PSYCHOMOTOR DIMENSION					
PSYCHOMOTOR EXCITATION - PSYCHOMOTOR HYPERACTIVITY					
Study	*Type*	*Sample*	*Phenomenal-Behavioral Pattern (Group)*	*Method*	*Results*
Korponay et al. (2017)	Study	105 HS	Impulsivity (HS)	Resting-state fMRI	Correlation of increased FC between basal ganglia, thalamus, motor cortex, and prefrontal cortex with impulsivity in HS
Conio et al. (2019)	Study	109 + 121 HS	Cyclothymic temperament (HS)	Resting-state fMRI	Correlation of increased neuronal variability (standard deviation of BOLD signal) in SMN with cyclothymic temperament level (and novelty seeking) in HS Increased neuronal variability in SMN in HS with cyclothymic temperament (vs. HS with depressive temperament)
Soros et al. (2019)	Study	38 Attention-deficit/hyperactivity disorder	Psychomotor hyperactivity (Attention-deficit/hyperactivity disorder)	Resting-state fMRI	Correlation of increased FC in putamen, caudate, central operculum, and postcentral gyrus within SMN with hyperactivity in attention-deficit/hyperactivity disorder
Cortese et al. (2012)*	Meta-analysis	741 Attention-deficit/hyperactivity disorder and 801 HS (55 fMRI studies)	Attention deficit and hyperactivity (Attention-deficit/hyperactivity disorder)	Task-based fMRI (impulsivity/inhibition tasks, attention tasks, memory tasks)	Decreased activation mainly in CEN and SN, as well as increased activation mainly in DMN, SN, and SMN, in childhood attention-deficit/hyperactivity disorder (vs. HS) during impulsivity/inhibition, attention, or working memory tasks Decreased activation in CEN, as well as increased activation in VN, DAN, and DMN, in adult attention-deficit/hyperactivity disorder (vs. HS) during impulsivity/inhibition, attention, or working memory tasks Decreased activation in CEN, SN, and DMN, as well as increased activation

					mainly in DMN and SMN, in comorbidity-free attention-deficit/hyperactivity disorder (vs. HS) during impulsivity/inhibition, attention, or working memory tasks Decreased activation in CEN, DMN, and SN, as well as increased activation in SMN, in medication-naive attention-deficit/hyperactivity disorder (vs. HS) during impulsivity/inhibition, attention, or working memory tasks
Martino et al. (2016)a*	Study	20 BD in mania 20 BD in depression 20 BD in euthymia 40 HS	Mania (BD)	Resting-state fMRI	Increased neuronal variability (standard deviation of BOLD signal) in SMN/DMN ratio (slow5) in manic BD (vs. depressed BD and HS), correlating with manic symptomatology Decreased neuronal variability in SMN/DMN ratio (slow5) in depressed BD (vs. manic and euthymic BD and HS), correlating with depressive symptomatology
Spielberg et al. (2016)	Study	30 BD in hypomania 30 BD in depression 30 HS	Mania (BD)	Resting-state fMRI	Correlation of increased FC in network centered on posterior superior frontal gyrus (including motor cortex), amygdala, and midbrain (including substantia nigra and ventral tegmental area) with manic symptomatology (mainly elated mood) in BD Correlation of increased FC in network centered on posterior medial orbitofrontal cortex with depressive symptomatology (mainly somatic anxiety) in BD
Brady et al. (2017)a	Study	26 BD in mania 21 BD in euthymia 10 BD in mania and	Mania (BD)	Resting-state fMRI	Increased FC between amygdala and supplementary motor area, as well as decreased FC between amygdala and

		euthymia			pregenual anterior cingulate cortex, in manic BD (vs. euthymic BD) (confirmed in longitudinal data)
Brady et al. (2017)b	Study	23 BD in mania 24 BD in euthymia 23 HS	Mania (BD)	Resting-state fMRI	Increased FC in DAN in manic BD (vs. HS and euthymic BD), correlating with manic symptomatology
Zhang et al. (2019)*	Study	30 BD in mania 35 BD in depression 34 BD in euthymia 64 HS	Mania (BD)	Resting-state fMRI	Increased global signal correlation (correlation between global signal and signal in local voxels) in SMN in manic BD (vs. depressed and euthymic BD, and HS), correlating with manic symptomatology Increased global signal correlation in DMN in depressed BD (vs. HS), correlating with depressive symptomatology
Russo et al. (2020)*	Study	36 BD in mania 43 BD in depression 29 BD in euthymia 112 HS	Mania (BD)	Resting-state fMRI	Decreased ReHo and DC (slow4) in DMN (mainly medial prefrontal cortex) in manic BD (vs. HS), correlating with manic symptomatology; decreased FC in DMN areas and relatively increased ReHo in SMN areas in manic BD (vs. HS) Decreased ReHo in SMN (mainly primary sensory-motor cortex) in depressed BD (vs. HS), correlating with depressive symptomatology; decreased FC in SMN areas and relatively increased ReHo and DC in DMN areas in depressed BD (vs. HS) Correlation of increased ReHo in SMN with hyperactivity in BD Correlation of decreased DC in DMN with thought deficit (distractibility and

					flight of ideas) in BD
Martino et al. (2020)*	Study	34 BD in mania 21 BD in inhibited depression 16 BD in agitated depression 29 BD in euthymia 67 HS	Mania/psychomotor hyperactivity (BD)	Resting-state fMRI	Increased FC between thalamus and SMN toward positive values in manic BD (and agitated depressed BD) with psychomotor hyperactivity (vs. HS) Decreased FC of raphe nuclei with basal ganglia/thalamic regions in manic BD with psychomotor hyperactivity (vs. HS) Decreased FC between thalamus and SMN toward around-zero values in depressed BD with psychomotor retardation (vs. HS) Decreased FC of substantia nigra and raphe nuclei with basal ganglia/thalamic regions in depressed BD with psychomotor retardation (vs. HS)
Rey et al. (2021)*	Study	20 BD across phases (20 in euthymia, 12 in depression, and 14 in hypomania) 41 HS	Mania (BD)	Resting-state fMRI	Increased occurrence of sensorimotor-interoceptive CAP (coactivation between amygdala, insula, precentral/postcentral gyrus of rolandic operculum, superior temporal gyrus, middle cingulate cortex, supplementary motor area, and putamen) in hypomanic BD (vs. depressed and euthymic BD), correlating with motor agitation and irritability Increased occurrence of default-mode CAP (coactivation between amygdala, posterior cingulate cortex, medial prefrontal cortex, angular gyrus, and middle temporal gyrus) in depressed BD (vs. manic and euthymic BD and HS)

Magioncalda et al. (2020)*	Study	18 SCZ with psychomotor retardation 20 SCZ with psychomotor hyperactivity 23 SCZ with no psychomotor alterations 19 + 108 HS	Psychomotor hyperactivity (SCZ)	Resting-state fMRI	Increased FC between thalamus and SMN toward positive values in SCZ with psychomotor hyperactivity (vs. HS) Decreased FC of raphe nuclei with basal ganglia/thalamic regions in SCZ with psychomotor hyperactivity (vs. HS) Decreased FC between thalamus and SMN toward around-zero values in SCZ with psychomotor retardation (vs. HS) Decreased FC of substantia nigra and raphe nuclei with basal ganglia/thalamic regions in SCZ with psychomotor retardation (vs. HS)

PSYCHOMOTOR EXCITATION – HYPERKINESIA					
Study	*Type*	*Sample*	*Phenomenal-Behavioral Pattern (Group)*	*Method*	*Results*
Braun et al. (1993)	Study	16 Tourette syndrome 16 HS	Hyperkinesia (Tourette syndrome)	Resting-state PET	Increased CMR in supplementary motor area, lateral premotor cortex, and motor cortex in Tourette syndrome (vs. HS)
Neuner et al. (2014)	Study	36 Tourette syndrome	Hyperkinesia (Tourette syndrome)	Resting-state fMRI	Activation in supplementary motor area, ventral primary motor cortex, primary sensorimotor cortex, and parietal operculum (2 seconds before tic onset); activation in anterior cingulate, insula, putamen, amygdala, cerebellum, and extrastriatal-visual cortex (1 second before tic onset); activation in primary motor cortex and somatosensory cortex, thalamus, central operculum (during tic onset) in Tourette syndrome Correlation of increased FC of supplementary motor area with tic severity in Tourette syndrome
Polyanska et al. (2017)	Meta-analysis	651 Tourette syndrome and HS (13 fMRI studies and 1 PET study)	Hyperkinesia (Tourette syndrome)	Task-based fMRI / PET (motor tasks, sensory tasks, cognitive tasks)	Altered activation in prefrontal cortex, anterior cingulate cortex, and motor cortex (lateral premotor cortex and supplementary motor area), as well as sensory cortex and temporo-parietal association cortex in Tourette syndrome (vs. HS) during motor tasks, sensory tasks, and cognitive tasks Correlation of increased activation in supplementary motor area, precentral gyrus, and middle frontal gyrus across tasks with tic severity in Tourette syndrome

Pini et al. (2020)	Systematic review	266 Huntington's disease, 641 pre-Huntington's disease, and 648 HS (23 fMRI studies)	Hyperkinesia (Huntington's disease)	Resting-state fMRI	Altered FC in SMN (reduced FC in pre-symptomatic stage and increased FC in clinical stage) in Huntington's disease (vs. HS); involvement of other networks during disease progression

PSYCHOMOTOR EXCITATION - CATATONIA (EXCITED)					
Study	*Type*	*Sample*	*Phenomenal-Behavioral Pattern (Group)*	*Method*	*Results*
Haroche et al. (2020)*	Systematic review	186 Catatonia (137 case reports and 18 studies)	Catatonia (SCZ + BD, MDD, other disorders)	MRI / PET / SPECT	Decreased CMR in frontal, temporal, and/or parietal cortex in catatonia (vs. non-catatonic disorders and/or HS) Decreased CBF in frontal, temporal, and/or parietal cortex, as well as increased CBF in premotor and motor cortex, in catatonia (vs. non-catatonic disorders and/or HS) Decreased resting-state activity (e.g., ALFF) in motor cortex and prefrontal cortex in catatonia (vs. non-catatonic disorders and/or HS) Decreased activation in motor cortex, premotor cortex, and prefrontal cortex during tasks in catatonia (vs. non-catatonic disorders and/or HS)
Walther et al. (2017) (included in Haroche et al., 2020)	Study	15 SCZ with catatonia 27 SCZ without catatonia 41 HS	Catatonia (SCZ)	Resting-state ASL-MRI	Increased CBF in supplementary motor area and premotor cortex in SCZ with catatonia (vs. SCZ without catatonia) Increased CBF in supplementary motor area in akinetic catatonia (vs. hyperkinetic catatonia) Correlation of increased CBF in supplementary motor area with catatonia severity

PSYCHOMOTOR INHIBITION - PSYCHOMOTOR RETARDATION					
Study	*Type*	*Sample*	*Phenomenal-Behavioral Pattern (Group)*	*Method*	*Results*
Hickie et al. (1999)	Study	25 MDD	Psychomotor retardation (MDD)	Resting-state SPECT	Correlation of decreased CBF in neostriatum with psychomotor retardation (measured by reaction time during motor task) in MDD
Yin et al. (2018)	Study	30 MDD with psychomotor retardation 30 MDD without psychomotor retardation 30 HS	Psychomotor retardation (MDD)	Resting-state ASL-MRI	Decreased CBF in primary motor cortex in MDD with psychomotor retardation (vs. MDD without psychomotor retardation and HS) Correlation of decreased CBF in motor cortex with psychomotor retardation Increased CBF in motor cortex in MDD with psychomotor retardation in remission at follow-up (vs. same MDD with psychomotor retardation at baseline)
Cantisani et al. (2016)	Study	22 BD in depression 20 MDD in depression 19 HS	Psychomotor retardation (MDD, BD)	Resting-state ASL-MRI	Decreased motor activity (measured by actigraphy) in depressed BD and MDD (vs. HS) Correlation of decreased CBF in precentral gyrus (along with insula and frontal cortex) with decreased motor activity (measured by actigraphy) in depressed BD Increased CBF in middle/superior temporal gyrus (extending to angular gyrus and precentral gyrus) and posterior cingulate cortex/precuneus in depressed BD (vs. depressed MDD and HS)
Kuhn and Gallinat (2013)*	Meta-analysis	220 MDD and 250 HS (6 fMRI studies and 5 PET studies)	Depression (MDD)	Resting-state fMRI / PET / SPECT	Increased ReHo, FC, CMR, and/or CBF in ventromedial prefrontal cortex, ventral striatum, and thalamus, as well

		285 SCZ and 282 HS (8 fMRI studies and 3 PET/SPECT studies)			as decreased ReHo, FC, CMR, and/or CBF in postcentral gyrus, insula, and fusiform gyrus, in MDD (vs. HS) Decreased ReHo, ALFF, FC, CMR, and/or CBF in ventromedial prefrontal cortex, posterior cingulate cortex/precuneus, and hippocampus, as well as increased ReHo, ALFF, FC, CMR, and/or CBF in lingual gyrus, in SCZ (vs. HS)
Iwabuchi et al. (2015)*	Meta-analysis	225 MDD in depression and 230 HS (10 fMRI studies)	Depression (MDD)	Resting-state fMRI	Increased ReHo in medial prefrontal cortex, as well as decreased ReHo in postcentral/precentral gyrus and cuneus (possibly along with superior temporal gyrus, inferior parietal cortex, and cerebellum) in depressed MDD (vs. HS)
Zhang et al. (2017)*	Meta-analysis	747 MDD and 757 HS (30 fMRI studies)	Depression (MDD)	Resting-state fMRI	Increased FC, ALFF, and/or ReHo in insula and dorsomedial prefrontal cortex, as well as decreased FC, ALFF, and/or ReHo in parahippocampal gyrus, orbitofrontal cortex, and postcentral gyrus, in MDD (vs. HS)
Li et al. (2017)a*	Meta-analysis	267 MDD in depression and 280 HS (8 fMRI studies) 198 MDD in depression and 277 HS (8 ASL-MRI, PET, SPECT studies)	Depression (MDD)	Resting-state fMRI / ASL-MRI / PET / SPECT	Increased ALFF in insula, supplementary motor area, medial frontal cortex, and striatum, as well as decreased ALFF in superior temporal gyrus (SMN)†, middle temporal gyrus, inferior frontal cortex, and cerebellum, in depressed MDD (vs. HS) Increased CBF in insula, posterior cingulate cortex/precuneus, hippocampus, and caudate, as well as decreased CBF in inferior frontal gyrus, middle frontal gyrus, and anterior cingulate cortex, in depressed MDD (vs. HS)

					Increased ALFF and CBF (combined) in insula in depressed MDD (vs. HS)
Zhou et al. (2017)*	Meta-analysis	438 MDD in depression and 421 HS (15 fMRI studies)	Depression (MDD)	Resting-state fMRI	Increased ALFF in perigenual anterior cingulate cortex (DMN)† and superior temporal gyrus (SN)†, as well as decreased ALFF in inferior frontal gyrus (CEN)†, middle temporal gyrus (DAN)†, occipital cortex (VN)†, and cerebellum, in depressed MDD (vs. HS) Increased ALFF in perigenual anterior cingulate cortex, inferior parietal lobule, inferior temporal gyrus, and inferior frontal gyrus, as well as decreased ALFF in precentral gyrus and occipital cortex, in medicated depressed MDD (vs. HS) (with increased ALFF in perigenual anterior cingulate cortex correlating with illness duration) Increased ALFF in insula, orbitofrontal cortex, and precentral gyrus, as well as decreased ALFF in inferior frontal gyrus, angular gyrus, and cerebellum, in drug-naive depressed MDD (vs. HS)
Gong et al. (2020)*	Meta-analysis	1399 MDD and 1332 HS (50 fMRI studies) 494 BD and 593 HS (15 fMRI studies)	Depression (MDD)	Resting-state fMRI	Increased ALFF in insula, superior frontal gyrus, anterior cingulate cortex, medial prefrontal cortex, medial orbitofrontal cortex, supramarginal gyrus, and striatum, as well as decreased ALFF in precuneus, occipital cortex, and cerebellum, in MDD including mainly depressed subjects (vs. HS) Increased ALFF in insula, inferior frontal gyrus, superior frontal gyrus,

					medial prefrontal cortex, superior temporal gyrus, and striatum, as well as decreased ALFF in precuneus, occipital cortex, superior temporal gyrus, anterior cingulate cortex, and cerebellum, in BD including depressed, euthymic, and manic subjects together (vs. HS) Increased ALFF in insula and medial prefrontal cortex, as well as decreased ALFF in cerebellum, in depressed MDD and BD (vs. HS)
Drysdale et al. (2017)	Study	333 MDD in depression 378 HS	Depression (MDD)	Resting-state fMRI	Decreased FC mainly in sensorimotor cortex (SMN) and insula (SN), along with orbitofrontal cortex/subgenual anterior cingulate cortex, amygdala, and hippocampus (LN), as well as increased FC mainly in ventromedial prefrontal cortex and posterior cingulate cortex/parahippocampal gyrus (DMN), along with thalamus and basal ganglia, in depressed MDD mainly showing dysphoria, anhedonia, and anergia (vs. HS) Correlation of altered FC mainly in SN areas (insula and ventrolateral prefrontal cortex), CEN areas (lateral frontal and parietal cortex), and LN areas (subgenual anterior cingulate cortex, ventral striatum, amygdala, and hippocampus) with anxiety in depressed MDD Correlation of altered FC mainly in SN areas (insula and anterior cingulate cortex), DMN areas (medial prefrontal cortex and anterior cingulate cortex), and LN areas (orbitofrontal cortex) with anhedonia in depressed MDD

					Decreased FC between SN, DMN, CEN, and LN areas in MDD subtype mainly showing anergia; Increased FC between SN and CEN areas, as well as decreased FC of LN areas, in MDD subtype mainly showing anxiety; Increased FC between SN and CEN areas, along with increased FC of thalamus/basal ganglia, as well as decreased FC of LN areas, in MDD subtype mainly showing anhedonia and psychomotor retardation; Increased FC between SN, CEN, and DMN areas, along with increased FC of thalamus/basal ganglia, as well as decreased FC of LN areas, in MDD subtype mainly showing anhedonia and anxiety
Kaiser et al. (2019)*	Study	23 MDD 22 HS	Depression (MDD)	Resting-state fMRI	Correlation of increased dominance (dwell time and persistence) of SN-DMN CAP (coactivation between insula, dorsolateral prefrontal cortex, medial prefrontal cortex, posterior cingulate cortex, and angular gyrus), decreased dominance (dwell time and persistence) of SMN CAP (coactivation of sensorimotor cortex), and increased transition from SN-DMN CAP to DMN CAP (coactivation of medial prefrontal cortex, posterior cingulate cortex, and temporoparietal junction) with depressive symptomatology in MDD and HS Correlation of increased dominance of SN-DMN CAP and increased transition from SN-DMN CAP to DMN CAP with trait rumination (mainly brooding) in MDD and HS

					(mediating relationship between network dynamics and depressive symptomatology)
Sambataro et al. (2017)	Study	19 MDD in depression 19 HS	Depression (MDD)	Resting-state fMRI Task-based fMRI (cognitive tasks)	Decreased FC within CEN (dorsolateral prefrontal cortex) and altered FC within DMN (decreased FC in parahippocampus, temporo-parietal cortex, and posterior cingulate cortex, as well as increased FC in precuneus), as well as decreased ALFF in SMN (precentral/postcentral gyrus, middle cingulate cortex, and cerebellum) and DAN, in depressed MDD (vs. HS) Decreased ALFF in SMN and DAN, as well as increased ALFF in SN, in depressed MDD (vs. HS) during (goal-directed low demanding cognitive) task
Sarkheil et al. (2017)	Study	25 MDD in depression 15 HS	Depression (MDD)	Task-based fMRI (motor tasks)	Decreased FC of supplementary motor area with basal ganglia (as well as increased FC of supplementary motor area with visual cortex, precuneus, and postcentral gyrus) in depressed MDD (vs. HS) during motor task (finger tapping at 4 Hz) Increased FC of supplementary motor area with visual cortex, somatomotor cortex, angular gyrus and posterior cingulate cortex, insula and anterior cingulate cortex, and cerebellum in depressed MDD (vs. HS) during motor task (finger tapping at 1 and 2 Hz)
Liu et al. (2012)a*	Study	26 BD in depression 26 HS	Depression (BD)	Resting-state fMRI	Decreased ALFF in postcentral gyrus and parahippocampal gyrus (possibly along with cerebellum), as well as increased ALFF in insula, inferior frontal gyrus, inferior parietal lobule, middle temporal gyrus, and caudate, in depressed BD (vs. HS)

Martino et al. (2016)a*	Study	20 BD in mania 20 BD in depression 20 BD in euthymia 40 HS	Depression (BD)	Resting-state fMRI	Increased neuronal variability (standard deviation of BOLD signal) in SMN/DMN ratio (slow5) in manic BD (vs. depressed BD and HS), correlating with manic symptomatology Decreased neuronal variability in SMN/DMN ratio (slow5) in depressed BD (vs. manic and euthymic BD and HS), correlating with depressive symptomatology
Russo et al. (2020)*	Study	36 BD in mania 43 BD in depression 29 BD in euthymia 112 HS	Depression (BD)	Resting-state fMRI	Decreased ReHo and DC (slow4) in DMN (mainly medial prefrontal cortex) in manic BD (vs. HS), correlating with manic symptomatology; decreased FC in DMN areas and relatively increased ReHo in SMN areas in manic BD (vs. HS) Decreased ReHo in SMN (mainly primary sensory-motor cortex) in depressed BD (vs. HS), correlating with depressive symptomatology; decreased FC in SMN areas and relatively increased ReHo and DC in DMN areas in depressed BD (vs. HS) Correlation of increased ReHo in SMN with hyperactivity in BD Correlation of decreased DC in DMN with thought deficit (distractibility and flight of ideas) in BD
Martino et al. (2020)*	Study	34 BD in mania 21 BD in inhibited depression 16 BD in agitated depression 29 BD in euthymia	Depression/psychomotor retardation (BD)	Resting-state fMRI	Increased FC between thalamus and SMN toward positive values in manic BD (and agitated depressed BD) with psychomotor hyperactivity (vs. HS) Decreased FC of raphe nuclei with

		67 HS			basal ganglia/thalamic regions in manic BD with psychomotor hyperactivity (vs. HS) Decreased FC between thalamus and SMN toward around-zero values in depressed BD with psychomotor retardation (vs. HS) Decreased FC of substantia nigra and raphe nuclei with basal ganglia/thalamic regions in depressed BD with psychomotor retardation (vs. HS)
Walther et al. (2011)	Study	11 SCZ 14 HS	Psychomotor retardation (SCZ)	Resting-state ASL-MRI	Correlation of increased CBF in primary motor cortex, cingulate motor area, and dorsolateral prefrontal cortex with motor activity (measured by actigraphy) in SCZ
Magioncalda et al. (2020)*	Study	18 SCZ with psychomotor retardation 20 SCZ with psychomotor hyperactivity 23 SCZ with no psychomotor alterations 19 + 108 HS	Psychomotor retardation (SCZ)	Resting-state fMRI	Increased FC between thalamus and SMN toward positive values in SCZ with psychomotor hyperactivity (vs. HS) Decreased FC of raphe nuclei with basal ganglia/thalamic regions in SCZ with psychomotor hyperactivity (vs. HS) Decreased FC between thalamus and SMN toward around-zero values in SCZ with psychomotor retardation (vs. HS) Decreased FC of substantia nigra and raphe nuclei with basal ganglia/thalamic regions in SCZ with psychomotor retardation (vs. HS)

