6 months <1 month	0 0 0 -2 -2 0 0 0 0	0 0 0 0 0 -2 0 0 0	N/A	N/A	N/A	N/A	N/A	N/A

	MTL (asym) MTL (sym) MTL (sym) Thalamus (asym) Thalamus (asym) Thalamus (sym) Thalamus (sym)	1-6 months <1 month 1-6 months <1 month 1-6 months <1 month 1-6 months	0 0 0 0 0 0 0	0 0 0 0 0 0 0						
Sours et. al., 2015[64]	DMN DMN DMN TPN TPN TPN	<1 month 1-6 months >6 months <1 month 1-6 months >6 months	-1 0 0 0 0 2	0 0 1 1 0 0	N/A	N/A	N/A	N/A	N/A	N/A
Vergara et. al., 2015[65]	Whole brain	>6 months	N/A	N/A	2	N/A	N/A	N/A	N/A	N/A
Zhan et. al., 2015[66]	Whole brain	<1 month	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-2
Zhou et. al., 2014[67]	Thalamus	1-6 months	N/A	-2	N/A	N/A	N/A	N/A	-2	N/A
Messe et. al., 2013[68]	Whole brain (asym) Whole brain (asym) Whole brain (sym) Whole brain (sym)	<1 month >6 months <1 month >6 months	N/A	N/A	N/A	0 -1 -1 0	N/A	N/A	N/A	N/A
Sours et. al., 2013[69]	DMN (asym) DMN (sym) TPN (asym) TPN (sym)	1-6 months 1-6 months 1-6 months 1-6 months	-2 -2 0 0	-2 2 0 0	N/A	N/A	N/A	N/A	N/A	N/A
Shumskaya et. al., 2012[70]	BN CN DAN DMN EN LFPN				0 0 0 0 0 0					

	MSN RFPN SMC VAN VS VN Whole brain	<1 month	N/A	N/A	-2 2 0 0 0 0 Equal	N/A	N/A	N/A	N/A	N/A
Stevens et. al., 2012[2]	Whole brain	1-6 months	N/A	N/A	-1	N/A	N/A	N/A	N/A	N/A
Zhou et. al., 2012[71]	DMN	1-6 months	N/A	-1	-1	N/A	N/A	N/A	N/A	N/A
Mayer et. al., 2011[72]	DMN TRN	<1 month <1 month	Equal 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tang et. al., 2011[73]	Thalamus	1-6 months	N/A	2	2	N/A	N/A	N/A	N/A	N/A

Supplementary Table 4. Number of studies and analyses of each ROI/network. Note some analyses involved multiple timepoints since mTBI (<1 month, 1-6 months, >6 months).

*aDMN = anterior default mode network, AN = attention network, AUDN = auditory network, BGN = basal ganglia network, BN = brainstem network, CCN = cognitive-control network, CEN = central executive network, CLN = cognitive-language network, CN = cerebellum network, CON = cingulo-opercular network, DAN = dorsal attention network, DLPFC = dorsolateral prefrontal cortex, DMN = default mode network, DVS = dorsal and ventral stream, ECN = executive control network, EMN = emotion network, EN = executive network, FPC = fronto-parietal control network, FPN = fronto-parietal network, LFPN = left fronto-parietal network, LSN = lower somatomotor network, LVN = lateral visual network, MN = motor network, MTL = medial temporal lobe, MSN = motor-striatal network, MVN = medial visual network, OFN = orbitofrontal network, pDMN = posterior default mode network, OCN = orbito-cerebellar network, RFPN = right fronto-parietal network, SMC = sensory motor cortex, SMN = sensorimotor network, SN = salience network, SPN = superior parietal network, TPN = task positive network, TRN = task related network, USN = upper somatomotor network, VAN = ventral attention network, VMPFC = ventromedial prefrontal cortex, VN = visual network, VS = ventral stream