Xu et al. (2015)	Meta-analysis	655 SCZ and 660 HS (10 fMRI studies)	Schizophrenic symptomatology (SCZ)	Resting-state fMRI	Decreased ALFF in postcentral/precentral gyrus and superior temporal gyrus (along with occipital cortex, insula, posterior parietal cortex, and medial orbitofrontal cortex), as well as increased ALFF in inferior frontal gyrus, medial temporal cortex, and striatum (along with occipital cortex, insula, posterior parietal cortex, and medial prefrontal cortex), in SCZ (vs. HS) Decreased ReHo in postcentral gyrus, superior temporal gyrus, occipital cortex, medial orbitofrontal cortex, posterior parietal cortex, and medial temporal cortex, as well as increased ReHo in anterior cingulate cortex, insula, and inferior frontal gyrus, in SCZ (vs. HS)
Li et al. (2017)b*	Meta-analysis	343 SCZ and 446 HS (5 fMRI studies)	Schizophrenic symptomatology (SCZ)	Resting-state fMRI	Increased FC in inferior frontal gyrus, superior frontal gyrus, middle frontal gyrus, orbitofrontal cortex, medial prefrontal cortex, anterior cingulate cortex, precuneus, posterior cingulate cortex, angular gyrus, middle temporal gyrus, and temporal pole, as well as decreased FC in precentral gyrus, postcentral gyrus, and fusiform gyrus, in first-episode SCZ (vs. HS) Decreased FC of thalamus with middle frontal gyrus, superior frontal gyrus, orbitofrontal cortex, anterior cingulate cortex, angular gyrus, and inferior parietal lobule (along with decreased FC of basal ganglia with posterior cingulate cortex, middle frontal gyrus, angular gyrus, and inferior parietal lobule), as well as increased FC of

					thalamus with precentral gyrus, postcentral gyrus, rolandic operculum, superior/middle temporal gyrus, fusiform/lingual gyrus, occipital cortex, and parahippocampal gyrus (along with increased FC of basal ganglia with middle temporal gyrus, postcentral gyrus, and occipital cortex), in chronic SCZ (vs. HS) Correlation (mainly) of decreased FC between thalamus and middle frontal gyrus/superior medial frontal gyrus (as well as increased FC between thalamus and postcentral gyrus) with psychotic symptomatology (mainly delusions) in chronic SCZ
Dong et al. (2018)a*	Meta-analysis	2115 SCZ and 2297 HS (52 fMRI studies)	Schizophrenic symptomatology (SCZ)	Resting-state fMRI	Decreased FC within DMN (mainly medial prefrontal cortex), SMN (mainly superior temporal gyrus), SN (mainly anterior cingulate cortex and putamen), and LN (mainly orbitofrontal cortex), as well as increased FC between LN and striatum, in SCZ (vs. HS) Decreased FC between DMN, CEN, SN, thalamus, and cerebellum in SCZ (vs. HS)
Gong et al. (2019)*	Meta-analysis	1249 SCZ and 1179 HS (24 fMRI studies)	Schizophrenic symptomatology (SCZ)	Resting-state fMRI	Decreased ALFF in DMN areas (precuneus and inferior parietal gyrus), SMN areas (postcentral gyrus), and VN areas (occipital cortex), as well as increased ALFF in SN areas (anterior cingulate cortex and inferior frontal gyrus) along with inferior temporal gyrus and putamen, in SCZ (vs. HS) Decreased ALFF in DMN areas (medial prefrontal cortex, precuneus,

					and inferior parietal gyrus), as well as increased ALFF in putamen, in first-episode SCZ (vs. HS) Decreased ALFF in DMN areas (precuneus), SMN areas (postcentral gyrus), and VN areas (occipital cortex), as well as increased ALFF in SN areas (insula, anterior cingulate cortex, and inferior frontal gyrus) along with inferior temporal gyrus, superior frontal gyrus, and amygdala, in chronic SCZ (vs. HS)
Zhao et al. (2014)	Meta-analysis	155 SCZ/Psychotic disorders and 159 HS (15 fMRI studies)	Schizophrenic symptomatology (SCZ/Psychotic disorders)	Task-based fMRI (motor tasks)	Decreased activation in putamen-pallidum, inferior frontal gyrus, and cerebellum, as well as increased activation in superior temporal gyrus and precuneus, in SCZ/psychotic disorders (vs. HS) during motor tasks Absence of activation in premotor cortex and visual cortex in SCZ/psychotic disorders (vs. activation in HS) during motor tasks
Kompus et al. (2011)*	Meta-analysis	103 SCZ with hallucinations (10 fMRI studies and 2 PET studies using hallucination capture) 204 SCZ with hallucinations and 170 HS (9 fMRI studies and 2 PET studies using exteroceptive stimulation)	Exterocective deficit (SCZ)	fMRI / PET (hallucination capture) Task-based fMRI / PET (exteroceptive stimulation)	Increased activation in superior temporal gyrus/primary auditory cortex, middle temporal gyrus, inferior parietal lobule, inferior frontal gyrus, superior frontal gyrus, insula, and hippocampus (possibly along with precentral/postcentral gyrus and cerebellum) in SCZ during auditory hallucinations (vs. same subjects during absence of hallucinations) Decreased activation in superior temporal gyrus/primary auditory cortex, anterior cingulate cortex, superior frontal gyrus, retrosplenial cortex/hippocampus, and thalamus in SCZ with auditory hallucinations (vs.

					HS) during exteroceptive auditory stimulation
Kuhn and Gallinat (2012)*	Meta-analysis	85 SCZ with hallucinations (8 fMRI studies and 2 PET studies using hallucination capture) 120 SCZ and 69 HS (6 fMRI studies and 1 PET study using verbal tasks)	Exteroceptive deficit (SCZ)	fMRI / PET (hallucination capture) Task-based fMRI / PET (verbal tasks)	Increased activation in inferior parietal lobule/parietal operculum, inferior frontal gyrus, and postcentral gyrus in SCZ during auditory hallucinations (vs. same subjects during absence of hallucinations) Decreased activation in superior temporal gyrus, middle temporal gyrus, anterior cingulate cortex, and premotor cortex in SCZ with auditory hallucinations (vs. SCZ without auditory hallucinations and HS) during verbal tasks
Richards et al. (2021)	Systematic review	305 SCZ/Psychotic disorders with hallucinations, 32 Subclinical conditions with hallucinations, 175 SCZ/Psychotic disorders without hallucinations, and 331 HS (28 studies)	Exteroceptive deficit (SCZ/Psychotic disorders, Subclinical conditions with hallucinations)	Task-based fMRI / PET (exteroceptive stimulation)	Decreased activation in superior temporal gyrus/primary auditory cortex and decreased FC in primary auditory cortex (possibly along with increased activation in supramarginal gyrus and increased FC between auditory cortex and DMN regions) in SCZ/psychotic disorders and subclinical conditions with auditory hallucinations (mainly showing exteroceptive deficits) (vs. SCZ/psychotic disorders without hallucinations and HS) during exteroceptive auditory stimulation (processing of sounds, words, and sentences)
Rocchi et al. (2020)*	Systematic Review	153 HS (8 phMRI studies and 2 PET studies)	Substance-induced symptomatology (Substance use: opioids)	phMRI / PET (opioid administration)	Increased activation and/or FC in SN areas (e.g., insula and supragenual anterior cingulate cortex) along with nucleus accumbens and amygdala, as well as decreased activation and/or FC in SMN areas (e.g., primary sensory-motor cortex) and DMN areas (e.g., medial prefrontal cortex, posterior

	cingulate cortex, and temporoparietal junction), in HS during low-dose opioid infusion Decreased activation in SN areas (e.g., insula and anterior cingulate cortex) and SMN areas (e.g., primary sensory-motor cortex), as well as increased activation in DMN areas (e.g., medial prefrontal cortex, posterior cingulate cortex, and temporoparietal junction), in HS during high-dose opioid infusion (e.g., opioid infusion after painful stimulation)

PSYCHOMOTOR INHIBITION – HYPOKINESIA					
Study	*Type*	*Sample*	*Phenomenal-Behavioral Pattern (Group)*	*Method*	*Results*
Pan et al. (2017)a	Meta-analysis	421 Parkinson's disease and 381 HS (11 fMRI studies)	Hypokinesia (Parkinson's disease)	Resting-state fMRI	Decreased ALFF in supplementary motor areas, premotor cortex, and putamen (while increased ALFF in inferior parietal gyrus) in Parkinson's disease (vs. HS) Correlation of decreased ALFF in supplementary motor area and increased ALFF in inferior parietal gyrus with Parkinson's symptomatology
Pan et al. (2017)b	Meta-analysis	212 Parkinson's disease and 182 HS (11 fMRI studies)	Hypokinesia (Parkinson's disease)	Resting-state fMRI	Decreased ReHo in precentral gyrus, putamen, and lingual gyrus (while increased ReHo in inferior parietal gyrus, medial prefrontal cortex, and cerebellum) in Parkinson's disease (vs. HS)
Xing et al. (2020)	Meta-analysis	657 Parkinson's disease and 1024 HS (126 studies)	Hypokinesia (Parkinson's disease)	Task-based fMRI / PET / SPECT (motor tasks)	Decreased activation in supplementary motor area, putamen, subthalamic nucleus, and thalamus in non-medicated Parkinson's disease (vs. HS) during motor tasks Correlation of decreased activation in supplementary motor area with Parkinson's symptomatology Increased activation in supplementary motor area and primary motor cortex in medicated (dopa) Parkinson's disease (vs. HS) during motor tasks
Kawabata et al. (2020)	Study	48 Parkinson's disease 48 HS	Exteroceptive deficit (Parkinson's disease)	Resting-state fMRI	Decreased visual perception in Parkinson's disease (vs. HS) visuoperceptual tasks Decreased FC within occipital primary

	visual cortex, along with decreased FC of primary visual cortex with calcarine sulcus and lingual gyrus (as well as increased FC between primary visual cortex and thalamus) in Parkinson's disease with visual perception deficit (vs. Parkinson's disease without visual perception deficit and HS)

PSYCHOMOTOR INHIBITION - CATATONIA (INHIBITED)					
Study	*Type*	*Sample*	*Phenomenal-Behavioral Pattern (Group)*	*Method*	*Results*
Haroche et al. (2020)*	Systematic review	186 Catatonia (137 case reports and 18 studies)	Catatonia (SCZ + BD, MDD, other disorders)	MRI / PET / SPECT	Decreased CMR in frontal, temporal, and/or parietal cortex in catatonia (vs. non-catatonic disorders and/or HS) Decreased CBF in frontal, temporal, and/or parietal cortex, as well as increased CBF in premotor and motor cortex, in catatonia (vs. non-catatonic disorders and/or HS) Decreased resting-state activity (e.g., ALFF) in motor cortex and prefrontal cortex in catatonia (vs. non-catatonic disorders and/or HS) Decreased activation in motor cortex, premotor cortex, and prefrontal cortex during tasks in catatonia (vs. non-catatonic disorders and/or HS)
Hirjak et al. (2020) (included in Haroche et al., 2020)	Study	24 SCZ with catatonia 22 SCZ without catatonia	Catatonia (SCZ)	Resting-state fMRI	Decreased ALFF in regions within frontotemporal/cortical motor network and frontoparietal network in SCZ with catatonia (vs. SCZ without catatonia) Correlation of altered ALFF in prefrontal/cortical motor network with behavioral catatonic symptomatology Correlation of altered ALFF in frontotemporal and frontoparietal networks with affective catatonic symptomatology

AFFECTIVE DIMENSION					
AFFECTIVE EXCITATION – ANXIETY					
Study	*Type*	*Sample*	*Phenomenal-Behavioral Pattern (Group)*	*Method*	*Results*
Seeley et al. (2007)	Study	14 HS	Anxiety (HS)	Resting-state fMRI	Correlation of increased FC in SN (supragenual anterior cingulate cortex and insula) with (state) anxiety in HS Correlation of increased FC in CEN (dorsolateral prefrontal cortex and posterior parietal cortex) with executive task performance in HS
Markett et al. (2013)	Study	23 HS	Anxiety (HS)	Resting-state fMRI	Correlation of increased FC in SN (between insula and anterior cingulate cortex/dorsolateral prefrontal cortex) with (trait) anxiety (harm avoidance) in HS
Wu et al. (2021)	Study	58 HS 29 MDD	Anxious-depressive-irritable temperament (HS)	Resting-state fMRI	Correlation of increased ALFF in anterior insula with anxious-depressive-irritable temperament level in HS (and MDD) Correlation of decreased ALFF in anterior insula with hyperthymic temperament level in HS (and MDD)
Fullana et al. (2016)	Meta-analysis	677 HS (27 fMRI studies)	Anxiety (HS)	Task-based fMRI (anxiety induction)	Increased activation mainly in anterior insula, supragenual anterior cingulate cortex, and ventral striatum/ventral tegmental area, along with thalamus, sensorimotor cortex, dorsolateral prefrontal cortex, precuneus, and cerebellum, as well as decreased activation in medial prefrontal cortex, posterior cingulate cortex, inferior parietal lobule, and others areas, in HS during anxiety induction by fear conditioning (comparing activation induced by fear-conditioned stimulus vs. unconditioned stimulus)

Andrzejewski et al. (2019)	Meta-analysis	2587 HS (63 fMRI studies)	Anxiety (HS)	Task-based fMRI (anxiety induction)	Increased activation in anterior insula, anterior cingulate cortex, amygdala, middle cingulate cortex, thalamus, caudate, and parahippocampal gyrus in HS during anxiety induction by aversive anticipation (increased activation in anterior insula, anterior cingulate cortex, and amygdala during aversive anticipation like during reward anticipation)
Weber-Goericke et al. (2019)*	Meta-analysis	264 HS with high worry and 267 HS (16 fMRI studies)	Anxiety (HS)	Task-based fMRI (affective tasks)	Increased activation in cluster comprising anterior insula, inferior frontal gyrus, and middle frontal gyrus (showing increased FC with SN and DMN) in HS with high worry (vs. HS with low worry) during affective tasks
Etkin and Wager (2007)	Meta-analysis	314 HS, 92 Specific phobia, 93 Social anxiety disorder, and 172 Post-traumatic stress disorder (20 fMRI studies and 10 PET studies)	Anxiety (HS / Anxiety-related disorders: Specific phobia, Social anxiety disorder, Post-traumatic stress disorder)	Task-based fMRI / PET (anxiety induction, affective tasks)	Increased activation mainly in insula, amygdala, fusiform gyrus, middle cingulate cortex, and substantia nigra in specific phobia (vs. HS) during anxiety induction or affective tasks (comparing negative affective processing vs. baseline, neutral affective processing, or positive affective processing) Increased activation mainly in insula, amygdala, globus pallidus, parahippocampal gyrus, fusiform gyrus, inferior frontal gyrus, and superior temporal gyrus in social anxiety disorder (vs. HS) during anxiety induction or affective tasks Increased activation mainly in insula, amygdala, parahippocampal gyrus, middle cingulate cortex, inferior parietal lobule, and precuneus (along with decreased activation in rostral/supragenual anterior cingulate

					cortex and ventromedial prefrontal cortex) in post-traumatic stress disorder (vs. HS) during anxiety induction or affective tasks Increased activation mainly in insula and amygdala in HS during fear conditioning (comparing activation induced by fear-conditioned stimulus vs. unconditioned stimulus) Increased activation in insula and amygdala consistently associated with all anxiety-related conditions (more frequently in specific phobia and social anxiety disorder than post-traumatic stress disorder)
Chavanne and Robinson (2021)	Meta-analysis	2348 HS, 414 Specific phobia, 805 Social anxiety disorder, 233 Generalized anxiety disorder, 263 Panic disorder, and 436 Post-traumatic stress disorder (138 fMRI studies)	Anxiety (HS / Anxiety-related disorders: Specific phobia, Social anxiety disorder, Generalized anxiety disorder, Panic disorder, Post-traumatic stress disorder)	Task-based fMRI (anxiety induction, affective tasks)	Increased activation mainly in insula, anterior/middle cingulate cortex, inferior frontal gyrus, amygdala, parahippocampal gyrus, hippocampus, middle and superior temporal gyrus, lingual/fusiform gyrus, thalamus, and periaqueductal gray in anxiety-related disorders (specific phobia, social anxiety disorder, generalized anxiety disorder, panic disorder, and post-traumatic stress disorder) (vs. HS) during anxiety induction or affective tasks Increased activation mainly in anterior insula, inferior frontal gyrus, cingulate cortex, medial frontal cortex, and periaqueductal gray in HS during anxiety induction (comparing unpredictable-threat condition vs. safe condition) (overlapping activation pattern during fear conditioning) Increased activation in insula, inferior

					frontal gyrus, anterior/middle cingulate cortex, medial frontal cortex, and periaqueductal gray associated with all anxiety-related conditions (both induced and pathological anxiety) Increased activation mainly in insula, inferior frontal gyrus, and putamen, along with cingulate cortex and medial prefrontal cortex, in specific phobia (vs. HS) (representing the most similar pattern of activation with respect to induced anxiety); increased activation mainly in insula and inferior frontal gyrus in social anxiety disorder, panic disorder, and post-traumatic stress disorder (vs. HS); decreased activation mainly in anterior/middle cingulate cortex in generalized anxiety disorder (vs. HS) (representing the less similar pattern of activation to induced anxiety)
Rasgon et al. (2017)*	Meta-analysis	1186 Obsessive-compulsive disorder and 1159 HS (54 fMRI studies)	Obsessive-compulsive symptomatology (Obsessive-compulsive disorder)	Task-based fMRI (obsessive-compulsive symptom provocation, affective tasks, cognitive tasks)	Increased activation in insula, caudate head, putamen, and perigenual anterior cingulate cortex (as well as decreased activation in middle frontal gyrus and posterior caudate) in obsessive-compulsive disorder (vs. HS) during symptom provocation and affective tasks Increased activation in posterior cingulate cortex (as well as decreased activation in pallidum, ventral anterior thalamus, and posterior caudate) in obsessive-compulsive disorder (vs. HS) during cognitive tasks
Thorsen et al. (2018)*	Meta-analysis	571 Obsessive-compulsive disorder and 564 HS (25 studies)	Obsessive-compulsive symptomatology (Obsessive-compulsive	Task-based fMRI / PET (obsessive-compulsive symptom provocation,	Increased activation in medial prefrontal cortex (including orbitofrontal cortex, ventromedial

			disorder)	affective tasks)	prefrontal cortex, and subgenual anterior cingulate cortex), middle temporal gyrus, inferior occipital gyrus, putamen, and amygdala in obsessive-compulsive disorder (vs. HS) during symptom provocation and affective tasks Correlation of increased activation in medial prefrontal cortex, subgenual anterior cingulate cortex, and precuneus with obsessive-compulsive symptomatology in obsessive-compulsive disorder Correlation of increased activation in insula and putamen (as well as decreased activation in ventromedial prefrontal cortex) with anxious-depressive symptomatology in obsessive-compulsive disorder
Zhu et al. (2012)	Meta-analysis	248 Anorexia nervosa and 241 HS (17 fMRI studies)	Anorexic symptomatology (Anorexia nervosa)	Task-based fMRI (anorexic symptom provocation)	Increased activation in insula, precentral/postcentral gyrus, paracentral lobule, and uncus (as well as decreased activation in inferior parietal area) in anorexia nervosa (vs. HS) during symptom provocation (processing of body stimuli) Increased activation in anterior cingulate cortex and caudate (as well as decreased activation in inferior parietal area) in anorexia nervosa (vs. HS) during symptom provocation (processing of food stimuli)
Cui et al. (2020)	Study	34 Generalized anxiety disorder 30 HS	Interoceptive increase (Generalized anxiety disorder)	Task-based fMRI (interoceptive tasks) Resting-state fMRI	Increased interoception in generalized anxiety disorder (vs. HS) Increased activation in insula in generalized anxiety disorder (vs. HS)

during interoceptive tasks Correlation of increased activation in insula with interoception in generalized anxiety disorder during interoceptive tasks Correlation of decreased FC between insula and medial prefrontal cortex with somatic anxiety in generalized anxiety disorder

AFFECTIVE EXCITATION - DYSPHORIA AND EUPHORIA					
Study	*Type*	*Sample*	*Phenomenal-Behavioral Pattern (Group)*	*Method*	*Results*
Xu et al. (2020)	Meta-analysis	3816 HS (200 fMRI studies)	Pain (HS)	Task-based fMRI (pain induction)	Increased activation in insula, anterior cingulate cortex, secondary somatosensory cortex, inferior parietal lobule, and thalamus in HS during pain induction (any type or location) (vs. HS during baseline or innocuous stimulation)
Wager et al. (2015)	Meta-analysis	2159 HS (148 studies)	Sadness-happiness (HS)	Task-based fMRI / PET (affective tasks)	Increased activation in insula, anterior cingulate cortex, ventral striatum, orbitofrontal cortex, amygdala, and brainstem in HS during processing of all emotions, i.e., sadness, happiness, disgust, fear, and anger (configuration of activation patterns across subcortical-cortical or network areas, rather than activation in single region or system, characterizing different emotions) Increased activation mainly in SN areas, primarily cingulo-insular regions (possibly along with SMN and VN areas) in HS during sadness (and disgust), as well as happiness (dominant internal orientation-interoceptive profile of emotion-related brain activation) Increased activation in DAN, VN, and DMN areas (possibly along with CEN and LN areas) in HS during fear and anger (increased contribution of external orientation-exteroceptive profile of emotion-related brain activation) Decreased intracortical coactivation, as well as decreased coactivation between

					cortex, basal ganglia, and cerebellum, during sadness and fear Increased intracortical coactivation, as well as decreased coactivation between cortex, basal ganglia, and cerebellum, during happiness Increased intracortical coactivation, as well as increased coactivation between cortex, basal ganglia, and cerebellum, during anger Increased coactivation between cortex and basal ganglia during disgust
Mayberg et al. (1999)	Study	8 HS 8 MDD	Sadness/dysphoria (HS / MDD)	Resting-state PET	Increased CBF in insula and subgenual cingulate cortex, as well as decreased CBF in dorsal prefrontal cortex, inferior parietal cortex, supragenual anterior cingulate cortex, and posterior cingulate cortex, in HS during sadness induction Decreased CMR in insula and subgenual cingulate cortex, as well as increased CMR in dorsal prefrontal cortex, inferior parietal cortex, supragenual anterior cingulate cortex, and posterior cingulate cortex, in MDD with dysphoric symptomatology in remission at follow-up (vs. same subjects with dysphoric symptomatology at baseline) Correlation of decreased activity in subgenual cingulate cortex and increased activity in dorsolateral prefrontal cortex Overlap of brain activity pattern between physiologic and pathologic dysphoric states

Li et al. (2017)a*	Meta-analysis	267 MDD in depression and 280 HS (8 fMRI studies) 198 MDD in depression and 277 HS (8 ASL-MRI, PET, SPECT studies)	Depression (MDD)	Resting-state fMRI / ASL-MRI / PET / SPECT	Increased ALFF in insula, supplementary motor area, medial frontal cortex, and striatum, as well as decreased ALFF in superior temporal gyrus (SMN)†, middle temporal gyrus, inferior frontal cortex, and cerebellum, in depressed MDD (vs. HS) Increased CBF in insula, posterior cingulate cortex/precuneus, hippocampus, and caudate, as well as decreased CBF in inferior frontal gyrus, middle frontal gyrus, and anterior cingulate cortex, in depressed MDD (vs. HS) Increased ALFF and CBF (combined) in insula in depressed MDD (vs. HS)
Zhang et al. (2017)*	Meta-analysis	747 MDD and 757 HS (30 fMRI studies)	Depression (MDD)	Resting-state fMRI	Increased FC, ALFF, and/or ReHo in insula and dorsomedial prefrontal cortex, as well as decreased FC, ALFF, and/or ReHo in parahippocampal gyrus, orbitofrontal cortex, and postcentral gyrus, in MDD (vs. HS)
Gong et al. (2020)*	Meta-analysis	1399 MDD and 1332 HS (50 fMRI studies) 494 BD and 593 HS (15 fMRI studies)	Depression (MDD)	Resting-state fMRI	Increased ALFF in insula, superior frontal gyrus, anterior cingulate cortex, medial prefrontal cortex, medial orbitofrontal cortex, supramarginal gyrus, and striatum, as well as decreased ALFF in precuneus, occipital cortex, and cerebellum, in MDD including mainly depressed subjects (vs. HS) Increased ALFF in insula, inferior frontal gyrus, superior frontal gyrus, medial prefrontal cortex, superior temporal gyrus, and striatum, as well as decreased ALFF in precuneus, occipital cortex, superior temporal

					gyrus, anterior cingulate cortex, and cerebellum, in BD including depressed, euthymic, and manic subjects together (vs. HS) Increased ALFF in insula and medial prefrontal cortex, as well as decreased ALFF in cerebellum, in depressed MDD and BD (vs. HS)
Pastrnak et al. (2021)	Meta-analysis	296 MDD in depression and 234 BD in depression (10 fMRI studies)	Depression (MDD + BD)	Resting-state fMRI	Increased ALFF, ReHo, and/or DC in insula (and claustrum) in depressed MDD (vs. depressed BD)
Kaiser et al. (2019)*	Study	23 MDD 22 HS	Depression (MDD)	Resting-state fMRI	Correlation of increased dominance (dwell time and persistence) of SN-DMN CAP (coactivation between insula, dorsolateral prefrontal cortex, medial prefrontal cortex, posterior cingulate cortex, and angular gyrus), decreased dominance (dwell time and persistence) of SMN CAP (coactivation of sensorimotor cortex), and increased transition from SN-DMN CAP to DMN CAP (coactivation of medial prefrontal cortex, posterior cingulate cortex, and temporoparietal junction) with depressive symptomatology in MDD and HS Correlation of increased dominance of SN-DMN CAP and increased transition from SN-DMN CAP to DMN CAP with trait rumination (mainly brooding) in MDD and HS (mediating relationship between network dynamics and depressive symptomatology)
Hamilton et al. (2012)	Meta-analysis	351 MDD in depression and 354 HS (24 fMRI studies)	Depression (MDD)	Task-based fMRI (affective tasks) Resting-state PET /	Increased activation in insula, supragenual anterior cingulate cortex, and amygdala, as well as decreased

		299 MDD in depression and 300 HS (14 PET/SPECT studies)		SPECT	activation in dorsolateral prefrontal cortex and dorsal striatum, in depressed MDD (vs. HS) during affective tasks (processing of negative stimuli and induction of negative affects) Increased CBF in pulvinar in depressed MDD (vs. HS)
Groenewold et al. (2013)	Meta-analysis	795 MDD in depression and 792 HS (44 fMRI studies)	Depression (MDD)	Task-based fMRI (affective tasks)	Increased activation in basal temporal-occipital cortex, putamen, insula, supragenual anterior cingulate cortex, and cerebellum, as well as decreased activation in dorsolateral prefrontal cortex, in depressed MDD (vs. HS) during affective processing of negative stimuli and induction of negative affects Increased activation in orbitofrontal cortex, hippocampus, and lingual gyrus, as well as decreased activation in anterior cingulate cortex, insula, striatum, amygdala, and cerebellum, in depressed MDD (vs. HS) during affective processing of positive stimuli and induction of positive affects
Li and Wang (2021)	Meta-analysis	1141 MDD in depression and 1242 HS (44 fMRI studies)	Depression (MDD)	Task-based fMRI (affective tasks)	Altered activation in insula, anterior cingulate cortex, superior/middle temporal gyrus, and occipital cortex in depressed MDD (vs. HS) during affective processing of negative and/or positive stimuli Increased activation in insula (along with superior temporal gyrus and rolandic operculum) in depressed (adult and youth) MDD (vs. HS) during affective processing of negative and/or positive stimuli

					Increased activation in insula in depressed (adult) MDD (vs. HS) during affective processing of negative and positive stimuli Increased activation in insula, middle frontal gyrus, and hippocampus, as well as decreased activation in striatum, occipital cortex, and middle temporal gyrus in depressed adult MDD (vs. depressed youth MDD) during affective processing of negative and/or positive stimuli
Liu et al. (2012)a*	Study	26 BD in depression 26 HS	Depression (BD)	Resting-state fMRI	Decreased ALFF in postcentral gyrus and parahippocampal gyrus (possibly along with cerebellum), as well as increased ALFF in insula, inferior frontal gyrus, inferior parietal lobule, middle temporal gyrus, and caudate, in depressed BD (vs. HS)
Leibenluft (2020)	Review	HS, Disruptive/impulse-control/conduct disorders, Anxiety disorders, Autism, Attention-deficit/hyperactivity disorder, MDD, and BD	Irritability (HS / Disruptive/impulse-control/conduct disorders, Anxiety disorders, Autism, Attention-deficit/hyperactivity disorder, MDD, BD)	Resting-state fMRI Task-based fMRI	Increased resting-state activity and task-based activation mainly in amygdala, striatum, anterior cingulate cortex, insula, medial prefrontal cortex, and association cortex (possibly mediating hyper-reactivity to threat) in HS or disorders with irritability
Rey et al. (2021)*	Study	20 BD across phases (20 in euthymia, 12 in depression, and 14 in hypomania) 41 HS	Mania (BD)	Resting-state fMRI	Increased occurrence of sensorimotor-interoceptive CAP (coactivation between amygdala, insula, precentral/postcentral gyrus of rolandic operculum, superior temporal gyrus, middle cingulate cortex, supplementary motor area, and putamen) in hypomanic BD (vs. depressed and euthymic BD), correlating with motor agitation and irritability

					Increased occurrence of default-mode CAP (coactivation between amygdala, posterior cingulate cortex, medial prefrontal cortex, angular gyrus, and middle temporal gyrus) in depressed BD (vs. manic and euthymic BD and HS)
Balthazar et al. (2014)	Study	20 Alzheimer's disease 17 HS	Irritability (Alzheimer's disease)	Resting-state fMRI	Increased FC within SN, as well as decreased FC within DMN, in Alzheimer's disease (vs. HS) Correlation of increased FC within SN (anterior cingulate cortex and insula) with hyperactivity syndrome (irritability, agitation, aberrant motor behavior, euphoria, and disinhibition) in Alzheimer's disease
Sescousse et al. (2013)	Meta-analysis	1452 HS (87 studies)	Pleasure (HS)	Task-based fMRI / PET (pleasure induction)	Increased activation in anterior insula, ventromedial prefrontal cortex, ventral striatum, amygdala, and mediodorsal thalamus in HS during pleasure induction by processing of erotic, food, and monetary stimuli Increased activation mainly in anterior insula in HS during processing of erotic and food stimuli (processing of primary rewards) Increased activation mainly in orbitofrontal cortex in HS during processing of money stimuli (processing of secondary/abstract rewards)
Reynaud et al. (2010)	Review	HS	Pleasure (HS)	Task-based fMRI / others (pleasure induction)	Increased activation in ventral tegmental area, ventral striatum/nucleus accumbens, anterior cingulate cortex, insula, orbitofrontal cortex, and prefrontal cortex in HS

					during processing of sexual stimuli (e.g., viewing sexually explicit videos) (like during substance use, e.g., alcohol, opioids, cocaine, cannabis, and nicotine use) Increased activation mainly in insula and cingulate cortex in HS during orgasm Increased activation in ventral tegmental area, caudate, anterior cingulate cortex, and insula in HS deeply in love (during viewing picture of the loved one) Decreased activation in ventral striatum, anterior cingulate cortex, insula, orbitofrontal cortex, and prefrontal cortex (mainly left side), as well as increased activation in associative areas (e.g., posterior cingulate cortex and middle temporal gyrus), in HS deeply heartbroken
Noori et al. (2016)*	Meta-analysis	2557 HS and 3016 Addictive disorders (163 fMRI studies, 11 PET studies, and 2 SPECT studies)	Pleasure (HS / Addictive disorders: alcohol, nicotine, cocaine, heroin, cannabis, gambling)	Task-based fMRI / PET / SPECT (pleasure induction, addictive symptom provocation)	Increased activation in insula, anterior cingulate cortex, inferior frontal gyrus, middle frontal gyrus, caudate head, amygdala, parahippocampal gyrus, substantia nigra, and cerebellum in HS during pleasure induction (exposure to natural stimuli like sex and food) and addictive disorders during addictive symptom provocation (exposure to drug/gambling cues) Additional increased activation in medial prefrontal cortex, posterior cingulate cortex, middle temporal gyrus, caudate body, and putamen in addictive disorders during exposure to drug/gambling cues

Hill-Bowen et al. (2021)*	Meta-analysis	2110 HS and 4093 Addictive disorders (196 fMRI studies)	Pleasure (HS / Addictive disorders: alcohol, nicotine, cocaine, heroin, cannabis)	Task-based fMRI (pleasure induction, addictive symptom provocation)	Increased activation in SN (ventral/posterior insula and anterior cingulate cortex), DMN (ventral anterior cingulate cortex, posterior cingulate cortex/precuneus, dorsomedial nucleus of thalamus, and nucleus accumbens), CEN (inferior frontal cortex, superior parietal lobule, and precentral gyrus), LN (orbitofrontal cortex, dorsal insula, and amygdala), and VN (inferior/medial occipital cortex, fusiform gyrus, and lateral geniculate nucleus of thalamus) in HS during pleasure induction (exposure to natural stimuli like sex and food) and addictive disorders during addictive symptom provocation (exposure to drug cues) Increased activation in posterior cingulate cortex, middle/inferior temporal gyrus, inferior parietal lobule, dorsolateral prefrontal cortex, and postcentral gyrus in addictive disorders during exposure to drug cues (vs. addictive disorders or HS during exposure to food and sex stimuli or control cues) Increased activation in posterior insula, orbitofrontal cortex, occipital cortex/fusiform gyrus, temporoparietal junction, and thalamus in addictive disorders or HS during exposure to food and sex stimuli (vs. addictive disorders or HS during exposure to drug cues)
Gonul et al. (2009)	Review	BD	Mania (BD)	Resting-state PET / SPECT	Increased CMR and/or CBF mainly in supragenual anterior cingulate cortex (along with striatum and amygdala), as well as decreased CMR and/or CBF

					mainly in orbitofrontal cortex and dorsolateral prefrontal cortex, in manic BD (vs. euthymic BD and/or HS) Increased CMR and/or CBF mainly in subgenual anterior cingulate cortex (along with amygdala, striatum, and insula), as well as decreased CMR and/or CBF mainly in dorsolateral prefrontal cortex, in depressed BD (vs. euthymic BD and/or HS)
Chai et al. (2011)	Study	14 BD in mania 16 SCZ in psychosis 15 HS	Mania (BD + SCZ)	Resting-state fMRI	Increased FC of medial prefrontal cortex with insula and ventrolateral prefrontal cortex (toward positive correlation between areas), as well as decreased FC of medial prefrontal cortex with dorsolateral prefrontal cortex (toward no correlation between areas) in manic BD (vs. HS, showing negative correlation between areas, and SCZ, showing no correlation between areas)
Altinay et al. (2016)	Study	30 BD in hypomania 30 BD in depression 30 HS	Mania (BD)	Resting-state fMRI	Increased FC of striatum with insula, orbitofrontal cortex, anterior cingulate cortex, as well as decreased FC of striatum with medial prefrontal cortex and middle frontal gyrus, in manic BD and depressed BD (vs. HS) Increased FC between striatum and midbrain (including substantia nigra) in manic BD (vs. HS), correlating with manic symptomatology
Shi et al. (2020)	Study	41 BD in mania 21 BD in depression 42 HS	Mania (BD)	Resting-state fMRI	Increased FC of orbitofrontal cortex with ventral striatum and amygdala in manic BD (vs. HS and depressed BD), correlating with manic symptomatology

					Decreased FC of orbitofrontal cortex with ventral striatum in depressed BD (vs. HS)
Fan et al. (2020)	Study	20 BD in mania 35 BD in depression 26 BD in euthymia 54 HS	Mania (BD)	Resting-state fMRI	Increased FC between insula, superior frontal gyrus, and putamen in manic BD (vs. HS, depressed BD, and euthymic BD), correlating with manic symptomatology
Townsend and Altshuler (2012)	Systematic review	364 BD (131 mania, 57 depression, 176 euthymia) and 341 HS (23 fMRI studies)	Mania (BD)	Task-based fMRI (affective tasks)	Increased activation mainly in amygdala (along with insula), as well as decreased activation mainly in ventrolateral prefrontal cortex (along with dorsolateral prefrontal cortex and medial prefrontal cortex), in manic BD (vs. HS) during affective processing of negative and/or positive stimuli Decreased activation mainly in ventrolateral prefrontal cortex (along with decreased activation in dorsolateral prefrontal cortex, increased activation in medial prefrontal cortex, and increased/decreased activation in amygdala) in depressed BD (vs. HS) during affective processing of negative and/or positive stimuli
Hummer et al. (2013)	Study	30 BD in mania 30 BD in depression 14 BD in euthymia 30 HS	Mania (BD)	Task-based fMRI (affective tasks)	Increased activation in insula, putamen, and inferior frontal gyrus in manic BD and depressed BD (vs. HS) during affective processing of negative stimuli Decreased activation in insula and superior temporal gyrus in depressed BD (vs. HS) during affective processing of positive stimuli

Koreki et al. (2012)	Case report	1 Focal brain lesion causing mania	Mania (Focal brain lesions)	Resting-state SPECT	Decreased CBF in fronto-temporal regions (due to lesion in putamen), along with increased CBF in anterior insula, inferior lateral prefrontal cortex, and superior/middle temporal gyrus in focal brain lesion causing mania (with alterations in CBF normalizing during euthymia)
Rocchi et al. (2020)*	Systematic Review	153 HS (8 phMRI studies and 2 PET studies)	Substance-induced symptomatology (Substance use: opioids)	phMRI / PET (opioid administration)	Increased activation and/or FC in SN areas (e.g., insula and supragenual anterior cingulate cortex) along with nucleus accumbens and amygdala, as well as decreased activation and/or FC in SMN areas (e.g., primary sensory-motor cortex) and DMN areas (e.g., medial prefrontal cortex, posterior cingulate cortex, and temporoparietal junction), in HS during low-dose opioid infusion Decreased activation in SN areas (e.g., insula and anterior cingulate cortex) and SMN areas (e.g., primary sensory-motor cortex), as well as increased activation in DMN areas (e.g., medial prefrontal cortex, posterior cingulate cortex, and temporoparietal junction), in HS during high-dose opioid infusion (e.g., opioid infusion after painful stimulation)
Ogunbiyi et al. (2020)	Systematic review	239 Cannabis addiction or HS (7 phPET studies and 1 phMRI study) 299 Cannabis addiction and 211 HS (7 PET studies, 1 SPECT study, and 4 MRI studies)	Substance-induced symptomatology (Substance use: cannabis)	phPET / phMRI (cannabis administration) Resting-state PET / SPECT / MRI Task-based PET (affective tasks, cognitive tasks)	Increased CBF mainly in insula, anterior cingulate cortex, and frontal cortex in cannabis (tetrahydrocannabinol) addiction or HS after cannabis administration (vs. same subjects before cannabis administration or after placebo administration) Decreased CBF mainly in prefrontal cortex in cannabis addiction (vs. HS) at

					rest and/or during affective/cognitive tasks
Van Hell et al. (2011) (included in Ogunbiyi et al., 2020)	Study	20 Cannabis addiction	Substance-induced symptomatology (Substance use: cannabis)	phMRI (cannabis administration)	Increased CBF in insula, anterior cingulate cortex, and superior frontal cortex, as well as decreased CBF in postcentral gyrus and occipital cortex, in cannabis (tetrahydrocannabinol) addiction after cannabis administration (vs. same subjects after placebo administration) Increased ALFF in insula, substantia nigra, and cerebellum in cannabis addiction after cannabis administration (vs. same subjects after placebo administration) Correlation of increased CBF in insula and decreased CBF in superior frontal cortex with "high" in cannabis addiction after cannabis administration
Bossong et al. (2019)*	Study	39 HS	Substance-induced symptomatology (Substance use: cannabis)	phMRI (cannabis administration)	Increased CBF in insula and medial superior frontal cortex (SN), along with lateral orbitofrontal cortex, in HS after cannabis (tetrahydrocannabinol) administration (vs. HS after placebo administration) Decreased FC between lateral orbitofrontal cortex and precuneus/posterior cingulate cortex in HS after cannabis administration (vs. HS after placebo administration) Correlation of increased CBF in insula with "high" (as well as decreased sedation) in HS after cannabis administration

Volkow et al. (2008)	Study	20 HS	Substance-induced symptomatology (Substance use: alcohol)	phPET (alcohol administration)	Decreased global brain metabolism (mainly right hemisphere) and decreased CMR mainly in occipital cortex (and cerebellum) as well as relatively increased CMR in insula, anterior cingulate cortex, precentral gyrus, premotor cortex, ventral striatum, amygdala, and mesencephalon, in HS during (moderate-dose) alcohol infusion (vs. same subjects before alcohol infusion) Decreased global brain functional heterogeneity/differentiation (mainly left hemisphere) and decreased heterogeneity mainly in frontal cortex, superior parietal cortex, and occipital cortex (and cerebellum), as well as relatively increased heterogeneity in anterior cingulate cortex, superior temporal gyrus, and gyrus rectus, in HS during (moderate-dose) alcohol infusion (vs. same subjects before alcohol infusion)
Bosch et al. (2017)	Study	17 HS	Substance-induced symptomatology (Substance use: GHB)	phASL-MRI (GHB administration)	Increased CBF in anterior insula and anterior cingulate cortex in HS during gamma-hydroxybutyrate (GHB) infusion (vs. HS during placebo infusion) Correlation of increased CBF in insula and anterior cingulate cortex with body and affective awareness in HS during GHB infusion
Bosch et al. (2018)	Study	19 HS	Substance-induced symptomatology (Substance use: GHB)	phMRI (GHB administration)	Increased FC of anterior insula with thalamus and superior frontal gyrus, as well as decreased FC of anterior cingulate cortex with paracentral lobule, in HS during gamma-hydroxybutyrate (GHB) infusion (vs.

					HS during placebo infusion) Correlation of increased FC between insula and superior frontal gyrus with euphoria in HS during GHB infusion
Wang et al. (2021)	Study	17 HS	Substance-induced symptomatology (Substance use: nicotine)	phMRI (nicotine administration)	Increased time spent in SN CAP (coactivation between insula and anterior cingulate cortex) and decreased time spent in frontoinsular-DMN CAP (coactivation between posterior cingulate cortex, medial prefrontal cortex, anterior insula, orbitofrontal cortex, and striatum) in HS after nicotine administration (vs. HS after placebo administration)
Breiter et al. (1997)	Study	17 Cocaine addiction	Substance-induced symptomatology (Substance use: cocaine)	phMRI (cocaine administration)	Increased activation mainly in nucleus accumbens/subcallosal cortex, insula, cingulate cortex, thalamus, and hippocampus/parahippocampal gyrus (as well as increased activation in striatum, basal forebrain, and ventral tegmental area, and increased or decreased activation in amygdala) in cocaine addiction during cocaine infusion (vs. cocaine addiction during placebo infusion) Correlation of increased activation in insula, cingulate cortex, prefrontal cortex, thalamus, caudate, basal forebrain, and ventral tegmental area with euphoric rush in cocaine addiction during cocaine infusion Correlation of increased activation in nucleus accumbens/subcallosal cortex, insula, cingulate cortex, and hippocampus/parahippocampal gyrus with craving in cocaine addiction during cocaine infusion

Kufahl et al. (2005)	Study	15 Cocaine addiction	Substance-induced symptomatology (Substance use: cocaine)	phMRI (cocaine administration)	Increased activation mainly in anterior insula, anterior/medial orbitofrontal cortex, and frontal pole, as well as decreased activation in nucleus accumbens and subcallosal cortex, in cocaine addiction during cocaine infusion (vs. cocaine addiction during placebo infusion) Correlation of increased activation in frontal pole and decreased activation in nucleus accumbens with "high" in cocaine addiction during cocaine infusion
Risinger et al. (2005)	Study	8 Cocaine addiction	Substance-induced symptomatology (Substance use: cocaine)	phMRI (cocaine administration)	Correlation of increased activation in insula, anterior cingulate cortex, frontal operculum, retrosplenial cingulate cortex, caudate, pulvinar, and substantia nigra, as well as decreased activation in inferior frontal/orbitofrontal gyrus, supragenual anterior cingulate cortex, inferior temporal gyrus, precentral gyrus, and nucleus accumbens/putamen, with "high" in cocaine addiction during cocaine infusion
Naqvi and Bechara (2009)	Review	Addictive disorders (16 fMRI studies)	Substance-induced symptomatology (Addictive disorders: nicotine, cocaine, alcohol, heroin)	Task-based fMRI (addictive symptom provocation)	Increased activation mainly in insula, along with anterior cingulate cortex, orbitofrontal cortex, ventromedial prefrontal cortex, dorsolateral prefrontal cortex, ventral striatum, and amygdala, in addictive disorders during addictive symptom provocation (exposure to drug cues) Correlation of increased activation in insula with craving in addictive disorders during exposure to drug cues

Landtblom et al. (2011)	Case report	1 Epilepsy with ecstatic seizures	Pleasure (Epilepsy)	SPECT-MRI	Increased CBF in anterior/middle insula in epilepsy during euphoria in complex partial ecstatic seizures

AFFECTIVE EXCITATION - PANIC					
Study	*Type*	*Sample*	*Phenomenal-Behavioral Pattern (Group)*	*Method*	*Results*
Dresler et al. (2013)	Systematic Review	126 Panic disorder and 108 HS (5 PET studies, 3 SPECT studies, and 5 SI studies using panic symptom provocation) 5 Panic disorder (3 fMRI studies and 1 PET study during spontaneous panic attacks) 173 Panic disorder and 220 HS (7 PET studies and 5 SPECT studies during resting-state) 69 Panic disorder and 75 HS (7 fMRI studies using affective tasks)	Panic (Panic disorder)	Task-based PET / SPECT / SI (panic symptom provocation) fMRI / PET (spontaneous panic attacks) Resting-state PET / SPECT Task-based fMRI (affective tasks)	Increased activation (CBF or lactate) mainly in insula, along with anterior cingulate cortex, basal ganglia, and brainstem, in panic disorder (vs. HS) during panic symptom provocation (e.g., sodium lactate challenges) Increased activation mainly in insula and amygdala in panic disorder during spontaneous panic attacks Altered CBF mainly in hippocampus and parahippocampal gyrus in panic disorder (vs. HS) Altered activation mainly in anterior cingulate cortex in panic disorder (vs. HS) during affective tasks
Goddard (2017)	Review	Panic disorder	Panic (Panic disorder)	Task-based fMRI / MRS / PET / SPECT (panic symptom provocation)	Increased activation mainly in insula, anterior cingulate cortex, prefrontal cortex, brainstem, and amygdala in panic disorder (vs. HS) during panic symptom provocation (e.g., threat stimuli or provocative challenges)
Dresler et al. (2011) (included in Dresler et al., 2013)	Case series	1 Specific phobia with panic attacks and 1 Panic disorder with panic attacks	Panic (Anxiety disorders: panic disorder, specific phobia)	fMRI (spontaneous panic attacks)	Increased activation in insula and amygdala, as well as altered activation in prefrontal cortex, in anxiety disorders during spontaneous panic attacks

AFFECTIVE INHIBITION - ANHEDONIA AND ANALGESIA					
Study	*Type*	*Sample*	*Phenomenal-Behavioral Pattern (Group)*	*Method*	*Results*
Keller et al. (2013)	Study	21 HS	Anhedonia (HS)	Task-based fMRI (pleasure induction)	Correlation of decreased activation in insula, orbitofrontal cortex, anterior cingulate cortex, posterior cingulate cortex, nucleus accumbens, basal forebrain, and hypothalamus (as well as decreased FC between ventral tegmental area/substantia nigra, nucleus accumbens, insula, orbitofrontal cortex, middle temporal gyrus, and sensory cortex) with trait anhedonia in HS during pleasure induction by music listening tasks
Dunn et al. (2002)	Study	31 MDD in depression 27 BD in depression	Anhedonia (MDD, BD)	Resting-state PET	Correlation of decreased CMR in insula, claustrum, anteroventral striatum, and temporal cortex (as well as increased CMR in anterior cingulate cortex) with anhedonia-psychomotor symptomatology in depressed MDD and BD Correlation of decreased CMR in frontal pole, dorsolateral prefrontal cortex, and supragenual cingulate cortex with cognitive deficits in depressed MDD
Hyett et al. (2015)	Study	16 MDD with melancholia 16 MDD without melancholia 16 HS	Anhedonia (MDD with melancholia)	Resting-state fMRI	Decreased effective FC between insula and CEN in melancholic MDD (characterized by anhedonia and psychomotor disturbances) (vs. non-melancholic MDD and HS)
Gong et al. (2018)	Study	68 MDD in depression 64 HS	Anhedonia (MDD)	Resting-state fMRI	Decreased FC of nucleus accumbens with reward-related network (including insula, medial orbitofrontal cortex, striatum, and hippocampus) toward around-zero values in depressed MDD (vs. HS, showing positive values)

					Correlation of decreased FC (from positive to around-zero values) in reward-related network with anhedonia in depressed MDD Decreased FC of nucleus accumbens with cognitive-related network (including dorsomedial prefrontal cortex, dorsolateral prefrontal cortex, inferior frontal gyrus, and posterior parietal cortex) toward around-zero values in depressed MDD (vs. HS, showing negative values) Correlation of decreased FC (from negative to around-zero values) in cognitive-related network with anhedonia in depressed MDD
Liu et al. (2021)	Study	23 MDD in depression 28 HS	Anhedonia (MDD)	Resting-state fMRI	Correlation of decreased FC between nucleus accumbens and orbitofrontal cortex/middle frontal gyrus/posterior parietal cortex/subgenual cingulate cortex/perigenual cingulate cortex/precuneus with anhedonia (consummatory) in depressed MDD (but not in HS)
Young et al. (2016)	Study	21 MDD in depression 22 HS	Anhedonia (MDD)	Task-based fMRI (pleasure induction) Resting-state fMRI	Correlation of decreased FC between subgenual cingulate cortex and insula/orbitofrontal cortex/nucleus accumbens/ventral tegmental area/substantia nigra/middle temporal gyrus/inferior frontal gyrus with anhedonia in depressed MDD during pleasure induction by music listening tasks (but not in HS) No correlation between baseline FC of subgenual cingulate cortex and anhedonia in depressed MDD