Area	# Studies	# Analyses	Area	# Studies	# Analyses	Area	# Studies	# Analyses
Whole brain	37	45	aDMN	1	1	MVN	1	1
DMN	25	32	AN	1	1	OCN	1	1
SN	10	13	Anterior cingulate	1	1	OFN	1	1
VN	8	9	Anterior insula	1	1	Parieto-occipital	1	1
Thalamus	5	9	BN	1	1	Periaqueductal gray	1	1
CN	6	6	CCN	1	1	Posterior cingulate	1	1
TPN	3	6	CLN	1	1	Posterior insula	1	1
EN	5	5	CON	1	1	Precentral	1	1
AUDN	4	5	Cuneus	1	1	Precuneus	1	1
DAN	4	5	DVS	1	1	Primary somatosensory	1	1
IFPN	4	5	ECN	1	1	Pulvinar	1	1
IFPN	4	5	EMN	1	1	rIFG	1	1
rFPN	4	5	FPC	1	1	rSTG	1	1
SMN	4	5	FPN	1	1	Secondary somatosensory	1	1
VAN	3	4	Fusiform gyrus	1	1	SMC	1	1
BGN	3	3	Hippocampus	1	1	Somatomotor	1	1
Hypothalamus	3	3	Inferior lateral parietal	1	1	Specific DICCCOLs	1	1
DLPFC	2	3	Lingual gyrus	1	1	Spinal trigeminal nucleus	1	1
MTL	2	3	lMFG	1	1	SPN	1	1
Amygdala	2	2	LSN	1	1	Superior parietal lobule	1	1
Caudate	2	2	LVN	1	1	Supramarginal gyrus	1	1
Insula	2	2	Middle cingulate	1	1	Temporal pole	1	1
L hippocampus	2	2	Middle frontal	1	1	TRN	1	1
pDMN	2	2	Middle occipital	1	1	USN	1	1
VS	2	2	Middle temporal	1	1	VMPFC	1	1
Lateral parietal	1	2	MN	1	1	White matter	1	1
Subcortical	1	2	MSN	1	1			

Supplementary Table 5. Metrics evaluated by every study that used graph theory to look at functional connectivity (FC) changes.

With regard to FC change, 2 means that relative to healthy controls, only decreased FC changes were seen in mTBI patients. -1 means more areas of decreased FC change than areas of increased FC change were seen. 0 means no FC changes were seen. Equal means the same number of areas of decreased and increased FC were seen. 1 means more areas of increased FC change than areas of decreased FC change were seen. 2 means only areas of increased FC changes were seen. For Messe et. al., 2013[68], see Supplementary Table 3 for detailed FC change.

Author, Year	**Metrics**	**FC Change**
Kim et. al., 2022[12]	Betweenness Centrality Clustering Coefficient Global Efficiency Local Efficiency Strength	-1
Li et. al., 2022[13]	Clustering Coefficient Global Efficiency Local Efficiency Rich Club Connectivity Shortest Path Length Small-world Parameters	2
Li et. al., 2022[14]	Clustering Coefficient Degree Centrality Global Efficiency Local Efficiency Small-world Parameters	1
Shi et. al., 2021[20]	Clustering Coefficient Global Efficiency Local Efficiency	-1
Sun et. al., 2021[21]	Betweenness Centrality Clustering Coefficient Global Efficiency Local Efficiency	-2
Wang et. al., 2021[74]	Betweenness Centrality Characteristic Path Length Clustering Coefficient Degree Centrality Global Efficiency Local Efficiency Small-world Parameters	0
Liu et. al., 2020[28]	Clustering Coefficient Path Length	0
Hou et. al., 2019[33]	Clustering Coefficient	Equal

	Minimum Spanning Tree Weight Shortest Path	
Kuceyeski et. al., 2019[34]	Clustering Coefficient Degree Global Efficiency Mean First Passage Time Mean Navigation Time Modularity Local Efficiency Path Length Small-world Parameters Transitivity	0
Li et. al., 2019[35]	Degree Centrality	-2
van der Horn et. al., 2017[44]	Betweenness Centrality Clustering Coefficient Degree Eigenvector Centrality Global Efficiency Local Efficiency Strength	0
Yan et. al., 2017[49]	Characteristic Path Length Clustering Coefficient Global Efficiency Local Efficiency	2
Messe et. al., 2013[68]	Assortativity Cost Edge Diversity Global Efficiency Hierarchy Local Efficiency Modularity Nodal Diversity Robustness Small-world Parameters Strength	0 and -1