Zhang et al. (2013)	Meta-analysis	341 MDD and 367 HS (22 fMRI studies)	Anhedonia (MDD)	Task-based fMRI (pleasure induction)	Decreased activation in striatum (caudate and putamen), anterior cingulate cortex, and insula, along with thalamus and cerebellum, in MDD with anhedonia (vs. HS) during pleasure induction by reward processing tasks Increased activation in middle/superior frontal gyrus, along with cuneus and lingual/fusiform gyrus, in MDD with anhedonia (vs. HS) during pleasure induction by reward processing tasks
Zhang et al. (2016)	Meta-analysis	968 MDD/SCZ and 1041 HS (33 fMRI studies on MDD and 24 fMRI studies on SCZ)	Anhedonia (MDD, SCZ)	Task-based fMRI (pleasure induction)	Decreased activation in ventral basal ganglia (striatum and pallidum), insula, and anterior cingulate cortex in MDD with consummatory/liking anhedonia (vs. HS) during pleasure induction by reward processing tasks Decreased activation mainly in striatum in SCZ with consummatory/liking anhedonia (vs. HS) during pleasure induction by reward processing tasks Decreased activation in basal ganglia and prefrontal regions (mainly middle frontal gyrus and/or medial prefrontal cortex) in MDD/SCZ with anticipatory anhedonia (vs. HS) during pleasure induction by reward processing tasks
Borsini et al. (2020)	Systematic review	MDD (57 fMRI studies and 2 meta-analyses of fMRI studies)	Anhedonia (MDD)	Task-based fMRI (pleasure induction)	Decreased activation in striatum (mainly ventral striatum and nucleus accumbens), anterior insula, and orbitofrontal cortex, as well as increased activation in medial and dorsolateral prefrontal cortex, in MDD with consummatory/liking anhedonia (and/or anticipatory/wanting

					anhedonia) during pleasure induction by reward processing tasks Decreased activation in striatal and prefrontal regions in MDD with deficit in reward learning
Barch et al. (2020)	Review	MDD and SCZ	Anhedonia (MDD, SCZ)	Task-based fMRI (pleasure induction)	Decreased activation in striatum (caudate and putamen), anterior cingulate cortex, insula, and orbitofrontal cortex in MDD with consummatory/liking anhedonia during pleasure induction by reward processing tasks Decreased activation in striatum and insula in SCZ with consummatory/liking anhedonia during pleasure induction by reward processing tasks
Avery et al. (2014)	Study	20 MDD 20 HS	Interoceptive deficit (MDD)	Task-based fMRI (interoceptive tasks) Resting-state fMRI	Decreased activation in dorsal insula in MDD (vs. HS) during interoceptive tasks Correlation of decreased activation in insula with depressive and somatic symptomatology in MDD during interoceptive tasks Increased FC of insula with orbitofrontal cortex and amygdala, along with DMN areas, in MDD (vs. HS) Correlation of increased FC between insula and OFC-DMN areas with depressive symptomatology in MDD
Kuhn and Gallinat (2013)*	Meta-analysis	220 MDD and 250 HS (6 fMRI studies and 5 PET studies)	Depression (MDD)	Resting-state fMRI / PET / SPECT	Increased ReHo, FC, CMR, and/or CBF in ventromedial prefrontal cortex, ventral striatum, and thalamus, as well

		285 SCZ and 282 HS (8 fMRI studies and 3 PET/SPECT studies)			as decreased ReHo, FC, CMR, and/or CBF in postcentral gyrus, insula, and fusiform gyrus, in MDD (vs. HS) Decreased ReHo, ALFF, FC, CMR, and/or CBF in ventromedial prefrontal cortex, posterior cingulate cortex/precuneus, and hippocampus, as well as increased ReHo, ALFF, FC, CMR, and/or CBF in lingual gyrus, in SCZ (vs. HS)
Chen et al. (2015)	Meta-analysis	336 MDD in depression and 357 HS (14 ASL-MRI, PET, SPECT studies) 187 MDD in depression and 188 HS (9 fMRI studies)	Depression (MDD)	Resting-state fMRI / ASL-MRI / PET / SPECT	Decreased CBF in insula, superior temporal gyrus, anterior cingulate cortex, and middle frontal gyrus, as well as increased CBF in precuneus, thalamus, and caudate, in MDD (vs. HS) Decreased ReHo in insula, superior temporal gyrus, and parahippocampal gyrus, as well as increased ReHo in temporal pole, in MDD (vs. HS)
Diener et al. (2012)	Meta-analysis	558 MDD in depression and 569 HS (40 fMRI studies)	Depression (MDD)	Task-based fMRI (affective tasks, cognitive tasks)	Decreased activation in anterior insula, anterior cingulate cortex, medial frontal gyrus/paracentral lobule, posterior parietal cortex, postcentral gyrus, precentral gyrus, middle occipital gyrus/lingual gyrus, and head/body caudate, as well as increased activation in inferior frontal gyrus, superior frontal gyrus, superior temporal gyrus, parahippocampal gyrus, and medial globus pallidus, in depressed MDD (vs. HS) during affective and/or cognitive tasks
Ng et al. (2019)	Meta-analysis	794 MDD and 803 HS (41 fMRI studies)	Depression (MDD)	Task-based fMRI (pleasure induction)	Decreased activation in ventral striatum, as well as increased activation in orbitofrontal cortex, in MDD (vs. HS) during pleasure

					induction by reward processing tasks
Zunhammer et al. (2021)	Meta-analysis	603 HS (20 fMRI studies)	Analgesia (HS)	Task-based fMRI (pain induction)	Decreased activation in insula (and near habenula) and cerebellum (SN and SMN), as well as possible increased activation in prefrontal cortex, intraparietal sulcus, perigenual anterior cingulate cortex, precuneus, and basal ganglia, in HS with (placebo-induced) analgesia (vs. HS without analgesia) during pain induction Correlation of decreased activation in insula, thalamus, somatosensory cortex, superior temporal gyrus, supplementary motor area, middle cingulate cortex, basal ganglia, and cerebellum (SN and SMN) with analgesia in HS with (placebo-induced) analgesia during pain induction
Rocchi et al. (2020)*	Systematic Review	153 HS (8 phMRI studies and 2 PET studies)	Substance-induced symptomatology (Substance use: opioids)	phMRI / PET (opioid administration)	Increased activation and/or FC in SN areas (e.g., insula and supragenual anterior cingulate cortex) along with nucleus accumbens and amygdala, as well as decreased activation and/or FC in SMN areas (e.g., primary sensory-motor cortex) and DMN areas (e.g., medial prefrontal cortex, posterior cingulate cortex, and temporoparietal junction), in HS during low-dose opioid infusion Decreased activation in SN areas (e.g., insula and anterior cingulate cortex) and SMN areas (e.g., primary sensory-motor cortex), as well as increased activation in DMN areas (e.g., medial prefrontal cortex, posterior cingulate cortex, and temporoparietal junction), in HS during high-dose opioid infusion (e.g., opioid infusion after painful

					stimulation)
Gorka et al. (2018)	Study	39 HS	Substance-induced symptomatology (Substance use: alcohol)	phMRI (alcohol administration)	Decreased FC between anterior insula and supragenual anterior cingulate cortex (SN) in HS during alcohol infusion (vs. HS during placebo infusion) Correlation of decreased FC between anterior insula and supragenual anterior cingulate cortex with "feeling calm" in HS during alcohol infusion
Boissoneault et al. (2020)	Study	15 HS	Substance-induced symptomatology (Substance use: alcohol)	phMRI (alcohol administration)	Decreased FC of nucleus accumbens with anterior cingulate cortex, medial prefrontal cortex, and amygdala in HS during alcohol infusion (vs. HS during placebo infusion)
Gilman et al. (2008)	Study	12 HS	Substance-induced symptomatology (Substance use: alcohol)	Task-based phMRI (alcohol administration, affective tasks)	Decreased activation in insula, amygdala, parahippocampal gyrus, and lingual/fusiform gyrus, as well as increased activation in ventral striatum, in HS during alcohol infusion and affective tasks (vs. HS during placebo infusion and affective tasks) Correlation of increased activation in ventral striatum with "feeling intoxication" in HS during alcohol infusion and affective task
Anderson et al. (2011)	Study	38 HS	Substance-induced symptomatology (Substance use: alcohol)	Task-based phMRI (alcohol administration, cognitive tasks)	Decreased activation in insula, anterior cingulate, dorsolateral prefrontal cortex, and parietal areas in HS during high-dose alcohol infusion and cognitive tasks (vs. HS during placebo infusion and cognitive tasks)

AFFECTIVE INHIBITION – APATHY					
Study	*Type*	*Sample*	*Phenomenal-Behavioral Pattern (Group)*	*Method*	*Results*
Begue et al. (2020)	Review	SCZ	Apathy (SCZ)	Resting-state fMRI Task-based fMRI (pleasure induction)	Decreased activation mainly in ventral striatum, along with insula, anterior cingulate cortex, ventromedial prefrontal cortex, and inferior frontal gyrus, in SCZ with apathy during pleasure induction by reward processing tasks Decreased FC between ventral tegmental area, insula, and fronto-temporal cortex in SCZ with apathy
Simon et al. (2015) (included in Begue et al., 2020)	Study	23 SCZ 37 HS	Apathy (HS / SCZ)	Task-based fMRI (pleasure induction)	Decreased activation in ventral striatum in HS with (subclinical) apathy and SCZ with apathy (vs. HS and SCZ without apathy) during pleasure induction by reward processing tasks Negative correlation between activation of ventral striatum and apathy across all subjects (independently from SCZ)
Giordano et al. (2018) (included in Begue et al., 2020)	Study	26 SCZ 22 HS	Apathy (SCZ)	Resting-state fMRI	Decreased FC of ventral tegmental area with insula, ventrolateral prefrontal cortex, and occipital cortex, as well as increased FC with dorsolateral prefrontal cortex, in SCZ (vs. HS) Correlation of decreased FC between ventral tegmental area, insula, ventrolateral prefrontal cortex, and occipital cortex, with apathy-avolition in SCZ
Dong et al. (2018)a*	Meta-analysis	2115 SCZ and 2297 HS (52 fMRI studies)	Schizophrenic symptomatology (SCZ)	Resting-state fMRI	Decreased FC within DMN (mainly medial prefrontal cortex), SMN (mainly superior temporal gyrus), SN

					(mainly anterior cingulate cortex and putamen), and LN (mainly orbitofrontal cortex), as well as increased FC between LN and striatum, in SCZ (vs. HS) Decreased FC between DMN, CEN, SN, thalamus, and cerebellum in SCZ (vs. HS)
Taylor et al. (2012)	Meta-analysis	450 SCZ and 422 HS (26 studies)	Schizophrenic symptomatology (SCZ)	Task-based fMRI / PET (pain/pleasure induction)	Decreased activation mainly in anterior cingulate cortex and amygdala/hippocampus, possibly along with ventrolateral prefrontal cortex (SN)†, medial frontal cortex (CEN)†, thalamus, caudate, and midbrain, in SCZ (vs. HS) during affective experience and affective processing tasks
Radua et al. (2015)	Meta-analysis	633 SCZ and 598 HS (31 fMRI studies)	Schizophrenic symptomatology (SCZ)	Task-based fMRI (pleasure induction)	Decreased activation in ventral striatum in SCZ mainly with negative symptomatology (vs. HS) during pleasure induction by reward processing tasks (reward anticipation and reward feedback processing)
Chase et al. (2017)	Meta-analysis	471 SCZ and 482 HS (20 fMRI studies)	Schizophrenic symptomatology (SCZ)	Task-based fMRI (pleasure induction)	Decreased activation in ventral striatum, possibly along with altered activation in anterior insula, dorsolateral prefrontal cortex, supplementary motor area, and thalamus (functionally connected with ventral striatum), in SCZ (vs. HS) during pleasure induction by reward processing tasks
Jani and kasparek (2017)*	Meta-analysis	199 SCZ and 215 HS (11 fMRI studies and 1 PET study using affective tasks) 262 SCZ and 278 HS	Schizophrenic symptomatology (SCZ)	Task-based fMRI / PET (affective tasks, cognitive tasks)	Decreased activation in inferior frontal gyrus, insula, and anterior cingulate cortex (SN and DMN)†, along with thalamus, striatum, and amygdala, as well as increased activation in inferior

		(15 fMRI studies and 1 PET study using cognitive tasks)			parietal cortex (DAN)†, in SCZ (vs. HS) during affective processing/recognition tasks Decreased activation in medial prefrontal cortex, insula, superior temporal gyrus, and occipital cortex (DMN and SMN-VN)†, as well as increased activation in posterior parietal cortex and dorsolateral prefrontal cortex (CEN)†, in SCZ (vs. HS) during theory of mind tasks
Dong et al. (2018)b	Meta-analysis	354 SCZ and 374 HS (19 fMRI studies)	Schizophrenic symptomatology (SCZ)	Task-based fMRI (affective tasks)	Decreased activation in putamen/amygdala/hippocampus, fusiform gyrus, inferior frontal gyrus, thalamus, and cerebellum, as well as increased activation in medial prefrontal cortex, in SCZ (vs. HS) during affective/threat processing tasks
Schroeter et al. (2014)	Meta-analysis	232 Frontotemporal dementia with behavioral variant and 218 HS (11 PET studies)	Affective-behavioral deficit (Frontotemporal dementia)	Resting-state PET	Decreased CMR in anterior insula, frontal areas (subcallosal area/fornix, gyrus rectus, posterior inferior frontal sulcus/inferior frontal junction area), basal ganglia (nucleus accumbens, caudate head and body, putamen), and middle thalamus in frontotemporal dementia with behavioral variant (vs. HS) (association of brain alterations with deficits mainly in affective processing (mainly reward processing), along with interoception and cognition, in frontotemporal dementia with behavioral variant)
Zhou et al. (2010)*	Study	12 Frontotemporal dementia with behavioral variant 12 Alzheimer's disease 12 HS	Affective-behavioral deficit (Frontotemporal dementia)	Resting-state fMRI	Decreased FC in SN, mainly between frontoinsular, cingulate, striatal, thalamic, and brainstem areas (as well as increased FC in DMN) in frontotemporal dementia with

					behavioral variant (vs. HS and Alzheimer's disease) Correlation of decreased SN-related FC, mainly frontoinsular FC (as well as increased DMN-related FC) with affective-behavioral symptomatology in frontotemporal dementia with behavioral variant Decreased FC in DMN, mainly between posterior cingulate/precuneus, temporoparietal junction, hippocampus, and raphe nuclei (as well as increased FC in SN) in Alzheimer's disease (vs. HS and/or frontotemporal dementia with behavioral variant)
Day et al. (2013)	Study	15 Frontotemporal dementia	Apathy (Frontotemporal dementia)	Resting-state fMRI	Altered ALFF in SN (mainly insula) at baseline predicting apathy at follow-up in frontotemporal dementia
Salamone et al. (2021)	Study	19 Frontotemporal dementia with behavioral variant 25 Parkinson's disease 22 Alzheimer's disease 48 HS	Interoceptive deficit (Frontotemporal dementia)	Resting-state fMRI	Decreased interoception in frontotemporal dementia with behavioral variant (vs. HS) during interoceptive tasks (no interoceptive alterations in Parkinson's disease and Alzheimer's disease, as well as no exteroceptive alterations in frontotemporal dementia, Parkinson's disease, and Alzheimer's disease) Correlation of increased FC in SN with interoceptive-related affective processing, as well as correlation of increased FC in CEN with exteroceptive-related affective processing, in HS Loss of correlation of FC in SN with interoceptive-related affective processing in frontotemporal dementia with behavioral variant (no loss of

					correlation in Parkinson's disease and Alzheimer's disease) Loss of correlation of FC in CEN with exteroceptive-related affective processing in Parkinson's disease (no loss of correlation in frontotemporal dementia with behavioral variant and Alzheimer's disease)
Adolfi et al. (2017)	Meta-analyses and study	Meta-analyses: 730 HS (34 studies using interoceptive tasks) 2602 HS (178 studies using affective tasks) 1438 HS (63 studies using cognitive tasks) Study: 17 Focal brain lesions in insula 20 HS	Interoceptive-affective deficit (Focal brain lesions)	Task-based fMRI / PET (interoceptive tasks, affective tasks, cognitive tasks)	Increased activation mainly in insula, possibly along with claustrum, inferior parietal lobule, cingulate cortex, parahippocampal gyrus, and pulvinar in HS during interoceptive tasks Increased activation in orbitofrontal cortex, insula, claustrum, amygdala, basal ganglia, dorsomedial nucleus of thalamus, along with anterior cingulate cortex, parahippocampal gyrus, and auditory-visual cortex, in HS during affective tasks Increased activation in cingulate cortex and superior temporal gyrus, along with middle frontal gyrus, middle temporal gyrus, orbitofrontal gyrus, insula, and amygdala, in HS during social cognition tasks Overlapped activation in anterior insula (along with orbitofrontal cortex/inferior frontal gyrus, anterior cingulate cortex, basal ganglia, amygdala, and hippocampus/parahippocampal gyrus) in HS during interoceptive tasks, affective tasks, and social cognition tasks (with major overlap of activation during interoceptive tasks and affective tasks)

			Decreased interoception, affective processing, and social cognition in focal brain lesions in insula (vs. HS) during interoceptive tasks, affective tasks, and social cognition tasks

AFFECTIVE INHIBITION - DEPERSONALIZATION					
Study	*Type*	*Sample*	*Phenomenal-Behavioral Pattern (Group)*	*Method*	*Results*
Sierra and David (2011)	Review	Depersonalization disorder	Depersonalization (Depersonalization disorder)	Task-based fMRI / PET (affective tasks)	Decreased activation mainly in anterior insula and amygdala (as well as increased activation in temporoparietal junction) in depersonalization disorder (vs. HS) during processing of arousing affective stimuli Decreased autonomic responses (e.g., skin conductance) in depersonalization disorder (vs. HS) during processing of arousing affective stimuli
Lemche et al. (2013)	Study	9 Depersonalization disorder 12 HS	Depersonalization (Depersonalization disorder)	Task-based fMRI (affective tasks)	Correlation of decreased activation and FC in anterior insula, supragenual anterior cingulate cortex, and globus pallidus (as well as altered activation in paracingulate cortex, posterior cingulate cortex, and orbitofrontal cortex) with alexithymia in depersonalization disorder during processing of arousing affective stimuli (specific correlation of decreased activation in insula with identification of feelings)
Medford et al. (2016)	Study	14 Depersonalization disorder 25 HS	Depersonalization (Depersonalization disorder)	Task-based fMRI (affective tasks)	Decreased activation mainly in insula, along with decreased autonomic responses (skin conductance), in depersonalization disorder (vs. HS) during processing of arousing affective stimuli Increased activation in insula in depersonalization disorder with depersonalization symptomatology in remission at follow-up (vs. depersonalization disorder with depersonalization symptomatology at baseline and depersonalization disorder

			with depersonalization symptomatology at follow-up) during processing of arousing affective stimuli

THOUGHT DIMENSION					
THOUGHT EXCITATION - MIND-WANDERING					
Study	*Type*	*Sample*	*Phenomenal-Behavioral Pattern (Group)*	*Method*	*Results*
Fox et al. (2015)	Meta-analysis	155 HS (8 fMRI studies and 2 PET studies)	Mind-wandering (HS)	fMRI / PET (mind-wandering assessment)	Increased activation in DMN areas (medial prefrontal cortex/perigenual anterior cingulate cortex, precuneus/posterior cingulate cortex, inferior parietal lobule, temporal pole, and parahippocampal gyrus), as well as CEN areas (dorsolateral prefrontal cortex and supragenual anterior cingulate cortex), middle insula, secondary somatosensory cortex, and lingual gyrus, in HS during mind-wandering and spontaneous thought processing
Stawarczyk and D'Argembeau (2015)	Meta-analysis	194 HS (9 studies investigating mind-wandering) 272 HS (16 studies investigating future thinking) 234 HS (9 studies investigating goal thinking)	Mind-wandering (HS)	fMRI / PET (mind-wandering assessment)	Increased activation in DMN areas (medial prefrontal cortex, precuneus/posterior cingulate cortex, inferior parietal lobule, middle temporal gyrus, and parahippocampal gyrus) in HS during mind-wandering, episodic future thinking, or thinking about personal goals Additional increased activation in dorsolateral prefrontal cortex in HS during episodic future thinking Additional increased activation in dorsal medial prefrontal cortex, inferior frontal gyrus, and orbitofrontal cortex in HS during thinking about personal goals
Mason et al. (2007) (included in Fox et al., 2015) (included in Stawarczyk and	Study	19 HS	Mind-wandering (HS)	fMRI (mind-wandering assessment)	Increased activation in DMN areas (medial prefrontal cortex, anterior cingulate cortex, posterior cingulate cortex/precuneus, angular gyrus, and superior/middle temporal gyrus), along

D'Argembeau, 2015)					with insula and superior frontal gyrus, in HS with high mind-wandering during practiced working memory tasks (vs. HS with low mind-wandering during novel working memory tasks) Correlation of increased activation in DMN areas (medial prefrontal cortex and posterior cingulate cortex/precuneus), insula, and superior frontal gyrus with mind-wandering in HS
Kucyi and Davis (2014)	Study	51 HS	Mind-wandering (HS)	fMRI (mind-wandering assessment)	Correlation of increased dynamic FC variability between posterior cingulate cortex, inferior parietal lobule, and medial temporal lobe with mind-wandering in HS during pain induction (while no correlation for static FC) Correlation of increased dynamic FC variability between posterior cingulate cortex, inferior parietal lobule, and medial temporal lobe with daydreaming in HS (while correlation of decreased static FC with daydreaming)
Kucyi et al. (2016)	Study	28 HS	Mind-wandering (HS)	fMRI (mind-wandering assessment)	Correlation of increased activation in DMN with mind-wandering and behavior stability in HS during attention tasks (while no correlation for CEN, SN, DAN, and SMN)
Zhou and Lei (2018)	Study	24 HS	Mind-wandering (HS)	fMRI (mind-wandering assessment)	Increased activation in DMN, as well as decreased activation in CEN and VN, in HS during mind-wandering (vs. HS during cognitive tasks) Increased FC between DMN and VN, as well as decreased FC between CEN

					and VN, in HS during mind-wandering (vs. HS during cognitive tasks) Functional reorganization of network subregions within and between DMN, CEN, and VN in HS during mind-wandering (vs. HS during cognitive tasks)
Poerio et al. (2017)	Study	80 HS	Mind-wandering (HS)	Resting-state fMRI	Correlation of increased FC between medial-temporal subsystem of DMN (mainly comprising retrosplenial/posterior cingulate cortex, parahippocampal gyrus, and temporoparietal junction) and dorsal-medial prefrontal subsystem of DMN (mainly comprising dorsomedial prefrontal cortex, inferior frontal cortex, and temporal pole/middle temporal gyrus) with task disengagement and future thinking in HS Correlation of decreased FC between core subsystem of DMN (mainly comprising medial prefrontal cortex, posterior cingulate cortex, and temporoparietal junction) and fusiform gyrus/cerebellum with memory retrieval and future thinking in HS (i.e., association of increased coupling between components of DMN, as well as decreased coupling between DMN and sensorimotor areas, with disengagement from external environment and memory retrieval supporting future planning)
Karapanagiotidis et al. (2017)	Study	86 + 141 HS	Mind-wandering (HS)	Resting-state fMRI	Increased FC between hippocampus and medial prefrontal cortex (DMN) in HS with high mental time travel (mind-wandering concerning past and future events) (vs. HS with low mental time

					travel)
Webb et al. (2021)	Study	29 MDD or Anxiety disorders with anhedonia 36 HS	Mind-wandering (MDD, Anxiety disorders)	Resting-state fMRI	Increased mind-wandering (mainly regarding unpleasant contents and correlating with negative affects) in MDD and anxiety disorders with anhedonia (vs. HS) Correlation of increased FC between medial prefrontal cortex (DMN) and anterior insula (SN) (along with rostral prefrontal cortex, superior frontal gyrus, and intraparietal sulcus) with mind-wandering in MDD and anxiety disorders with anhedonia
Shin et al. (2015)	Study	33 SCZ 33 HS	Mind-wandering (SCZ)	Resting-state fMRI	Increased mind-wandering in SCZ (vs. HS); correlation of increased mind-wandering with positive symptomatology (and general symptomatology) in SCZ Increased FC within DMN, as well as decreased FC within CEN and SN (along with decreased FC of SN with DMN and CEN) in SCZ (vs. HS) Correlation of increased FC in DMN with mind-wandering in HS (but not in SCZ)
Walpola et al. (2020)	Study	18 Parkinson's disease with hallucinations 20 Parkinson's disease without hallucinations 40 HS	Mind-wandering (Parkinson's disease)	Resting-state fMRI	Increased mind-wandering in Parkinson's disease with visual hallucinations (vs. Parkinson's disease without hallucinations) (while decreased mind-wandering in Parkinson's disease without hallucinations vs. HS and Parkinson's disease with hallucinations) Increased correlation of FC between DMN (posterior cingulate cortex,

	medial prefrontal cortex, and inferior parietal lobule) and primary visual cortex with mind-wandering in Parkinson's disease with visual hallucinations (vs. Parkinson's disease without hallucinations)

THOUGHT EXCITATION - REPETITIVE THINKING					
Study	*Type*	*Sample*	*Phenomenal-Behavioral Pattern (Group)*	*Method*	*Results*
Makovac et al. (2020)	Meta-analysis	980 HS, 307 MDD, 66 Generalized anxiety disorder, 39 Post-traumatic stress disorder, 18 Obsessive-compulsive disorder, 14 Borderline disorder, and 111 Pain syndromes and other disorders (32 task-based fMRI studies and 11 resting-state fMRI studies)	Repetitive thinking/rumination-worry (HS / MDD, Generalized anxiety disorder, Post-traumatic stress disorder, Obsessive-compulsive disorder, other disorders)	Resting-state fMRI Task-based fMRI (rumination-worry induction)	Correlation of altered FC of posterior cingulate cortex, perigenual anterior cingulate cortex, and dorsomedial thalamus with rumination or worry in HS and MDD/generalized anxiety disorder/post-traumatic stress disorder/obsessive-compulsive disorder/other disorders Altered activation in posterior cingulate cortex/precuneus, perigenual anterior cingulate cortex/medial prefrontal cortex, superior frontal gyrus, middle cingulate cortex, middle temporal gyrus, and parahippocampal gyrus, along with anterior insula and visual cortex (occipital cortex/fusiform gyrus) in HS and MDD/generalized anxiety disorder/post-traumatic stress disorder/obsessive-compulsive disorder/other disorders during rumination or worry induction Differential activation in supragenual anterior cingulate cortex, middle temporal gyrus, precuneus, and middle occipital gyrus in MDD/generalized anxiety disorder/post-traumatic stress disorder/obsessive-compulsive disorder/other disorders (vs. HS) during rumination or worry induction Altered activation in posterior cingulate cortex and anterior cingulate cortex in HS and MDD/generalized anxiety disorder/post-traumatic stress disorder/obsessive-compulsive disorder/other disorders during rumination and worry induction, while

					altered activation in subgenual anterior cingulate cortex in HS and MDD/generalized anxiety disorder/post-traumatic stress disorder/obsessive-compulsive disorder/other disorders during rumination induction (but not during worry induction)
Zhou et al. (2020)	Meta-analysis	286 HS (14 fMRI studies)	Repetitive thinking/rumination (HS)	Task-based fMRI (rumination induction)	Increased activation in medial prefrontal cortex, posterior cingulate cortex/precuneus, superior/middle temporal gyrus, angular gyrus, and inferior frontal gyrus in HS during rumination induction (vs. HS during distraction/control) Increased rumination-related activation mainly in DMN (31.3%), along with CEN (7.0%), SN (4.7%), SMN (3.3%), VN (2.8%), LN (1.4%), and DAN (1.1%) Increased rumination-related activation mainly in core subsystem of DMN (medial prefrontal cortex, posterior cingulate cortex, and temporoparietal junction: 49.7%) and dorsal-medial prefrontal subsystem of DMN (dorsal medial prefrontal cortex and temporal pole/middle temporal gyrus: 18.2%) rather than medial-temporal subsystem of DMN (retrosplenial cingulate cortex and parahippocampal areas: 7.3%)
Provenzano et al. (2021)	Study	34 HS	Repetitive thinking/rumination (HS)	Resting-state fMRI	Correlation of increased efficiency in DMN (and increased node strength mainly in dorsomedial prefrontal cortex) with rumination, along with subclinical depressive symptomatology, in HS

					Correlation of increased efficiency in DMN (along with increased node strength mainly in posterior cingulate cortex, medial prefrontal cortex, superior frontal gyrus, inferior temporal gyrus, and parahippocampal gyrus) with negative affective inertia (reduced affective response to environmental stimuli), along with subclinical depressive symptomatology, in HS Correlation of increased efficiency in DMN with subclinical depressive symptomatology, fully and independently mediated by rumination and negative affective inertia, in HS
Denson et al. (2009) (included in Zhou et al., 2020; Makovac et al., 2020)	Study	20 HS	Repetitive thinking/rumination (HS)	Task-based fMRI (rumination induction)	Increased activation in supragenual anterior cingulate cortex, insula, posterior cingulate cortex, medial frontal cortex, middle frontal gyrus, and hippocampus in HS during anger and rumination induction (vs. HS during baseline and distraction)
Chen et al. (2020)	Study	42 HS	Repetitive thinking/rumination (HS)	Task-based fMRI (rumination induction)	Decreased FC within DMN in HS during rumination induction, mainly in form of inner speech, associated with negative affects, and focused on past events (vs. HS during distraction, mainly in form of imagery, associated with positive affects, and usually focused on future events) Increased FC between core subsystem of DMN (mainly comprising medial prefrontal cortex, posterior cingulate cortex, and temporoparietal junction) and medial-temporal subsystem of DMN (mainly comprising retrosplenial/posterior cingulate cortex

					and parahippocampal gyrus), as well as decreased FC between core subsystem of DMN and dorsal-medial prefrontal subsystem of DMN (mainly comprising dorsomedial prefrontal cortex and temporal pole/middle temporal gyrus), in HS during rumination induction, mainly in form of inner speech, associated with negative affects, and focused on past events (vs. HS during distraction, mainly in form of imagery, associated with positive affects, and usually focused on future events) Correlation of decreased FC between core and dorsal-medial prefrontal subsystems of DMN with trait rumination (brooding) in HS
Berman et al. (2011)	Study	15 MDD 15 HS	Repetitive thinking/rumination (MDD)	Resting-state fMRI Task-based fMRI (cognitive tasks)	Increased FC of DMN (between posterior cingulate cortex and subgenual anterior cingulate cortex) in MDD (vs. HS) during rest (but not during task engagement) Correlation of increased FC in DMN (between posterior cingulate cortex and perigenual anterior cingulate cortex) with rumination (brooding but not reflection) in both MDD and HS
Hamilton et al. (2011)	Study	17 MDD 17 HS	Repetitive thinking/rumination (MDD)	Resting-state fMRI	Correlation of increased dominance of DMN over CEN with depressive rumination (and decreased reflection) in MDD (but not in HS) Increased activity of insula at DMN peaks/CEN troughs in MDD, while increased activity of insula at CEN peaks/DMN troughs in HS

Zhu et al. (2012)	Study	35 MDD 35 HS	Repetitive thinking/rumination (MDD)	Resting-state fMRI	Increased FC in anterior DMN (medial prefrontal cortex and ventral anterior cingulate cortex) and decreased FC in posterior DMN (posterior cingulate cortex/precuneus and angular gyrus), along with increased rumination and autobiographical memory, in MDD (vs. HS) Correlation of increased FC in anterior DMN with rumination, as well as correlation of decreased FC in posterior DMN with autobiographical memory, in MDD
Kaiser et al. (2016)	Study	100 MDD 108 HS	Repetitive thinking/rumination (MDD)	Resting-state fMRI	Decreased dynamic FC (decreased variability of FC, i.e., sustained positive FC) between medial prefrontal cortex and parahippocampal gyrus (within DMN), as well as increased dynamic FC (increased variability of FC, i.e., increased frequency of strong positive and negative FC) between medial prefrontal cortex and insula, in MDD (vs. HS) Correlation of increased dynamic FC between medial prefrontal cortex and insula with rumination in MDD Correlation of increased dynamic FC between medial prefrontal cortex and dorsolateral prefrontal cortex with depressive symtomatology in MDD
Zhu et al. (2017)	Study	33 MDD 33 HS	Repetitive thinking/rumination (MDD)	Resting-state fMRI	Increased FC within dorsal-medial prefrontal subsystem of DMN, increased FC between dorsal-medial prefrontal subsystem and medial-temporal subsystem of DMN, and decreased FC between dorsal-medial prefrontal subsystem and core

					subsystem of DMN in MDD (vs. HS) Correlation of increased FC within dorsal-medial prefrontal subsystem of DMN and increased FC between dorsal-medial prefrontal subsystem and medial-temporal subsystem of DMN with rumination in MDD
Kaiser et al. (2019)*	Study	23 MDD 22 HS	Repetitive thinking/rumination (MDD)	Resting-state fMRI	Correlation of increased dominance (dwell time and persistence) of SN-DMN CAP (coactivation between insula, dorsolateral prefrontal cortex, medial prefrontal cortex, posterior cingulate cortex, and angular gyrus), decreased dominance (dwell time and persistence) of SMN CAP (coactivation of sensorimotor cortex), and increased transition from SN-DMN CAP to DMN CAP (coactivation of medial prefrontal cortex, posterior cingulate cortex, and temporoparietal junction) with depressive symptomatology in MDD and HS Correlation of increased dominance of SN-DMN CAP and increased transition from SN-DMN CAP to DMN CAP with trait rumination (mainly brooding) in MDD and HS (mediating relationship between network dynamics and depressive symptomatology)
Misaki et al. (2020)	Study	223 MDD, Generalized anxiety disorder, other disorders 45 HS	Repetitive thinking/rumination (MDD, Generalized anxiety disorder, other disorders)	Resting-state fMRI	Correlation of increased FC between posterior cingulate cortex/precuneus and temporoparietal junction with depressive rumination (along with brooding and reflection) in MDD and generalized anxiety disorder (while correlation of decreased FC between posterior cingulate cortex/precuneus

					and insula, motor cortex, and occipital cortex with depressive rumination in HS) Correlation of increased FC between anterior cingulate cortex/medial prefrontal cortex and middle frontal gyrus/temporal pole/visual occipital cortex-fusiform gyrus/precuneus with rumination (reflection) in MDD, generalized anxiety disorder, and HS
Piguet et al. (2021)	Study	22 BD 9 MDD 32 HS	Repetitive thinking/rumination (BD, MDD)	Resting-state fMRI	Increased duration of DMN CAP, increased duration and occurrence of posterior DMN CAP, increased duration and occurrence of insula-centered CAP, and increased duration of insula-posterior DMN CAP (as well as decreased occurrence of VN CAP and anterior SN CAP) in BD and MDD (vs. HS) Correlation of increased duration of DMN CAP with depressive symptomatology in BD and MDD (while correlation of decreased duration of DMN CAP with depressive symptomatology in HS) Correlation of increased occurrence of posterior DMN CAP and insula CAP with trait rumination (brooding), as well as correlation of increased occurrence of posterior DMN CAP with intrusive thought and decreased thought control, in BD, MDD, and HS
Cooney et al. (2010) (included in Zhou et al., 2020; Makovac et al., 2020)	Study	14 MDD 14 HS	Repetitive thinking/rumination (MDD)	Task-based fMRI (rumination induction)	Increased activation in subgenual anterior cingulate cortex, orbitofrontal cortex, dorsolateral prefrontal cortex, medial prefrontal cortex, posterior cingulate cortex, middle/superior

					temporal gyrus, inferior parietal lobule, parahippocampal gyrus, and amygdala, in MDD (vs. HS) during rumination induction (vs. concrete and/or abstract distraction)
Lydon-Staley et al. (2019)	Study	29 MDD 29 HS	Repetitive thinking/rumination (MDD)	Task-based fMRI (rumination induction)	Correlation of increased FC between DMN and CEN, decreased FC between SN and CEN, and decreased flexibility of SN (decreased dynamic FC of SN with DMN and CEN) with rumination in MDD and HS following sadness induction
Sacher et al. (2012)	Meta-analysis	102 MDD in depression and 94 HS (4 PET studies)	Depression (MDD)	Resting-state PET	Increased CMR in perigenual anterior cingulate cortex and subgenual anterior cingulate cortex in depressed MDD (vs. HS)
Kuhn and Gallinat (2013)*	Meta-analysis	220 MDD and 250 HS (6 fMRI studies and 5 PET studies) 285 SCZ and 282 HS (8 fMRI studies and 3 PET/SPECT studies)	Depression (MDD)	Resting-state fMRI / PET / SPECT	Increased ReHo, FC, CMR, and/or CBF in ventromedial prefrontal cortex, ventral striatum, and thalamus, as well as decreased ReHo, FC, CMR, and/or CBF in postcentral gyrus, insula, and fusiform gyrus, in MDD (vs. HS) Decreased ReHo, ALFF, FC, CMR, and/or CBF in ventromedial prefrontal cortex, posterior cingulate cortex/precuneus, and hippocampus, as well as increased ReHo, ALFF, FC, CMR, and/or CBF in lingual gyrus, in SCZ (vs. HS)
Kaiser et al. (2015)	Meta-analysis	556 MDD in depression and 518 HS (25 fMRI studies)	Depression (MDD)	Resting-state fMRI	Increased FC within DMN (increased positive FC between medial prefrontal cortex, middle temporal gyrus, and hippocampal area) and decreased FC within CEN (decreased positive FC between dorsolateral prefrontal cortex and posterior parietal cortex), as well as increased FC of DMN with CEN

					(increased positive FC or decreased negative FC between DMN areas and dorsolateral prefrontal cortex), decreased FC of DMN with LN (decreased positive FC between medial prefrontal cortex and nucleus accumbens, or increased negative FC between medial prefrontal cortex and amygdala), SN (decreased FC between posterior cingulate cortex/precuneus and SN areas), and SMN (decreased positive FC of DMN areas with middle cingulate cortex, thalamus, and putamen), and decreased FC of CEN with DAN (decreased positive FC between CEN areas and superior parietal lobule), in depressed MDD (vs. HS)
Iwabuchi et al. (2015)*	Meta-analysis	225 MDD in depression and 230 HS (10 fMRI studies)	Depression (MDD)	Resting-state fMRI	Increased ReHo in medial prefrontal cortex, as well as decreased ReHo in postcentral/precentral gyrus and cuneus (possibly along with superior temporal gyrus, inferior parietal cortex, and cerebellum) in depressed MDD (vs. HS)
Zhou et al. (2017)*	Meta-analysis	438 MDD in depression and 421 HS (15 fMRI studies)	Depression (MDD)	Resting-state fMRI	Increased ALFF in perigenual anterior cingulate cortex (DMN)† and superior temporal gyrus (SN)†, as well as decreased ALFF in inferior frontal gyrus (CEN)†, middle temporal gyrus (DAN)†, occipital cortex (VN)†, and cerebellum, in depressed MDD (vs. HS) Increased ALFF in perigenual anterior cingulate cortex, inferior parietal lobule, inferior temporal gyrus, and inferior frontal gyrus, as well as decreased ALFF in precentral gyrus and occipital cortex, in medicated

					depressed MDD (vs. HS) (with increased ALFF in perigenual anterior cingulate cortex correlating with illness duration) Increased ALFF in insula, orbitofrontal cortex, and precentral gyrus, as well as decreased ALFF in inferior frontal gyrus, angular gyrus, and cerebellum, in drug-naive depressed MDD (vs. HS)
Zhang et al. (2017)*	Meta-analysis	747 MDD and 757 HS (30 fMRI studies)	Depression (MDD)	Resting-state fMRI	Increased FC, ALFF, and/or ReHo in insula and dorsomedial prefrontal cortex, as well as decreased FC, ALFF, and/or ReHo in parahippocampal gyrus, orbitofrontal cortex, and postcentral gyrus, in MDD (vs. HS)
Gong et al. (2020)*	Meta-analysis	1399 MDD and 1332 HS (50 fMRI studies) 494 BD and 593 HS (15 fMRI studies)	Depression (MDD)	Resting-state fMRI	Increased ALFF in insula, superior frontal gyrus, anterior cingulate cortex, medial prefrontal cortex, medial orbitofrontal cortex, supramarginal gyrus, and striatum, as well as decreased ALFF in precuneus, occipital cortex, and cerebellum, in MDD including mainly depressed subjects (vs. HS) Increased ALFF in insula, inferior frontal gyrus, superior frontal gyrus, medial prefrontal cortex, superior temporal gyrus, and striatum, as well as decreased ALFF in precuneus, occipital cortex, superior temporal gyrus, anterior cingulate cortex, and cerebellum, in BD including depressed, euthymic, and manic subjects together (vs. HS) Increased ALFF in insula and medial prefrontal cortex, as well as decreased ALFF in cerebellum, in depressed

					MDD and BD (vs. HS)
Doucet et al. (2020)*	Meta-analysis	1486 SCZ, 779 MDD, 191 BD, 121 Obsessive-compulsive disorder, 192 Post-traumatic stress disorder, 20 Social anxiety disorder, and 3002 HS (70 fMRI studies)	Depression (MDD)	Resting-state fMRI	Altered FC within DMN (mainly in perigenual medial prefrontal cortex and precuneus/posterior cingulate cortex) across disorders (mainly SCZ and MDD) (vs. HS) Decreased FC in precuneus/posterior cingulate cortex and mainly decreased FC in perigenual medial prefrontal cortex in SCZ (vs. HS) Increased FC in dorsomedial prefrontal cortex in MDD (vs. HS)
Goodman et al. (2021)	Study	85 MDD, Generalized anxiety disorders, other disorders 360 HS	Depression (MDD, Generalized anxiety disorder, other disorders)	Resting-state fMRI	Correlation of increased frequency in DMN CAP, increased dwell time/frequency in VN CAP, decreased dwell time/frequency in SMN CAP, and decreased dwell time/frequency in CEN-DMN CAP with depressive symptomatology (severe) in HS, MDD, generalized anxiety disorder, and other disorders Correlation of decreased dwell time/frequency in VN CAP and increased dwell time/frequency in SMN CAP with depressive symptomatology (mild) in HS, MDD, generalized anxiety disorder, and other disorders
Liu et al. (2012)a*	Study	26 BD in depression 26 HS	Depression (BD)	Resting-state fMRI	Decreased ALFF in postcentral gyrus and parahippocampal gyrus (possibly along with cerebellum), as well as increased ALFF in insula, inferior frontal gyrus, inferior parietal lobule, middle temporal gyrus, and caudate, in depressed BD (vs. HS)

Liu et al. (2012)b	Study	26 BD in depression 26 HS	Depression (BD)	Resting-state fMRI	Increased ReHo in medial prefrontal cortex and inferior parietal lobule (DMN) in depressed BD (vs. HS)
Martino et al. (2016)a*	Study	20 BD in mania 20 BD in depression 20 BD in euthymia 40 HS	Depression (BD)	Resting-state fMRI	Increased neuronal variability (standard deviation of BOLD signal) in SMN/DMN ratio (slow5) in manic BD (vs. depressed BD and HS), correlating with manic symptomatology Decreased neuronal variability in SMN/DMN ratio (slow5) in depressed BD (vs. manic and euthymic BD and HS), correlating with depressive symptomatology
Zhang et al. (2019)*	Study	30 BD in mania 35 BD in depression 34 BD in euthymia 64 HS	Depression (BD)	Resting-state fMRI	Increased global signal correlation (correlation between global signal and signal in local voxels) in SMN in manic BD (vs. depressed and euthymic BD, and HS), correlating with manic symptomatology Increased global signal correlation in DMN in depressed BD (vs. HS), correlating with depressive symptomatology
Russo et al. (2020)*	Study	36 BD in mania 43 BD in depression 29 BD in euthymia 112 HS	Depression (BD)	Resting-state fMRI	Decreased ReHo and DC (slow4) in DMN (mainly medial prefrontal cortex) in manic BD (vs. HS), correlating with manic symptomatology; decreased FC in DMN areas and relatively increased ReHo in SMN areas in manic BD (vs. HS) Decreased ReHo in SMN (mainly primary sensory-motor cortex) in depressed BD (vs. HS), correlating with depressive symptomatology; decreased FC in SMN areas and

					relatively increased ReHo and DC in DMN areas in depressed BD (vs. HS) Correlation of increased ReHo in SMN with hyperactivity in BD Correlation of decreased DC in DMN with thought deficit (distractibility and flight of ideas) in BD
Zeng et al. (2021)*	Study	20 BD in mania 41 BD in depression 40 HS	Depression (BD)	Resting-state fMRI	Decreased FC within DMN (medial prefrontal cortex and temporoparietal junction) and CEN in manic BD (vs. depressed BD and HS), correlating with manic symptomatology Increased FC within DMN (medial prefrontal cortex and temporoparietal junction) and CEN in depressed BD (vs. manic BD and HS), correlating with depressive symptomatology
Rey et al. (2021)*	Study	20 BD across phases (20 in euthymia, 12 in depression, and 14 in hypomania) 41 HS	Depression (BD)	Resting-state fMRI	Increased occurrence of sensorimotor-interoceptive CAP (coactivation between amygdala, insula, precentral/postcentral gyrus of rolandic operculum, superior temporal gyrus, middle cingulate cortex, supplementary motor area, and putamen) in hypomanic BD (vs. depressed and euthymic BD), correlating with motor agitation and irritability Increased occurrence of default-mode CAP (coactivation between amygdala, posterior cingulate cortex, medial prefrontal cortex, angular gyrus, and middle temporal gyrus) in depressed BD (vs. manic and euthymic BD and HS)

Weber-Goericke et al. (2019)*	Meta-analysis	264 HS with high worry and 267 HS (16 fMRI studies)	Repetitive thinking/worry (HS)	Task-based fMRI (affective tasks)	Increased activation in cluster comprising anterior insula, inferior frontal gyrus, and middle frontal gyrus (showing increased FC with SN and DMN) in HS with high worry (vs. HS with low worry) during affective tasks
Stern et al. (2022)	Study	85 Obsessive-compulsive disorder 51 HS	Repetitive thinking (Obsessive-compulsive disorder)	Resting-state fMRI	Correlation of increased local connectivity/ReHo in DMN areas (subgenual/pregenual anterior cingulate cortex, temporal pole, middle temporal gyrus, and caudate) and decreased local connectivity/ReHo in SMN areas (precentral gyrus, postcentral gyrus, paracentral lobule, and supplementary motor area) with perseverative thinking in obsessive-compulsive disorder and HS (with obsessive-compulsive disorder showing higher perseverative thinking vs. HS) Decreased dominance of local connectivity in SMN areas over DMN areas in obsessive-compulsive disorder with high perseverative thinking (vs. HS) and increased dominance of local connectivity in SMN areas over DMN areas in obsessive-compulsive disorder with low perseverative thinking (vs. HS) Correlation of increased local connectivity in DMN areas and decreased dominance of SMN over DMN connectivity with unacceptable perseverative thoughts in obsessive-compulsive disorder; correlation of increased local connectivity in SMN areas and increased dominance of SMN over DMN connectivity with symmetry/ordering/arranging

					symptoms in obsessive-compulsive disorder
Rasgon et al. (2017)*	Meta-analysis	1186 Obsessive-compulsive disorder and 1159 HS (54 fMRI studies)	Obsessive-compulsive symptomatology (Obsessive-compulsive disorder)	Task-based fMRI (obsessive-compulsive symptom provocation, affective tasks, cognitive tasks)	Increased activation in insula, caudate head, putamen, and perigenual anterior cingulate cortex (as well as decreased activation in middle frontal gyrus and posterior caudate) in obsessive-compulsive disorder (vs. HS) during symptom provocation and affective tasks Increased activation in posterior cingulate cortex (as well as decreased activation in pallidum, ventral anterior thalamus, and posterior caudate) in obsessive-compulsive disorder (vs. HS) during cognitive tasks
Thorsen et al. (2018)*	Meta-analysis	571 Obsessive-compulsive disorder and 564 HS (25 studies)	Obsessive-compulsive symptomatology (Obsessive-compulsive disorder)	Task-based fMRI / PET (obsessive-compulsive symptom provocation, affective tasks)	Increased activation in medial prefrontal cortex (including orbitofrontal cortex, ventromedial prefrontal cortex, and subgenual anterior cingulate cortex), middle temporal gyrus, inferior occipital gyrus, putamen, and amygdala in obsessive-compulsive disorder (vs. HS) during symptom provocation and affective tasks Correlation of increased activation in medial prefrontal cortex, subgenual anterior cingulate cortex, and precuneus with obsessive-compulsive symptomatology in obsessive-compulsive disorder Correlation of increased activation in insula and putamen (as well as decreased activation in ventromedial prefrontal cortex) with anxious-depressive symptomatology in

					obsessive-compulsive disorder
Lee et al. (2014)	Study	18 Anorexia nervosa 20 Bulimia nervosa 20 HS	Repetitive thinking/worry-rumination (Anorexia nervosa)	Resting-state fMRI	Increased FC of supragenual anterior cingulate cortex with precuneus and retrosplenial cingulate cortex (as well as decreased FC of supragenual anterior cingulate cortex with ventrolateral and dorsolateral prefrontal cortex) in anorexia nervosa (vs. HS) Increased FC of supragenual anterior cingulate cortex with precuneus and orbitofrontal cortex (as well as decreased FC of supragenual anterior cingulate cortex with parahippocampal gyrus) in bulimia nervosa (vs. HS) Correlation of increased FC between supragenual anterior cingulate cortex and precuneus/retrosplenial cingulate cortex with worry-rumination on body shape in HS and anorexia-bulimia nervosa
Boehm et al. (2014)	Study	35 Anorexia nervosa 35 HS	Anorexic symptomatology (Anorexia nervosa)	Resting-state fMRI	Increased FC between DMN and anterior insula, as well as increased FC between CEN and angular gyrus, in anorexia nervosa (vs. HS)
Chase et al. (2011)	Meta-analysis	522 Addictive disorders (42 studies)	Repetitive thinking/craving (Addictive disorders: alcohol, nicotine, cocaine, heroin, cannabis, gambling)	Task-based fMRI / PET (addictive symptom provocation)	Increased activation in medial prefrontal cortex/orbitofrontal cortex, inferior frontal gyrus, superior frontal gyrus, posterior cingulate cortex, inferior occipital gyrus, ventral striatum, and amygdala in addictive disorders during addictive symptom provocation (exposure to drug cues) (vs. exposure to control cues) Correlation of increased activation in middle frontal gyrus, inferior parietal

					lobule, and amygdala with increased craving in addictive disorders
Schacht et al. (2013)	Meta-analysis	679 Alcohol addiction and 174 HS (28 studies)	Repetitive thinking/craving (Addictive disorders: alcohol)	Task-based fMRI / PET / SPECT (addictive symptom provocation)	Increased activation in ventral anterior cingulate cortex, insula/claustrum, ventromedial prefrontal cortex, posterior cingulate cortex/precuneus, middle temporal gyrus, parahippocampal gyrus, inferior occipital gyrus/fusiform gyrus, ventral striatum (caudate head), and thalamus in alcohol addiction during addictive symptom provocation (exposure to drug cues) Increased activation in posterior cingulate cortex/precuneus and superior temporal gyrus in alcohol addiction (vs. HS) during exposure to drug cues
Wilson and Sayette (2015)	Meta-analysis	667 Nicotine addiction (25 fMRI studies)	Repetitive thinking/craving (Addictive disorders: nicotine)	Task-based fMRI (addictive symptom provocation)	Increased activation in ventromedial prefrontal cortex in nicotine addiction with nicotine deprivation (vs. nicotine addiction without nicotine deprivation) during addictive symptom provocation (exposure to drug cues)
Noori et al. (2016)*	Meta-analysis	2557 HS and 3016 Addictive disorders (163 fMRI studies, 11 PET studies, and 2 SPECT studies)	Repetitive thinking/craving (HS / Addictive disorders: alcohol, nicotine, cocaine, heroin, cannabis, gambling)	Task-based fMRI / PET / SPECT (pleasure induction, addictive symptom provocation)	Increased activation in insula, anterior cingulate cortex, inferior frontal gyrus, middle frontal gyrus, caudate head, amygdala, parahippocampal gyrus, substantia nigra, and cerebellum in HS during pleasure induction (exposure to natural stimuli like sex and food) and addictive disorders during addictive symptom provocation (exposure to drug/gambling cues) Additional increased activation in medial prefrontal cortex, posterior cingulate cortex, middle temporal

					gyrus, caudate body, and putamen in addictive disorders during exposure to drug/gambling cues
Hill-Bowen et al. (2021)*	Meta-analysis	2110 HS and 4093 Addictive disorders (196 fMRI studies)	Repetitive thinking/craving (HS / Addictive disorders: alcohol, nicotine, cocaine, heroin, cannabis)	Task-based fMRI (pleasure induction, addictive symptom provocation)	Increased activation in SN (ventral/posterior insula and anterior cingulate cortex), DMN (ventral anterior cingulate cortex, posterior cingulate cortex/precuneus, dorsomedial nucleus of thalamus, and nucleus accumbens), CEN (inferior frontal cortex, superior parietal lobule, and precentral gyrus), LN (orbitofrontal cortex, dorsal insula, and amygdala), and VN (inferior/medial occipital cortex, fusiform gyrus, and lateral geniculate nucleus of thalamus) in HS during pleasure induction (exposure to natural stimuli like sex and food) and addictive disorders during addictive symptom provocation (exposure to drug cues) Increased activation in posterior cingulate cortex, middle/inferior temporal gyrus, inferior parietal lobule, dorsolateral prefrontal cortex, and postcentral gyrus in addictive disorders during exposure to drug cues (vs. addictive disorders or HS during exposure to food and sex stimuli or control cues) Increased activation in posterior insula, orbitofrontal cortex, occipital cortex/fusiform gyrus, temporoparietal junction, and thalamus in addictive disorders or HS during exposure to food and sex stimuli (vs. addictive disorders or HS during exposure to drug cues)

THOUGHT EXCITATION – PSYCHOSIS					
Study	Type	Sample	Phenomenal-Behavioral Pattern (Group)	Method	Results
Jardri et al. (2011)	Meta-analysis	68 SCZ with hallucinations (8 fMRI studies and 2 PET studies)	Hallucinations: auditory (SCZ)	fMRI / PET (hallucination capture)	Increased activation in superior temporal gyrus/primary auditory cortex, precentral gyrus, middle temporal gyrus, inferior parietal lobule, inferior frontal gyrus/Broca's area, frontal operculum, anterior insula, and hippocampus/parahippocampal gyrus in SCZ during auditory hallucinations (vs. same subjects during absence of hallucinations)
Kompus et al. (2011)*	Meta-analysis	103 SCZ with hallucinations (10 fMRI studies and 2 PET studies using hallucination capture) 204 SCZ with hallucinations and 170 HS (9 fMRI studies and 2 PET studies using exteroceptive stimulation)	Hallucinations: auditory (SCZ)	fMRI / PET (hallucination capture) Task-based fMRI / PET (exteroceptive stimulation)	Increased activation in superior temporal gyrus/primary auditory cortex, middle temporal gyrus, inferior parietal lobule, inferior frontal gyrus, superior frontal gyrus, insula, and hippocampus (possibly along with precentral/postcentral gyrus and cerebellum) in SCZ during auditory hallucinations (vs. same subjects during absence of hallucinations) Decreased activation in superior temporal gyrus/primary auditory cortex, anterior cingulate cortex, superior frontal gyrus, retrosplenial cortex/hippocampus, and thalamus in SCZ with auditory hallucinations (vs. HS) during exteroceptive auditory stimulation
Kuhn and Gallinat (2012)*	Meta-analysis	85 SCZ with hallucinations (8 fMRI studies and 2 PET studies using hallucination capture) 120 SCZ and 69 HS (6 fMRI studies and 1 PET study using verbal	Hallucinations/auditory (SCZ)	fMRI / PET (hallucination capture) Task-based fMRI / PET (verbal tasks)	Increased activation in inferior parietal lobule/parietal operculum, inferior frontal gyrus, and postcentral gyrus in SCZ during auditory hallucinations (vs. same subjects during absence of hallucinations) Decreased activation in superior

		tasks)			temporal gyrus, middle temporal gyrus, anterior cingulate cortex, and premotor cortex in SCZ with auditory hallucinations (vs. SCZ without auditory hallucinations and HS) during verbal tasks
Van Lutterveld et al. (2013)	Meta-analysis	80 SCZ with hallucinations (8 fMRI studies and 2 PET studies using hallucination capture) 284 HS (11 fMRI studies using exteroceptive stimulation)	Hallucinations: auditory (SCZ)	fMRI / PET (hallucination capture) Task-based fMRI (exteroceptive stimulation)	Increased activation in superior temporal gyrus/primary auditory cortex, postcentral/precentral gyrus, inferior frontal gyrus (DMN/SN)†, insula/claustrum, medial frontal cortex (SN)†, parahippocampal gyrus, pulvinar and medial geniculate nucleus of thalamus, putamen, and cerebellum in SCZ during auditory hallucinations (vs. same subjects during absence of hallucinations) Increased activation in superior temporal gyrus/primary auditory cortex, postcentral/precentral gyrus, inferior parietal lobule, inferior frontal gyrus, superior frontal gyrus, insula/claustrum, medial frontal cortex, anterior cingulate cortex, posterior cingulate cortex, inferior occipital gyrus, thalamus, putamen, amygdala, and cerebellum in HS during exteroceptive auditory stimulation (vs. same subjects during absence of auditory stimulation) Increased activation in superior (transverse) temporal gyrus/primary auditory cortex and inferior frontal gyrus in both SCZ during auditory hallucinations and HS during exteroceptive auditory stimulation
Zmigrod et al. (2016)	Meta-analysis	211 SCZ/Psychotic disorders with	Hallucinations: auditory and visual	fMRI / PET (hallucination capture)	Increased activation in superior temporal gyrus (mainly auditory

	hallucinations: 190 with auditory hallucinations and 21 with visual hallucinations (16 fMRI studies and 1 PET study)	(SCZ/Psychotic disorders)		associative cortex), along with postcentral/precentral gyrus (SMN)†, middle temporal gyrus and inferior frontal gyrus (DMN)†, insula/claustrum and anterior cingulate cortex/medial prefrontal cortex (SN)†, hippocampus/parahippocampal gyrus, thalamus, and cerebellum in SCZ and other psychotic disorders during auditory hallucinations (vs. same subjects during absence of hallucinations) Increased activation in occipito-temporo-parietal cortex around cuneus, lingual/fusiform gyrus, and precuneus (mainly visual associative visual cortex), and cerebellum in SCZ and other psychotic disorders during visual hallucinations (vs. same subjects during absence of hallucinations) Increased activation in superior temporal gyrus (auditory associative cortex), inferior frontal gyrus, and insula in SCZ and other psychotic disorders during auditory hallucinations (vs. SCZ and other psychotic disorders during visual hallucinations) Increased activation in occipito-temporo-parietal cortex around cuneus and lingual/fusiform gyrus (mainly visual associative cortex) and cerebellum in SCZ and other psychotic disorders during visual hallucinations (vs. SCZ and other psychotic disorders during auditory hallucinations) No common activation in SCZ and other psychotic disorders during auditory or visual hallucinations

Barber et al. (2021)	Meta-analysis	144 SCZ with hallucinations (9 fMRI studies and 2 PET studies)	Hallucinations: auditory (SCZ)	fMRI / PET (hallucination capture)	Increased activation in inferior parietal lobule/postcentral gyrus/insula and cerebellum in SCZ during auditory hallucinations (vs. same subjects during absence of hallucinations)
Jardri et al. (2013)	Study	20 Brief psychotic disorder with hallucinations 20 HS	Hallucinations: auditory and visual (Brief psychotic disorder)	fMRI (hallucination capture) Task-based fMRI (exteroceptive stimulation)	Increased activation mainly in auditory associative cortex (superior temporal gyrus), along with precentral gyrus, middle temporal gyrus, inferior parietal lobule, inferior frontal gyrus, and anterior insula, in SCZ during auditory hallucinations (vs. same subjects during absence of hallucinations) Increased activation mainly in visual associative cortex (cuneus, lingual gyrus, and fusiform gyrus) in SCZ during visual hallucinations (vs. same subjects during absence of hallucinations) Increased activation mainly in multimodal associative cortex (superior temporal sulcus), along with sensory-related cortex (temporo-occipital cortex), in SCZ during auditory and visual hallucinations (vs. same subjects during absence of hallucinations) Increased activation in primary auditory or visual cortex (Heschl's gyrus or striate cortex) in subgroup of SCZ during auditory or visual hallucinations, respectively (vs. same subjects during absence of hallucinations); correlation of increased activation in primary sensory cortex with vividness of hallucinations in SCZ

					Correlation of increased activation in sensory associative cortex with decreased activation in DMN (anti-correlation) in SCZ during hallucinations and HS during exteroceptive stimulation (while no correlation in SCZ during absence of hallucinations and HS during absence of exteroceptive stimulation) Correlation of increased spatial and temporal instability of DMN (decreased spatial fitting of DMN and increased power spectral density of low-frequency fluctuations typical of DMN) with hallucinations in SCZ (both during hallucinations and absence of hallucinations) (with alterations of DMN persisting during hallucination-free periods in SCZ)
Lefebvre et al. (2016)	Study	25 SCZ with hallucinations	Hallucinations (SCZ)	fMRI (hallucination capture)	Increased activation in middle/superior temporal gyrus (DMN/DAN)†, precentral/postcentral gyrus and premotor cortex (SMN)†, supramarginal gyrus and temporoparietal junction (SN)†, inferior frontal gyrus/Broca's area (CEN/SN)†, dorsolateral prefrontal cortex (DAN)†, insula and supragenual anterior cingulate cortex (SN)† in SCZ during auditory (mainly), visual, and other hallucinations (vs. same subjects during absence of hallucinations) (with progressive increasing activity from hallucination-free period to hallucinatory period and then decreasing activity during transition out from hallucinatory period) Low activity (BOLD signal) of hallucination-related areas, along with

					correlation between hallucination-related areas and DMN, as well as SN modulation of connection from CEN to DMN, in SCZ during hallucination-free period Intermediate activity of hallucination-related areas, along with SN-DMN-CEN disorganization, in SCZ during transition from hallucination-free period to hallucinatory period High activity of hallucination-related areas, along with anti-correlation between hallucination-related areas and DMN, as well as hippocampus modulation of SN and SN modulation of connection from CEN to DMN and from DMN to CEN, in SCZ during hallucinatory period Low activity of hallucination-related areas, along with SN modulation of connection from CEN to DMN and modulation from SN to CEN (with CEN takeover), in SCZ during transition out from hallucinatory period Correlation between activity in hallucination-related areas and activity in DMN mainly persisting in all periods, with transient anti-correlation during hallucinatory experience
Mallikarjun et al. (2018)	Study	9 First-episode psychosis with hallucinations 9 First-episode psychosis without hallucinations 18 HS	Hallucinations: auditory (First-episode psychosis)	fMRI (hallucination capture) Resting-state fMRI	Increased activation in superior temporal gyrus/auditory cortex, along with insula/claustrum (SN), posterior cingulate cortex/precuneus (DMN), and parahippocampal gyrus/lingual gyrus in first-episode psychosis during auditory hallucinations (vs. same subjects during absence of

					hallucinations) Increased FC of insula (SN) with angular gyrus (DMN) and cerebellum, along with increased FC of claustrum with postcentral gyrus and cerebellum (as well as decreased FC between insula and claustrum), in first-episode psychosis with auditory hallucinations (vs. HS)
Hugdahl et al. (2022)	Study	45 SCZ with hallucinations 21 Subclinical conditions with hallucinations	Hallucinations: auditory (SCZ, Subclinical conditions with hallucinations)	fMRI (hallucination capture)	Increased activation in superior/middle temporal gyrus (including Wernicke's area), inferior frontal gyrus (including Broca's area), insula, superior frontal gyrus, inferior parietal lobule, parahippocampal gyrus/hippocampus, postcentral/precentral gyrus, thalamus, and cerebellum in SCZ and subclinical conditions during auditory hallucinations (vs. same subjects during absence of hallucinations) Increased activation in ventromedial prefrontal cortex (DMN)† 2-5 seconds before onset of auditory hallucinations in SCZ and subclinical conditions
Horga et al. (2011)	Study	9 SCZ with hallucinations 7 SCZ without hallucinations 8 HS	Hallucinations: auditory (SCZ)	Resting-state PET	Increased CMR in superior and middle temporal gyrus, superior medial prefrontal cortex (DMN)†, and caudate (as well as decreased CMR in parietal cortex, hippocampus/parahippocampal gyrus, and cerebellum), in SCZ with auditory hallucinations (vs. SCZ without hallucinations and HS)
Wolf et al. (2011)	Study	10 SCZ with hallucinations 14 HS	Hallucinations: auditory (SCZ)	Resting-state fMRI	Increased FC in superior/middle temporal gyrus and middle frontal gyrus, as well as decreased FC in anterior cingulate cortex and posterior cingulate cortex/precuneus (within a

					fronto-temporo-parietal network), in SCZ with auditory hallucinations (vs. HS) Correlation of increased FC in superior temporal gyrus and middle frontal gyrus, as well as decreased FC in anterior cingulate cortex, with hallucinations in SCZ Correlation of increased FC in middle temporal gyrus with psychotic symptomatology, as well as correlation of decreased FC in middle frontal gyrus with negative symptomatology, in SCZ
Manoliu et al. (2014)	Study	18 SCZ with hallucinations and delusions 24 HS	Hallucinations (SCZ)	Resting-state fMRI	Increased FC within DMN (decreased FC in anterior cingulate cortex and precuneus, along with increased FC between anterior and posterior components of DMN); altered FC within CEN (decreased FC in middle frontal gyrus and inferior parietal lobule, as well as increased FC in angular gyrus and inferior temporal gyrus); altered FC within SN (decreased FC in anterior insula, as well as increased FC in anterior cingulate cortex); increased FC between DMN and CEN (increased FC of anterior and posterior-superior components of DMN with ventral component of CEN), in SCZ with hallucinations and delusions (vs. HS) Correlation of decreased FC in anterior insula with increased FC between anterior DMN and ventral CEN; correlation of decreased FC in anterior insula, as well as increased FC between anterior DMN and ventral

					CEN, with hallucinations, in SCZ
Amad et al. (2014)	Study	33 SCZ with hallucinations	Hallucinations: auditory and visual (SCZ)	Resting-state fMRI	Increased FC of hippocampus with medial prefrontal cortex and caudate in SCZ with auditory and visual hallucinations (vs. SCZ with auditory hallucinations) Increased FC of hippocampus with superior temporal gyrus, precentral/postcentral gyrus, middle frontal gyrus, lenticular nucleus, and dorsomedial nucleus of thalamus in SCZ with auditory hallucinations (vs. SCZ with auditory and visual hallucinations)
Oertel-Knochel et al. (2014)	Study	24 SCZ with hallucinations 24 SCZ relatives 24 HS	Hallucinations: auditory (SCZ)	Resting-state fMRI	Increased FC of superior temporal gyrus/primary auditory cortex with anterior cingulate cortex in SCZ with (history of) auditory hallucinations (vs. SCZ relatives and HS) Decreased FC of primary auditory cortex with superior temporal gyrus, insula, and parahippocampal gyrus in SCZ with (history of) auditory hallucinations and SCZ relatives (vs. HS)
Alonso-Solis et al. (2015)	Study	19 SCZ with hallucinations 14 SCZ without hallucinations 20 HS	Hallucinations: auditory (SCZ)	Resting-state fMRI	Increased FC of dorsomedial prefrontal cortex (DMN) with superior temporal gyrus/primary auditory cortex, insula/central opercular cortex (SN), and precentral gyrus, along with increased FC of temporal pole with cerebellum; decreased FC of ventromedial prefrontal cortex with supragenual anterior cingulate cortex/paracingulate cortex, along with decreased FC of hippocampus with posterior cingulate cortex, in SCZ with

					auditory hallucinations (vs. SCZ without hallucinations) Increased FC of dorsomedial prefrontal cortex with superior temporal gyrus/primary auditory cortex, along with increased FC of temporal pole with cerebellum; decreased FC of ventromedial prefrontal cortex with supragenual anterior cingulate cortex/paracingulate cortex, along with decreased FC of hippocampus with posterior cingulate cortex; and increased FC of inferior parietal lobule and retrosplenial cortex with occipital cortex, in SCZ with auditory hallucinations (vs. HS) Increased FC of inferior parietal lobule and retrosplenial cortex with occipital cortex, in SCZ without auditory hallucinations (vs. HS)
Cui et al. (2016)	Study	17 SCZ with hallucinations 15 SCZ without hallucinations 19 HS	Hallucinations: auditory (SCZ)	Resting-state fMRI	Increased ReHo in middle frontal gyrus (CEN)†, as well as increased FC between middle/inferior frontal gyrus and putamen, in SCZ with auditory hallucinations (vs. SCZ without hallucinations) Increased ReHo in middle frontal gyrus and putamen; increased ALFF in putamen, as well as decreased ALFF in postcentral gyrus; decreased FC between putamen, occipital cortex, precuneus, fusiform gyrus, postcentral/precentral gyrus, and cerebellum, in SCZ with auditory hallucinations (vs. HS) Increased ReHo in putamen; increased ALFF in putamen, as well as decreased

					ALFF in parahippocampal gyrus; decreased FC between putamen, occipital cortex, precuneus, inferior temporal gyrus/fusiform gyrus, postcentral/precentral gyrus and supplementary motor area, and cerebellum, along with middle temporal gyrus, middle/inferior frontal gyrus, and orbitofrontal cortex, in SCZ without auditory hallucinations (vs. HS)
Cui et al. (2017)a	Study	17 SCZ with hallucinations 15 SCZ without hallucinations 19 HS	Hallucinations: auditory (SCZ)	Resting-state fMRI	Increased FC and/or ALFF mainly in superior temporal gyrus/auditory cortex, along with medial prefrontal cortex, posterior cingulate cortex/precuneus, and angular gyrus (DMN), dorsolateral prefrontal cortex (CEN), and insula, as well as decreased FC and/or ALFF in precentral gyrus (SMN), in SCZ with auditory hallucinations (vs. SCZ without hallucinations and/or HS)
Zhuo et al. (2017)	Study	35 SCZ with hallucinations 41 SCZ without hallucinations 50 HS	Hallucinations: auditory (SCZ)	Resting-state ASL-MRI	Increased CBF in superior temporal gyrus, middle temporal gyrus, and caudate, as well as decreased CBF in superior parietal lobule, in SCZ with auditory hallucinations (vs. SCZ without hallucinations and HS) Decreased CBF in anterior cingulate cortex, insula, lateral prefrontal cortex/frontal pole, and occipital cortex, as well as increased CBF in posterior cingulate cortex, middle temporal gyrus/temporal pole, putamen, and thalamus, in SCZ with and without auditory hallucinations (vs. HS)

Cui et al. (2017)b	Study	25 SCZ with hallucinations 25 SCZ without hallucinations 25 HS	Hallucinations: auditory (SCZ)	Resting-state ASL-MRI	Decreased CBF in superior frontal gyrus (DMN)†, middle frontal gyrus and supplementary motor area (CEN)†, and postcentral gyrus (SMN)† in SCZ with auditory hallucinations (vs. SCZ without hallucinations); decreased CBF in superior/middle/inferior frontal gyrus, supplementary motor area, precentral/postcentral gyrus, insula, inferior parietal lobule/angular gyrus, and caudate in SCZ with auditory hallucinations (vs. HS); decreased CBF in middle frontal gyrus in SCZ without auditory hallucinations (vs. HS) Increased FC of superior frontal gyrus with middle temporal gyrus and fusiform gyrus, along with decreased FC of superior frontal gyrus with pallidum; increased FC of middle frontal gyrus with insula; increased FC of supplementary motor area with pallidum, as well as decreased FC of supplementary motor area with hippocampus and precentral gyrus; increased FC of postcentral gyrus with occipital cortex, as well as decreased FC of postcentral gyrus with angular gyrus, in SCZ with auditory hallucinations (vs. SCZ without hallucinations)
Hare et al. (2017)	Study	81 SCZ with hallucinations 61 SCZ without hallucinations 155 HS	Hallucinations: auditory and visual (SCZ)	Resting-state fMRI	Increased ALFF in middle temporal gyrus/temporal pole (DMN)†, inferior frontal cortex, and hippocampus, as well as possible decreased ALFF in occipital cortex in SCZ with visual and auditory hallucinations (vs. HS) Increased ALFF in inferior frontal gyrus and (possibly) inferior temporal cortex, as well as decreased ALFF in

					occipital cortex (cuneus and lingual gyrus), in SCZ with auditory hallucinations (vs. HS) Increased ALFF in inferior temporal cortex (fusiform gyrus) and hippocampus in SCZ with visual and auditory hallucinations (vs. SCZ with auditory hallucinations); increased ALFF in inferior frontal gyrus in SCZ with auditory hallucinations (vs. SCZ with visual and auditory hallucinations) Decreased ALFF in occipital cortex (cuneus and lingual gyrus) and inferior posterior temporal cortex in SCZ without hallucinations (vs. HS) Decreased ALFF in occipital cortex (cuneus and lingual gyrus), precuneus, postcentral gyrus, and thalamus, as well as increased ALFF in inferior frontal gyrus, inferior temporal cortex, insula, and hippocampus, in SCZ (vs. HS)
Chang et al. (2017)	Study	18 SCZ with hallucinations 18 SCZ without hallucinations 18 HS	Hallucinations: auditory (SCZ)	Resting-state fMRI	Increased FC between superior temporal gyrus, postcentral gyrus, and inferior frontal gyrus (AN)†, insula and supragenual anterior cingulate cortex (SN)†, and inferior parietal lobule (DMN)† (in particular, increased FC of insula with superior temporal gyrus and inferior parietal lobule, increased FC of supragenual anterior cingulate cortex with insula and superior temporal gyrus, and increased FC of postcentral gyrus with inferior frontal gyrus/Broca's area and supragenual anterior cingulate cortex), in first-episode SCZ with auditory

					hallucinations (vs. first-episode SCZ without hallucinations and HS)
Orliac et al. (2017)	Study	17 SCZ with hallucinations 11 SCZ without hallucinations 29 HS	Hallucinations: auditory and visual (SCZ)	Resting-state fMRI	Increased FC of posterior cingulate cortex/precuneus with visual occipital cortex in SCZ with visual and auditory hallucinations (vs. SCZ with auditory hallucinations and SCZ without hallucinations) (correlation of increased FC between posterior cingulate cortex and visual occipital cortex with positive symptomatology in SCZ) Decreased FC within temporo-insular areas, occipital areas, and fronto-parietal areas, along with decreased FC between superior temporal gyrus/insula and occipital cortex, in SCZ (vs. HS)
Hare et al. (2018)	Study	81 SCZ with hallucinations 60 SCZ without hallucinations 153 HS	Hallucinations: auditory and visual (SCZ)	Resting-state fMRI	Increased FC of superior temporal gyrus/Wernicke's area with hippocampus and SN areas, as well as decreased FC of superior temporal gyrus/Wernicke's area with occipital cortex/primary visual cortex, in SCZ with auditory or auditory-visual hallucinations (vs. HS) Increased FC of superior temporal gyrus/Wernicke's area with hippocampus, as well as decreased FC of superior temporal gyrus/Wernicke's area with occipital cortex/primary visual cortex, along with decreased FC of superior temporal gyrus/primary auditory cortex with superior temporal gyrus/Wernicke's area, SN areas, anterior and posterior DMN areas, occipital cortex/primary visual cortex, and putamen, in SCZ without hallucinations (vs. HS)

					Correlation of increased FC between superior temporal gyrus/Wernicke's area and SN areas with auditory (but not visual) hallucinations in SCZ Correlation of increased ALFF in hippocampus with increased FC between superior temporal gyrus/primary auditory cortex and SN areas in SCZ with hallucinations (while: no correlation in SCZ without hallucinations; correlation of increased ALFF in hippocampus with decreased FC between superior temporal gyrus/primary auditory cortex and SN areas, decreased FC between superior temporal gyrus/primary auditory cortex and superior temporal gyrus/Wernicke's area, and increased FC between superior temporal gyrus/Wernicke's area and hippocampus, in HS)
Scheinost et al. (2019)	Study	28 SCZ with hallucinations 18 SCZ without hallucinations 20 HS	Hallucinations: auditory (SCZ)	Resting-state fMRI	Decreased FC distribution in medial prefrontal cortex and posterior cingulate cortex, along with decreased FC distribution in thalamus and increased FC distribution in parahippocampal gyrus, in SCZ with auditory hallucinations (vs. SCZ without hallucinations and vs. HS, respectively) Increased FC of medial prefrontal cortex with inferior frontal gyrus/Broca's area, anterior cingulate cortex/supplementary motor area, supramarginal gyrus/temporoparietal junction, and putamen, as well as decreased FC of medial prefrontal cortex with orbitofrontal cortex and

posterior cingulate cortex; increased FC of posterior cingulate cortex with insula/inferior frontal gyrus, anterior cingulate cortex/supplementary motor area, and supramarginal gyrus/temporoparietal junction, as well as decreased FC of posterior cingulate cortex with lateral prefrontal cortex and orbitofrontal cortex; increased FC of inferior frontal gyrus/Broca's area with medial prefrontal cortex, lateral prefrontal cortex, temporoparietal junction, and posterior cingulate cortex, as well as decreased FC of inferior frontal gyrus/Broca's area with insula, postcentral/precentral gyrus, superior temporal gyrus/auditory cortex, and fusiform gyrus; decreased FC of visual occipital cortex with parahippocampal gyrus and temporal cortex; increased FC of putamen with medial prefrontal cortex, temporoparietal junction, lateral prefrontal cortex, and posterior parietal cortex, as well as decreased FC of putamen with somatosensory parietal cortex and visual occipital cortex, in SCZ with auditory hallucinations (vs. SCZ without hallucinations)

Correlation of increased FC distribution in superior temporal gyrus/auditory cortex, as well as decreased FC distribution in posterior cingulate cortex and temporoparietal junction, with auditory hallucinations in SCZ

Maximum overlap of functional alterations in DMN and SMN (including auditory cortex) in SCZ with auditory hallucinations

					In summary: decreased FC between anterior and posterior midline areas of DMN† (decreased FC between medial prefrontal cortex and posterior cingulate cortex); increased FC between midline and lateral areas of DMN† (increased FC of medial prefrontal cortex and posterior cingulate cortex with temporoparietal junction); increased FC between posterior DMN† and SN† (increased FC of posterior cingulate cortex with insula and anterior cingulate cortex); increased FC between DMN† and CEN† (increased FC of medial prefrontal cortex and posterior cingulate cortex with inferior frontal gyrus, anterior cingulate cortex/supplementary motor area, and supramarginal gyrus/temporoparietal junction); decreased FC between LN† and DMN† (decreased FC of orbitofrontal cortex with medial prefrontal cortex and posterior cingulate cortex); decreased FC in VN† (decreased FC between occipital and temporal cortex), in SCZ with auditory hallucinations (vs. SCZ without hallucinations)
Zhuo et al. (2020)b	Study	35 SCZ with hallucinations 60 HS	Hallucinations: auditory (SCZ)	Resting-state fMRI	Increased global FC density in superior temporal gyrus and medial prefrontal cortex in SCZ with auditory hallucinations (vs. HS) Additional increased global FC density in posterior cingulate cortex and angular gyrus, as well as decreased global FC density in dorsolateral prefrontal cortex and inferior frontal gyrus/Broca's area, in SCZ with

					auditory hallucinations consisting of non-verbal hallucinations (vs. HS) Additional increased global FC density in inferior frontal gyrus/Broca's area and hippocampus in SCZ with auditory hallucinations consisting of commanding and commenting verbal hallucinations (vs. HS)
Weber et al. (2020)	Study	80 SCZ (including 49 with hallucinations and 19 without hallucinations) 80 HS	Hallucinations (SCZ)	Resting-state fMRI	Decreased dwell time in brain state of negative FC between DMN and insula/SMN/CEN, along with positive FC within DMN, in SCZ with (history of) hallucinations, mainly auditory (vs. SCZ without hallucinations) Decreased dwell time and occurrence rate in brain state of positive FC within and between sensory networks (SMN/AN and VN), as well as increased dwell time in brain state of positive FC within and between all networks (mainly DMN and language network), in SCZ (vs. HS)
Geng et al. (2020)	Study	20 SCZ with hallucinations 17 SCZ without hallucinations	Hallucinations: auditory (SCZ)	Resting-state fMRI	Decreased dwell time (and decreased switch probability) in brain state of negative FC between DMN (medial prefrontal cortex and posterior cingulate cortex) and language network/AN (superior temporal gyrus/Wernicke's area, inferior frontal gyrus/Broca's area, and supplementary motor area), as well as decreased dynamic and static FC within language network/AN, decreased dynamic FC between language network and CEN, and decreased static FC between language network and supragenual anterior cingulate cortex/amygdala, in SCZ with (history of) auditory

					hallucinations (vs. SCZ without hallucinations)
Okuneye et al. (2020)	Study	123 SCZ with hallucinations 39 SCZ without hallucinations 24 BD with hallucinations 57 BD without hallucinations 186 HS	Hallucinations (SCZ, BD)	Resting-state fMRI	Correlation of increased FC between superior temporal gyrus/primary auditory cortex, superior/middle temporal gyrus, and superior temporal gyrus/temporoparietal junction (including Wernicke's area) with hallucinations (mainly auditory) in SCZ and BD Decreased FC between superior temporal gyrus, postcentral gyrus, middle temporal gyrus, and occipital cortex in SCZ (mainly) and BD (vs. HS)
Schutte et al. (2021)	Study	99 SCZ with hallucinations 74 BD with hallucinations 42 BD without hallucinations 40 Subclinical conditions with hallucinations 228 HS	Hallucinations (SCZ, BD, Subclinical conditions with hallucinations)	Resting-state fMRI	Increased FC mainly between superior temporal gyrus/auditory cortex, language-related areas, insula, and cingulate cortex (increased FC between AN, SMN, and cingulo-opercular network, as well as decreased FC between VN, SN, DMN, and CEN) in SCZ (and subclinical conditions) with hallucinations (vs. HS) Decreased FC between AN, SMN, cingulo-opercular network, SN, and CEN, as well as increased FC between VN, DAN, and DMN, in BD with hallucinations (vs. HS) (while no differences in BD without hallucinations vs. HS)
Qiu et al. (2020)	Study	40 BD in depression with hallucinations 40 BD in depression without hallucinations 40 HS	Hallucinations: auditory (BD)	Resting-state fMRI	Increased global FC density in superior temporal gyrus/Wernicke's area and inferior frontal gyrus/Broca's area, as well as decreased global FC density in hippocampus, in depressed BD with auditory hallucinations (vs. depressed

					BD without hallucinations) Increased global FC density in insula, anterior cingulate cortex, middle/posterior cingulate cortex, and parieto-temporal cortex (mainly SN and DMN)†, as well as decreased global FC density in dorsolateral prefrontal cortex, posterior parietal cortex, and occipital cortex (mainly CEN and VN)†, in depressed BD with and without auditory hallucinations (vs. HS)
Zhuo et al. (2020)c	Study	35 MDD in depression with hallucinations 40 MDD in depression without hallucinations 50 HS	Hallucinations: auditory (MDD)	Resting-state fMRI	Increased global FC density in superior temporal gyrus/Wernicke's area, hippocampus, and thalamus, as well as decreased global FC density in dorsolateral prefrontal cortex, in depressed MDD with auditory hallucinations (vs. depressed MDD without hallucinations) Decreased global FC density in postcentral gyrus, precentral gyrus, occipital cortex, insula, and striatum (mainly SMN-VN and SN)†, as well as increased global FC density in anterior/middle/posterior cingulate cortex, in depressed MDD with and without auditory hallucinations (vs. HS)
Gao et al. (2015)	Study	14 SCZ with delusions 14 HS	Delusions (SCZ)	Resting-state fMRI	Increased ReHo in dorsomedial prefrontal cortex and anterior cingulate cortex, as well as decreased ReHo in occipital cortex, in SCZ with delusions (vs. HS)
Spence et al. (1997)	Study	7 SCZ with delusions 6 SCZ without delusions	Psychosis (delusions/control) / SCZ	Task-based PET (motor tasks)	Increased CBF of inferior parietal lobule/angular gyrus and cingulate cortex (possibly along with premotor

		6 HS			cortex and cerebellum) in SCZ with delusion of control (vs. same subjects with delusion of control in remission at follow-up, as well as SCZ without delusion of control and HS) during volitional processing in motor tasks Decreased CBF of sensorimotor cortex (and possibly prefrontal cortex) in SCZ with and without delusion of control (vs. HS) during volitional processing in motor tasks
Blackwood et al. (2004)	Study	8 SCZ with delusions 8 HS	Delusions: reference-persecution (SCZ)	Task-based fMRI (delusion induction)	Increased activation in posterior cingulate cortex, as well as decreased activation in ventral anterior cingulate cortex, in SCZ with delusions of persecution (vs. HS) during delusion induction by self-referential processing
Farrer et al. (2004)	Study	8 SCZ with delusions 8 HS	Delusions: control (SCZ)	Task-based PET (delusion induction)	Increased CBF in angular gyrus in SCZ with delusions of control (and related delusions/hallucinations) (vs. HS) during delusion induction by volitional processing (non-ambiguous self-attribution of motor action) Decreased CBF of angular gyrus in SCZ with delusions of control (and related delusions/hallucinations) (vs. HS) during delusion induction by volitional processing (ambiguous self-attribution of motor action) Correlation of increased CBF in angular gyrus with delusions of control (and related delusions/hallucinations) in SCZ during delusion induction by volitional processing (motor action attribution) Correlation of increased CBF in

					angular gyrus and decreased CBF in posterior insula with attribution of motor action from self to others in HS during delusion induction by volitional processing (while absence of correlation in SCZ with delusions of control)
Corlett et al. (2007)	Study	12 SCZ with delusions 12 HS	Delusions (SCZ)	Task-based fMRI (cognitive tasks)	Decreased activation in lateral prefrontal cortex, as well as increased activation in middle temporal gyrus, in SCZ with delusions (vs. HS) during prediction error processing in cognitive tasks Correlation of decreased activation in lateral prefrontal cortex with delusions in SCZ during prediction error processing in cognitive tasks
Menon et al. (2011)	Study	14 SCZ with delusions 15 HS	Delusions: reference-persecution (SCZ)	Task-based fMRI (delusion induction)	Increased activation in dorsal/ventral medial prefrontal cortex and posterior cingulate cortex/precuneus (DMN)†, along with anterior cingulate cortex, insula, ventral striatum/nucleus accumbens, caudate, and midbrain (including ventral tegmental area/substantia nigra) (SN)†, in SCZ with delusions of reference and HS during delusion induction by processing of self-referential stimuli (sentences) (vs. SCZ and HS during processing of non-self-referential stimuli), with SCZ considering as self-referential higher number of non-personalized stimuli than HS Increased activation in dorsomedial prefrontal cortex, insula, and ventral striatum in SCZ similarly during processing of self-referential and non self-referential stimuli (while

					activation greater for self-referential than non self-referential stimuli in HS) Correlation of increased activation in insula and ventral striatum with delusions of reference in SCZ during delusion induction by self-referential processing
Park et al. (2011)	Study	14 SCZ with delusions 15 HS	Delusions: reference-persecution (SCZ)	Task-based fMRI (delusion induction)	Increased activation in ventral and dorsal medial prefrontal cortex, as well as decreased activation in superior temporal sulcus, inferior frontal gyrus, and anterior cingulate cortex, in SCZ with delusions of reference (vs. HS) during delusion induction by theory of mind processing Correlation of increased activation in dorsomedial prefrontal cortex with self-reference and anxiety in SCZ during delusion induction by theory of mind processing (in non self-referential context) Correlation of decreased activation in superior temporal sulcus with delusions and hallucinations in SCZ during delusion induction by theory of mind processing (in self-referential context)
Perez et al. (2015)	Study	26 SCZ with delusions	Delusions: reference-persecution (SCZ)	Task-based fMRI (delusion induction, affective tasks)	Correlation of: increased activation in ventromedial prefrontal cortex, hippocampus/parahippocampal gyrus, and SN areas (supragenual anterior cingulate cortex and insula); decreased activation in posterior DMN areas (posterior cingulate cortex/precuneus and inferior parietal lobule/temporoparietal junction); and increased/decreased activation in

language areas (inferior frontal gyrus and superior temporal gyrus) and visual cortex (occipital cortex and lingual/fusiform gyrus), with delusions of persecution in SCZ during delusion induction by processing of persecutory stimuli (words)

Correlation of: increased activation in lateral orbitofrontal cortex and hippocampus; decreased activation in SN areas (supragenual anterior cingulate cortex and insula) and posterior DMN areas (posterior cingulate cortex/precuneus and inferior parietal lobule); increased/decreased activation in visual cortex (occipital cortex and lingual/fusiform gyrus), with delusions of persecution in SCZ during processing of unspecific fear (visual) stimuli in affective tasks

Correlation of: increased activation in SN areas (supragenual anterior cingulate cortex and insula); decreased activation in orbitofrontal cortex and DMN areas (ventromedial prefrontal cortex, posterior cingulate cortex/precuneus, and inferior parietal lobule, along with hippocampus/parahippocampal gyrus); and increased/decreased activation in language areas (inferior frontal gyrus and superior temporal gyrus) and/or visual cortex (occipital cortex and lingual/fusiform gyrus), with delusions of persecution in SCZ during processing of neutral (auditory or visual) stimuli in affective tasks

In summary: specific increased activation in ventromedial prefrontal

					cortex/anterior DMN† during processing of persecutory stimuli and decreased activation in posterior DMN† during processing of persecutory, fear, and neutral stimuli (possibly reflecting abnormal increased baseline activity); altered activation in SN† during processing of persecutory, fear, and neutral stimuli (increased activation for persecutory stimuli, along with abnormal decreased activation for unspecific fear stimuli and increased activation for neutral stimuli, possibly reflecting decreased differentiation between unspecific fear and neutral stimuli), in SCZ with delusions of persecution
Vicens et al. (2016)	Study	22 Delusional disorder 44 HS	Delusions (Delusional disorder)	Task-based fMRI (cognitive tasks) Resting-state fMRI	Increased activation (decreased deactivation) in medial prefrontal cortex in delusional disorder (vs. HS) during cognitive tasks Decreased FC in insula in delusional disorder (vs. HS)
Kaplan et al. (2016)	Study	7 SCZ with delusions 10 SCZ without delusions 24 HS	Delusions (SCZ)	Task-based fMRI (cognitive tasks)	Decreased activation and effective FC in lateral prefrontal cortex, as well as increased activation and effective FC in midbrain, in SCZ with delusions (vs. SCZ without delusions and/or HS) during prediction error processing in cognitive tasks
Girard et al. (2017)	Study	14 SCZ with delusions 15 HS	Delusions: reference-persecution (SCZ)	Task-based fMRI (delusion induction)	Decreased activation in medial (dorsal and ventral) prefrontal cortex, precuneus, insula, and striatum in SCZ with delusions of reference (vs. HS) during delusion induction by processing of self-referential stimuli (sentences) with positive valence

					Increased activation (trend) in medial (dorsal and ventral) prefrontal cortex, precuneus, insula, and striatum in SCZ with delusions of reference (vs. HS) during delusion induction by processing of self-referential stimuli (sentences) with negative valence
Lariviere et al. (2017)	Study	14 SCZ with delusions 13 SCZ without delusions 15 HS	Delusions: reference-persecution (SCZ)	Task-based fMRI (delusion induction)	Increased activation in medial/orbital prefrontal cortex and middle/inferior temporal gyrus in SCZ with delusions of reference (vs. HS) during delusion induction by processing of self-referential stimuli (sentences) Altered activation in dorsolateral prefrontal cortex, posterior parieto-temporal cortex, supragenual anterior cingulate cortex, and insula in SCZ (vs. HS) during processing of self-referential or non self-referential stimuli (decreased late activation in SCZ with delusions of reference, while increased early activation and decreased late activation in SCZ without delusions, for self-referential stimuli; decreased early activation in SCZ with delusions of reference, while increased early and late activation in SCZ without delusions, for non self-referential stimuli) Decreased deactivation in occipital cortex/precuneus, inferior temporal cortex, superior temporal gyrus, postcentral/precentral gyrus, striatum, thalamus, and cerebellum in SCZ without delusions (vs. HS) during processing of self-referential stimuli Correlation of increased activation in medial/orbital prefrontal cortex and

					middle/inferior temporal gyrus with self-referential attribution in SCZ with delusions of reference during delusion induction by self-referential processing
Lavigne et al. (2020)	Study	33 SCZ with delusions 37 SCZ without delusions 41 HS	Delusions (SCZ)	Task-based fMRI (cognitive tasks)	Increased activation (decreased deactivation) in DMN (including medial prefrontal cortex, posterior cingulate cortex/precuneus, and middle/superior temporal gyrus) and increased activation in SN-DAN-VN (including insula and supragenual anterior cingulate cortex, supramarginal gyrus and premotor cortex, and occipital cortex) as well as decreased activation in CEN (including dorsolateral prefrontal cortex, inferior frontal gyrus, orbitofrontal cortex, and parietal cortex) in SCZ with delusions (vs. SCZ without delusions and HS) during evidence integration processing in cognitive tasks Correlation of increased activation (decreased deactivation) in DMN, increased activation in SN-VN, and decreased activation in CEN with decreased (confirmatory and/or disconfirmatory) evidence integration in SCZ during cognitive tasks
Greenman et al. (2020)	Study	35 SCZ with delusions 31 SCZ without delusions 143 HS	Delusions (SCZ)	Task-based fMRI (cognitive tasks)	Decreased effective FC from parietal to prefrontal cortex (CEN) in SCZ with delusions (vs. SCZ without delusions and HS) during context information updating in working memory tasks (with decreased context information updating in SCZ vs. HS) Correlation of decreased effective FC from parietal to prefrontal cortex with delusions in SCZ during context

					information updating in working memory tasks
Stoyanov et al. (2021)	Study	25 SCZ with delusions 16 BD in depression with delusions 10 MDD in depression with delusions	Delusions: reference-persecution (SCZ + BD, MDD)	Task-based fMRI (delusion induction) Resting-state fMRI	Increased activation in posterior cingulate cortex/precuneus and angular gyrus (DMN) in SCZ with delusions (vs. depressed BD or MDD with delusions) during delusion induction by processing of persecutory stimuli Decreased effective FC from middle frontal gyrus to anterior insula in SCZ with delusions (vs. depressed BD or MDD with delusions)

THOUGHT INHIBITION - ATTENTION DEFICIT					
Study	*Type*	*Sample*	*Phenomenal-Behavioral Pattern (Group)*	*Method*	*Results*
Gao et al. (2019)	Meta-analysis	700 Attention-deficit/hyperactivity disorder and 580 HS (21 fMRI studies)	Attention deficit and hyperactivity (Attention-deficit/hyperactivity disorder)	Resting-state fMRI	Decreased FC within DMN (mainly in middle frontal gyrus) in attention-deficit/hyperactivity disorder (vs. HS) Increased FC of DMN with CEN (supramarginal gyrus), as well as decreased FC of DMN with LN (subcallosal cingulate cortex); increased FC of CEN with LN (orbitofrontal cortex), as well as decreased FC of CEN with SN (insula and putamen) and SMN (precentral gyrus); increased FC of LN with DMN (middle frontal gyrus) and CEN (dorsolateral prefrontal cortex), in attention-deficit/hyperactivity disorder (vs. HS) Additional decreased FC within DMN (mainly in medial prefrontal cortex), increased FC of DMN with SN (insula) and SMN (superior temporal gyrus), and increased FC within CEN (mainly in supragenual anterior cingulate cortex), in attention-deficit/hyperactivity disorder in children (vs. HS)
Cortese et al. (2012)*	Meta-analysis	741 Attention-deficit/hyperactivity disorder and 801 HS (55 fMRI studies)	Attention deficit and hyperactivity (Attention-deficit/hyperactivity disorder)	Task-based fMRI (impulsivity/inhibition tasks, attention tasks, memory tasks)	Decreased activation mainly in CEN and SN, as well as increased activation mainly in DMN, SN, and SMN, in childhood attention-deficit/hyperactivity disorder (vs. HS) during impulsivity/inhibition, attention, or working memory tasks Decreased activation in CEN, as well as increased activation in VN, DAN, and DMN, in adult attention-

					deficit/hyperactivity disorder (vs. HS) during impulsivity/inhibition, attention, or working memory tasks Decreased activation in CEN, SN, and DMN, as well as increased activation mainly in DMN and SMN, in comorbidity-free attention-deficit/hyperactivity disorder (vs. HS) during impulsivity/inhibition, attention, or working memory tasks Decreased activation in CEN, DMN, and SN, as well as increased activation in SMN, in medication-naive attention-deficit/hyperactivity disorder (vs. HS) during impulsivity/inhibition, attention, or working memory tasks
Ongur et al. (2010)	Study	17 BD in mania 14 SCZ 15 HS	Mania (BD)	Resting-state fMRI	Decreased FC within DMN (mainly medial prefrontal cortex), along with decreased DMN recruitment of hippocampus and premotor cortex, as well as increased DMN recruitment of posterior parietal cortex and visual/auditory cortex, in manic BD (vs. HS) Decreased power spectral density of low-frequency fluctuations (slow4) in DMN in manic BD (vs. HS) Correlation of decreased FC in medial prefrontal cortex (and hippocampus) with manic symptomatology in BD Decreased DMN recruitment of supragenual anterior cingulate cortex, as well as increased DMN recruitment of frontopolar cortex, dorsolateral prefrontal cortex, and basal ganglia (along with altered power spectral

					density of low-frequency fluctuations in DMN) in SCZ (vs. HS)
Magioncalda et al. (2015)	Study	11 BD in mania 11 BD in depression 7 BD in mixed state 11 BD in euthymia 40 HS	Mania (BD)	Resting-state fMRI	Decreased FC within DMN (between perigenual anterior cingulate cortex and posterior cingulate cortex or orbitofrontal cortex) in manic BD (vs. HS), correlating with manic symptomatology Decreased FC between DMN and SN (between perigenual anterior cingulate cortex and supragenual anterior cingulate cortex) in depressed BD (vs. HS), correlating with depressive symptomatology
Martino et al. (2016)a*	Study	20 BD in mania 20 BD in depression 20 BD in euthymia 40 HS	Mania (BD)	Resting-state fMRI	Increased neuronal variability (standard deviation of BOLD signal) in SMN/DMN ratio (slow5) in manic BD (vs. depressed BD and HS), correlating with manic symptomatology Decreased neuronal variability in SMN/DMN ratio (slow5) in depressed BD (vs. manic and euthymic BD and HS), correlating with depressive symptomatology
Martino et al. (2016)b	Study	21 BD in mania 20 BD in depression 20 BD in euthymia 42 HS	Mania (BD)	Resting-state fMRI	Decreased FC within DMN (between perigenual anterior cingulate cortex and posterior cingulate cortex) in manic BD (vs. depressed BD and HS), correlating with manic symptomatology
Russo et al. (2020)*	Study	36 BD in mania 43 BD in depression 29 BD in euthymia 112 HS	Mania (BD)	Resting-state fMRI	Decreased ReHo and DC (slow4) in DMN (mainly medial prefrontal cortex) in manic BD (vs. HS), correlating with manic symptomatology; decreased FC in DMN areas and

					relatively increased ReHo in SMN areas in manic BD (vs. HS) Decreased ReHo in SMN (mainly primary sensory-motor cortex) in depressed BD (vs. HS), correlating with depressive symptomatology; decreased FC in SMN areas and relatively increased ReHo and DC in DMN areas in depressed BD (vs. HS) Correlation of increased ReHo in SMN with hyperactivity in BD Correlation of decreased DC in DMN with thought deficit (distractibility and flight of ideas) in BD
Zeng et al. (2021)*	Study	20 BD in mania 41 BD in depression 40 HS	Mania (BD)	Resting-state fMRI	Decreased FC within DMN (medial prefrontal cortex and temporoparietal junction) and CEN in manic BD (vs. depressed BD and HS), correlating with manic symptomatology Increased FC within DMN (medial prefrontal cortex and temporoparietal junction) and CEN in depressed BD (vs. manic BD and HS), correlating with depressive symptomatology
Cotovio et al. (2020)	Study	41 + 15 Focal brain lesions causing mania 79 + 490 Focal brain lesions causing other symptomatology	Mania (Focal brain lesions)	Resting-state fMRI (MRI)	Positive FC of (right) orbitofrontal cortex and temporal cortex (possibly along with other LN, DMN, and CEN areas) with focal brain lesions causing mania (while positive FC of SN and SMN areas with focal brain lesions causing other symptomatology)
Wang et al. (2017)	Meta-analysis	261 MDD in depression and 278 HS (10 fMRI studies)	Depression (MDD)	Resting-state fMRI	Decreased ALFF in orbitofrontal cortex (DMN/CEN)†, as well as increased ALFF in parahippocampal gyrus (LN)† and supplementary motor

					area (SN/SMN)†, in first-episode depressed MDD (vs. HS)
Hao et al. (2019)	Meta-analysis	402 MDD in depression and 330 HS (10 fMRI studies)	Depression (MDD)	Resting-state fMRI	Decreased ReHo in medial prefrontal cortex (DMN)† and occipital cortex (VN)†, as well as increased ReHo in insula (SN)†, supramarginal gyrus (DAN)†, and hippocampus, in first-episode depressed MDD (vs. HS)

THOUGHT INHIBITION - COGNITIVE DEFICIT					
Study	*Type*	*Sample*	*Phenomenal-Behavioral Pattern (Group)*	*Method*	*Results*
Kuhn and Gallinat (2013)*	Meta-analysis	220 MDD and 250 HS (6 fMRI studies and 5 PET studies) 285 SCZ and 282 HS (8 fMRI studies and 3 PET/SPECT studies)	Schizophrenic symptomatology (SCZ)	Resting-state fMRI / PET / SPECT	Increased ReHo, FC, CMR, and/or CBF in ventromedial prefrontal cortex, ventral striatum, and thalamus, as well as decreased ReHo, FC, CMR, and/or CBF in postcentral gyrus, insula, and fusiform gyrus, in MDD (vs. HS) Decreased ReHo, ALFF, FC, CMR, and/or CBF in ventromedial prefrontal cortex, posterior cingulate cortex/precuneus, and hippocampus, as well as increased ReHo, ALFF, FC, CMR, and/or CBF in lingual gyrus, in SCZ (vs. HS)
Li et al. (2017)b*	Meta-analysis	343 SCZ and 446 HS (5 fMRI studies)	Schizophrenic symptomatology (SCZ)	Resting-state fMRI	Increased FC in inferior frontal gyrus, superior frontal gyrus, middle frontal gyrus, orbitofrontal cortex, medial prefrontal cortex, anterior cingulate cortex, precuneus, posterior cingulate cortex, angular gyrus, middle temporal gyrus, and temporal pole, as well as decreased FC in precentral gyrus, postcentral gyrus, and fusiform gyrus, in first-episode SCZ (vs. HS) Decreased FC of thalamus with middle frontal gyrus, superior frontal gyrus, orbitofrontal cortex, anterior cingulate cortex, angular gyrus, and inferior parietal lobule (along with decreased FC of basal ganglia with posterior cingulate cortex, middle frontal gyrus, angular gyrus, and inferior parietal lobule), as well as increased FC of thalamus with precentral gyrus, postcentral gyrus, rolandic operculum, superior/middle temporal gyrus, fusiform/lingual gyrus, occipital

					cortex, and parahippocampal gyrus (along with increased FC of basal ganglia with middle temporal gyrus, postcentral gyrus, and occipital cortex), in chronic SCZ (vs. HS) Correlation (mainly) of decreased FC between thalamus and middle frontal gyrus/superior medial frontal gyrus (as well as increased FC between thalamus and postcentral gyrus) with psychotic symptomatology (mainly delusions) in chronic SCZ
Dong et al. (2018)a*	Meta-analysis	2115 SCZ and 2297 HS (52 fMRI studies)	Schizophrenic symptomatology (SCZ)	Resting-state fMRI	Decreased FC within DMN (mainly medial prefrontal cortex), SMN (mainly superior temporal gyrus), SN (mainly anterior cingulate cortex and putamen), and LN (mainly orbitofrontal cortex), as well as increased FC between LN and striatum, in SCZ (vs. HS) Decreased FC between DMN, CEN, SN, thalamus, and cerebellum in SCZ (vs. HS)
Ramsay et al. (2019)	Meta-analysis	904 SCZ, 318 BD with psychosis, 497 other psychotic disorders, and 1343 HS (17 fMRI studies)	Schizophrenic symptomatology (SCZ/Psychotic disorders)	Resting-state fMRI	Decreased FC of thalamus with anterior cingulate cortex, middle frontal gyrus, and posterior cingulate cortex (mainly in CEN)†, as well as increased FC of thalamus with postcentral/precentral gyrus, superior temporal gyrus, inferior temporal gyrus, middle temporal gyrus, and insula (mainly in SMN, SN, and DMN)†, in SCZ and other psychotic disorders (vs. HS)
Gong et al. (2019)*	Meta-analysis	1249 SCZ and 1179 HS (24 fMRI studies)	Schizophrenic symptomatology (SCZ)	Resting-state fMRI	Decreased ALFF in DMN areas (precuneus and inferior parietal gyrus), SMN areas (postcentral gyrus), and

					VN areas (occipital cortex), as well as increased ALFF in SN areas (anterior cingulate cortex and inferior frontal gyrus) along with inferior temporal gyrus and putamen, in SCZ (vs. HS) Decreased ALFF in DMN areas (medial prefrontal cortex, precuneus, and inferior parietal gyrus), as well as increased ALFF in putamen, in first-episode SCZ (vs. HS) Decreased ALFF in DMN areas (precuneus), SMN areas (postcentral gyrus), and VN areas (occipital cortex), as well as increased ALFF in SN areas (insula, anterior cingulate cortex, and inferior frontal gyrus) along with inferior temporal gyrus, superior frontal gyrus, and amygdala, in chronic SCZ (vs. HS)
Doucet et al. (2020)*	Meta-analysis	1486 SCZ, 779 MDD, 191 BD, 121 Obsessive-compulsive disorder, 192 Post-traumatic stress disorder, 20 Social anxiety disorder, and 3002 HS (70 fMRI studies)	Schizophrenic symptomatology (SCZ)	Resting-state fMRI	Altered FC within DMN (mainly in perigenual medial prefrontal cortex and precuneus/posterior cingulate cortex) across disorders (mainly SCZ and MDD) (vs. HS) Decreased FC in precuneus/posterior cingulate cortex and mainly decreased FC in perigenual medial prefrontal cortex in SCZ (vs. HS) Increased FC in dorsomedial prefrontal cortex in MDD (vs. HS)
Gao et al. (2018)	Meta-analysis	403 SCZ and 428 HS (7 resting-state fMRI studies and 9 task-based fMRI studies)	Schizophrenic symptomatology (SCZ)	Resting-state fMRI Task-based fMRI (cognitive tasks)	Decreased activity in posterior cingulate cortex/paracingulate cortex, inferior parietal lobule, inferior frontal gyrus/temporal pole/superior temporal gyrus/insula, fusiform gyrus/middle temporal gyrus, caudate, and

					cerebellum, as well as increased activity in superior temporal gyrus, fusiform/lingual gyrus, insula, and cerebellum, in SCZ (vs. HS) at rest and/or during cognitive tasks
Minzenberg et al. (2009)	Meta-analysis	594 SCZ and 623 HS (41 studies)	Schizophrenic symptomatology (SCZ)	Task-based fMRI / PET (cognitive tasks)	Decreased activation in middle frontal gyrus, claustrum, and mediodorsal nucleus of thalamus (along with anterior cingulate cortex), as well as increased activation in posterior parietal cortex (along with anterior cingulate cortex), in SCZ (vs. HS) during cognitive tasks (executive function processing)
Ragland et al. (2009)	Meta-analysis	249 SCZ and 231 HS (18 studies)	Schizophrenic symptomatology (SCZ)	Task-based fMRI / PET (cognitive tasks)	Decreased activation in dorsolateral prefrontal cortex, superior frontal gyrus, inferior parietal gyrus, posterior cingulate cortex, and lingual gyrus, as well as increased activation in parahippocampal gyrus, precentral gyrus, postcentral gyrus, anterior cingulate cortex, and middle temporal gyrus, in SCZ (vs. HS) during cognitive tasks (episodic memory encoding) Decreased activation in dorsolateral prefrontal cortex, inferior frontal gyrus, anterior cingulate cortex, cuneus, thalamus, and cerebellum, as well as increased activation in parahippocampal gyrus, precentral gyrus, medial frontal cortex, and thalamus, in SCZ (vs. HS) during cognitive tasks (episodic memory retrieval)
Del Casale et al. (2016)	Meta-analysis	290 SCZ and 316 HS (11 fMRI studies)	Schizophrenic symptomatology (SCZ)	Task-based fMRI (cognitive tasks)	Decreased activation in middle frontal gyrus and posterior parietal cortex (CEN), along with insula, in SCZ (vs.

					HS) during attention tasks (vs. HS); decreased activation in insula in SCZ (vs. HS) during memory tasks
Jani and kasparek (2017)*	Meta-analysis	199 SCZ and 215 HS (11 fMRI studies and 1 PET study using affective tasks) 262 SCZ and 278 HS (15 fMRI studies and 1 PET study using cognitive tasks)	Schizophrenic symptomatology (SCZ)	Task-based fMRI / PET (affective tasks, cognitive tasks)	Decreased activation in inferior frontal gyrus, insula, and anterior cingulate cortex (SN and DMN)†, along with thalamus, striatum, and amygdala, as well as increased activation in inferior parietal cortex (DAN)†, in SCZ (vs. HS) during affective processing/recognition tasks Decreased activation in medial prefrontal cortex, insula, superior temporal gyrus, and occipital cortex (DMN and SMN-VN)†, as well as increased activation in posterior parietal cortex and dorsolateral prefrontal cortex (CEN)†, in SCZ (vs. HS) during theory of mind tasks
Kronbichler et al. (2017)	Meta-analysis	308 SCZ and 315 HS (21 fMRI studies)	Schizophrenic symptomatology (SCZ)	Task-based fMRI (cognitive tasks)	Decreased activation in medial prefrontal cortex and temporoparietal junction (DMN)†, along with orbitofrontal cortex, premotor/motor cortex, and occipital cortex, as well as increased activation in posterior parietal cortex (CEN)†, in SCZ (vs. HS) during theory of mind tasks
Alustiza et al. (2017)	Meta-analysis	1086 SCZ and 1182 HS (29 fMRI studies using cognitive tasks) 387 BD and 385 HS (12 fMRI studies using cognitive tasks) 200 SCZ and 195 HS (8 fMRI studies using timing tasks)	Schizophrenic symptomatology (SCZ)	Task-based fMRI (cognitive tasks)	Decreased activation in middle/inferior frontal gyrus, posterior parietal cortex, and anterior cingulate cortex, along with thalamus and cerebellum (as well as increased activation/decreased deactivation in occipital cortex and precentral gyrus) in SCZ (vs. HS) during cognitive tasks Decreased activation mainly in orbitofrontal cortex and striatum, along

					with superior parietal gyrus (as well as increased activation/decreased deactivation in precentral gyrus) in BD (vs. HS) during cognitive tasks Decreased activation in striatum, occipital cortex, and supplementary motor area in SCZ (vs. HS) during timing tasks
Wu and Jiang (2020)	Meta-analysis	971 SCZ and 1047 HS (52 fMRI studies)	Schizophrenic symptomatology (SCZ)	Task-based fMRI (cognitive tasks)	Decreased activation in dorsolateral prefrontal cortex and claustrum/insula (mainly in CEN and, to a lesser extent, SN), as well as increased activation/decreased deactivation in anterior cingulate cortex, ventromedial prefrontal cortex, posterior cingulate cortex, and inferior parietal lobule (mainly in DMN and, to a lesser extent, SN) in SCZ (vs. HS) during working memory tasks
Hare et al. (2019)	Study	100 SCZ	Schizophrenic symptomatology (SCZ)	Resting-state fMRI	Correlation of decreased FC within DMN (time-lag-shifted FC from anterior DMN to posterior DMN) with attention deficit and disordered thought in SCZ Correlation of increased FC between DMN and SN (time-lag-shifted FC from anterior DMN to SN) with flattening affect in SCZ
Rocchi et al. (2020)*	Systematic Review	153 HS (8 phMRI studies and 2 PET studies)	Substance-induced symptomatology (Substance use: opioids)	phMRI / PET (opioid administration)	Increased activation and/or FC in SN areas (e.g., insula and supragenual anterior cingulate cortex) along with nucleus accumbens and amygdala, as well as decreased activation and/or FC in SMN areas (e.g., primary sensory-motor cortex) and DMN areas (e.g., medial prefrontal cortex, posterior cingulate cortex, and temporoparietal

					junction), in HS during low-dose opioid infusion Decreased activation in SN areas (e.g., insula and anterior cingulate cortex) and SMN areas (e.g., primary sensory-motor cortex), as well as increased activation in DMN areas (e.g., medial prefrontal cortex, posterior cingulate cortex, and temporoparietal junction), in HS during high-dose opioid infusion (e.g., opioid infusion after painful stimulation)
Zheng et al. (2015)	Study	32 HS	Substance-induced symptomatology (Substance use: alcohol)	phMRI (alcohol administration)	Decreased FC of posterior cingulate cortex mainly with superior frontal gyrus, along with decreased ALFF and ReHo mainly in superior frontal gyrus (DMN), as well as increased ReHo mainly in basal ganglia, in HS during alcohol infusion (vs. same subjects before alcohol infusion)
Speth et al. (2016)	Study	20 HS	Substance-induced symptomatology (Substance use: LSD)	phMRI (LSD administration)	Correlation of decreased FC within DMN with decreased mind-wandering (mental time travel to the past) in HS after LSD infusion (vs. HS after placebo infusion)
Bossong et al. (2019)*	Study	39 HS	Substance-induced symptomatology (Substance use: cannabis)	phMRI (cannabis administration)	Increased CBF in insula and medial superior frontal cortex (SN), along with lateral orbitofrontal cortex, in HS after cannabis (tetrahydrocannabinol) administration (vs. HS after placebo administration) Decreased FC between lateral orbitofrontal cortex and precuneus/posterior cingulate cortex in HS after cannabis administration (vs. HS after placebo administration)

					Correlation of increased CBF in insula with "high" (as well as decreased sedation) in HS after cannabis administration
Philippi et al. (2021)	Study	29 Focal brain lesions causing cognitive deficit 19 HS	Cognitive deficit (Focal brain lesions)	Resting-state fMRI (MRI)	Positive FC of inferior parietal lobule/angular gyrus within DMN (possibly along with other DMN and CEN areas, such as medial prefrontal cortex, precuneus, middle temporal gyrus, parahippocampal gyrus, middle/inferior frontal gyrus) with focal brain lesions causing cognitive deficit (decreased mind-wandering)
Weil et al. (2019)*	Meta-analysis	168 Parkinson's disease with hallucinations and 234 Parkinson's disease without hallucinations (9 studies) 355 Parkinson's disease with mild cognitive impairment and 489 Parkinson's disease without mild cognitive impairment (15 studies) 175 Parkinson's disease with dementia and 210 Parkinson's disease without dementia (11 studies)	Cognitive deficit (Parkinson's disease)	Resting-state fMRI (PET / SPECT / MRI)	Positive FC of lateral geniculate nucleus of thalamus with areas showing decreased CMR or atrophy in Parkinson's disease with visual hallucinations (vs. Parkinson's disease without visual hallucinations) Positive FC of middle temporal gyrus/temporoparietal junction (and posterior DMN) with areas showing decreased CMR or atrophy in Parkinson's disease with mild cognitive impairment (vs. Parkinson's disease without mild cognitive impairment) Positive FC of hippocampus (and posterior DMN) with areas showing decreased CMR or atrophy in Parkinson's disease with dementia (vs. Parkinson's disease without dementia)
Jacobs et al. (2013)	Meta-analysis	235 Alzheimer's disease, 530 Mild cognitive impairment, 428 Alzheimer's disease risk, and 1255 HS (53 fMRI studies)	Cognitive deficit (Alzheimer's disease)	Resting-state fMRI Task-based fMRI (cognitive tasks)	Decreased FC mainly in posterior cingulate cortex/precuneus, parahippocampal gyrus, postcentral gyrus, and thalamus, as well as increased FC mainly in uncus, in Alzheimer's disease (vs. HS)

					Decreased activation mainly in posterior cingulate cortex, parahippocampal gyrus, and lingual gyrus, as well as increased activation mainly in precuneus, in Alzheimer's disease (vs. HS) during cognitive tasks (mainly episodic memory, working memory, and visuospatial processing) Decreased FC mainly in posterior cingulate cortex/precuneus, angular gyrus, middle temporal gyrus, anterior cingulate cortex, medial frontal gyrus, and putamen, as well as increased FC mainly in fusiform gyrus, in mild cognitive impairment (vs. HS) Decreased activation mainly in posterior cingulate cortex/precuneus, as well as increased activation mainly in superior temporal gyrus, inferior parietal lobule, claustrum, and caudate, in mild cognitive impairment (vs. HS) during cognitive tasks Decreased FC mainly in posterior cingulate cortex and medial frontal gyrus in Alzheimer's disease risk (vs. HS) Decreased activation mainly in superior temporal gyrus, as well as increased activation mainly in parahippocampal gyrus, middle temporal gyrus, and insula, in Alzheimer's disease risk (vs. HS) during cognitive tasks
Darby et al. (2019)	Meta-analysis	Alzheimer's disease and HS (48 studies) Alzheimer's disease	Cognitive deficit (Alzheimer's disease)	Resting-state fMRI (PET / SPECT / MRI)	Positive FC of posterior DMN areas (mainly posterior cingulate cortex/precuneus, angular gyrus, and

		with delusions and Alzheimer's disease without delusions (12 studies) Frontotemporal dementia with behavioral variant and HS (21 studies) Frontotemporal dementia with progressive nonfluent aphasia and HS (8 studies) Corticobasal syndrome and HS (12 studies)			parahippocampal gyrus/hippocampus, along with middle temporal gyrus, superior frontal gyrus, and medial prefrontal cortex) with cortical areas showing decreased CMR, CBF, and/or atrophy in Alzheimer's disease (vs. HS and other dementias) Positive FC of (right) frontal cortex (mainly middle frontal gyrus, inferior frontal gyrus, orbitofrontal cortex, and precentral gyrus, along with supramarginal gyrus) with cortical areas showing decreased CMR, CBF, and/or atrophy in Alzheimer's disease with delusions (vs. Alzheimer's disease without delusions) Positive FC of SN areas (fronto-insular cortex and orbitofrontal cortex) with cortical areas showing atrophy in frontotemporal dementia with behavioral variant (vs. other dementias) Positive FC of inferior frontal gyrus/Broca's area with cortical areas showing atrophy in frontotemporal dementia with progressive nonfluent aphasia (vs. other dementias) Positive FC of SMN areas (precentral/postcentral gyrus, along with intraparietal sulcus) with cortical areas showing atrophy in corticobasal syndrome (vs. other dementias)
Zhou et al. (2010)*	Study	12 Frontotemporal dementia with behavioral variant 12 Alzheimer's disease 12 HS	Cognitive deficit (Alzheimer's disease)	Resting-state fMRI	Decreased FC in SN, mainly between frontoinsular, cingulate, striatal, thalamic, and brainstem areas (as well as increased FC in DMN) in frontotemporal dementia with

	behavioral variant (vs. HS and Alzheimer's disease) Correlation of decreased SN-related FC, mainly frontoinsular FC (as well as increased DMN-related FC) with affective-behavioral symptomatology in frontotemporal dementia with behavioral variant Decreased FC in DMN, mainly between posterior cingulate/precuneus, temporoparietal junction, hippocampus, and raphe nuclei (as well as increased FC in SN) in Alzheimer's disease (vs. HS and/or frontotemporal dementia with behavioral variant)

THOUGHT INHIBITION - LOSS OF CONSCIOUSNESS					
Study	*Type*	*Sample*	*Phenomenal-Behavioral Pattern (Group)*	*Method*	*Results*
Jiang et al. (2022)	Meta-analysis	659 Epilepsy and 709 HS (22 fMRI studies)	Loss of consciousness (Epilepsy)	Resting-state fMRI	Decreased FC in medial prefrontal cortex and angular gyrus (DMN) in generalized epilepsy (vs. HS) Decreased FC in medial prefrontal cortex and medial temporal lobe, as well as increased FC in posterior cingulate cortex, in temporal lobe epilepsy (vs. HS)
Blumenfeld et al. (2004)	Study	21 Epilepsy	Loss of consciousness (Epilepsy)	Resting-state SPECT	Increased CBF in medial temporal lobe, mainly hippocampus (site of seizure onset), followed by medial thalamus, hypothalamus, ventral basal ganglia, midbrain/upper pons, and cerebellum; then decreased CBF in medial prefrontal cortex/anterior cingulate cortex, posterior cingulate cortex/precuneus, orbitofrontal cortex, dorsolateral prefrontal cortex, temporoparietal junction, and insula (with increased CBF in medial thalamus correlating with decreased CBF in fronto-parietal association cortex); and no changes in CBF in primary somatomotor/somatosensory perirolandic cortex, primary auditory temporal cortex, and primary visual occipital cortex, in epilepsy during complex partial temporal lobe seizures with loss of consciousness (vs. same subjects during absence of seizure) Increased CBF in medial temporal lobe (site of seizure onset) and no changes in CBF in fronto-parietal association cortex in epilepsy during simple partial temporal lobe seizures with no loss of consciousness (vs. same subjects

					during absence of seizure)
Hannawi et al. (2015)	Meta-analysis	272 Disorders of consciousness and 259 HS (13 studies)	Loss of consciousness (Disorders of consciousness: vegetative state, minimally conscious state)	Resting-state fMRI / PET / SPECT	Decreased activity (ALFF, FC, DC, ReHo, CMR, and/or CBF) in posterior cingulate cortex/precuneus, middle temporal gyrus, middle frontal gyrus, and dorsomedial nucleus of thalamus (DMN) in disorders of consciousness, i.e., vegetative state and minimal conscious state (vs. HS) (with decreased activity more severe in vegetative state than minimally conscious state) Correlation of decreased activity in middle frontal gyrus and posterior cingulate cortex with decreased consciousness (responsiveness) in disorders of consciousness

Supplementary Table 1
The table provides an extensive and detailed review of functional neuroimaging studies on healthy subjects and neuropsychiatric disorders that report direct or indirect information on the relationship of brain functioning with psychomotricity, affectivity, and thought. *(A) For each section:* (1) the studies that provide direct information on the relationship between brain functioning and the specific dimensions/symptomatology are reported; (2) relevant studies that provide indirect information on this relationship are also reported. *(B) For studies reporting direct information and studies reporting indirect information*, (1) resting-state studies and then (2) task-based studies are described. *(C) For each topic (in the parts on direct and indirect studies within each section), the article types are organized as follows*. (1) The relevant meta-analyses are reported; moreover, the relevant systematic reviews (especially when meta-analyses are not available) and/or particularly relevant non-systematic reviews (especially when systematic reviews are not available) are reported (when multiple meta-analyses/reviews are available on the same topic, especially when describing similar results, the most extensive and/or recent is selected). (2) The relevant original studies are reported, especially when meta-analyses or systematic reviews are not available on the topic; moreover, the relevant original studies not included in the meta-analyses/reviews (e.g., published after the more recent meta-analysis/review) or particularly relevant studies, seminal studies, and exemplificative studies, even if included in the meta-analyses/reviews, are also reported. (3) Particularly relevant case reports are reported.
Abbreviations: HS, healthy subjects; MDD, major depressive disorder; BD, bipolar disorder; SCZ, schizophrenia; MRI, magnetic resonance imaging; fMRI, functional MRI; ASL-MRI, arterial spin labeling MRI; PET, positron emission tomography; SPECT, single-photon emission computed tomography; SI, spectroscopy imaging; phMRI, pharmaco-MRI; phPET, pharmaco-PET; phASL-MRI, pharmaco-ASL-MRI; FC, functional connectivity; ReHo, regional homogeneity; DC, degree of centrality; ALFF, amplitude of low-frequency fluctuations; CAP, co-activation patter; CMR, cerebral metabolic rate; CBF, cerebral blood flow; DMN, default mode network; CEN, central executive network; SN, salience network; SMN, sensorimotor network; DAN, dorsal attention network; VN, visual network; AN, auditory network; LN, limbic network.
* The study is reported in different sections of the table
† The brain network (not specified in the original study) is identified mainly using the work by Yeo et al., 2011