Supplemental Methods and Results for

Mapping neural circuit biotypes to symptoms and behavioral dimensions of depression and anxiety

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Table S4A. Regions implicated in dysfunction, and which defined quantified regional and composite circuit clinical scores for task-free circuits: region labels, coordinate definitions and metrics, computational steps and formulas used to generate global scores

Default Mode Circuit			
Circuit Type	**Condition**	**Task Contrast**	**Neurosynth Search criteria**
Intrinsic	Task-free	---	Terms = "default mode"; "resting state" Number of studies = 516; 825 Search Date = 6.4.17
Region label	**Region anatomy**	**Z Value**	**Template coordinates and definitions**
D1	amPFC	22.0	-2, 50, -6
D2	AG L	26.1	-46, -70, 32
D3	AG R	20.6	50, -62, 26
D4	PCC	29.8	0, -50, 28
Computed inputs	**Anatomical combinations**	**Input metric**	**Global Circuit Clinical Score Formula**
$C_{D1,D2}$	amPFC with AG L	Intrinsic FC	
$C_{D1,D3}$	amPFC with AG R	Intrinsic FC	
$C_{D1,D4}$	amPFC with PCC	Intrinsic FC	$(C_{D1,D2} + C_{D1,D3} + C_{D1,D4} + C_{D2,D4} + C_{D3,D4})/5$
$C_{D2,D4}$	AG L with PCC	Intrinsic FC	
$C_{D3,D4}$	AG R with PCC	Intrinsic FC	
Salience Circuit			
Circuit Type	**Condition**	**Task Contrast**	**Neurosynth Search criteria**
Intrinsic	Task-free	---	Terms = "salience network"; "salience" Number of studies = 60; 269 Search Date = 6.4.17
Region label	**Region anatomy**	**Z Value**	**Template coordinates and definitions**
S1	aI L	11.9	-38, 14, -6
S2	aI R	14.8	38, 18, 2
S3	Amygdala L	6.9	AAL
S4	Amygdala R	14.7	AAL
Computed inputs	**Anatomical combinations**	**Input Metric**	**Global Circuit Clinical Formula**
$C_{S1,S3}$	aI L with Amygdala L	Intrinsic FC	
$C_{S2,S4}$	aI R with Amygdala R	Intrinsic FC	$(-C_{S1,S3} - C_{S2,S4} - C_{S1,S2})/3$
$C_{S1,S2}$	aI L with aI R	Intrinsic FC	
Attention Circuit			
Circuit Type	**Condition**	**Task Contrast**	**Neurosynth Search criteria**
Intrinsic	Task-free	---	Terms = "frontoparietal network"; "attention" Number of studies = 1447; 79 Search Date = 6.4.17
Region label	**Region anatomy**	**Z Value**	**Template coordinates and definitions**
A1	msPFC	10.4	-2, 14, 52
A2	LPFC L	13.9	-44, 6, 32
A3	LPFC R	11.3	50, 10, 28
A4	aIPL L	10.4	-30, -54, 40
A5	aIPL R	10.4	38, -56, 48
A6	Precuneus L	13.0	-14, -66, 52
A7	Precuneus R	11.3	18, -68, 52
Computed inputs	**Anatomical combinations**	**Input metric**	**Global Circuit Clinical Formula**
$C_{A1,A4}$	msPFC with aIPL L	Intrinsic FC	
$C_{A1,A5}$	msPFC with aIPL R	Intrinsic FC	
$C_{A2,A4}$	LPFC L with aIPL L	Intrinsic FC	$(- C_{A1,A4} - C_{A1,A5} - C_{A2,A4} - C_{A3,A5} - C_{A4,A6} - C_{A5,A7})/6$
$C_{A3,A5}$	LPFC R with aIPL R	Intrinsic FC	
$C_{A4,A6}$	aIPL L with precuneus L	Intrinsic FC	
$C_{A5,A7}$	aIPL R with precuneus R	Intrinsic FC	

Notes: Z-scores and coordinates refer to peaks of meta-analytic Z values. Coordinates are in MNI atlas space and subcortical regions are defined by overlap with the AAL or FSL atlas. For the computation of circuit score formulas some inputs have been inverted according to the theoretical direction of dysfunction. Designs, stimuli and conditions underlying the task contrasts are outlined in more detail in the main text.

Anatomical Abbreviations: AAL = Automated Anatomical Labeling; AG = Angular Gyrus; aI = anterior Insula; aIPL = anterior Inferior Parietal Lobule; amPFC = anterior medial Prefrontal Cortex; FC = Frontal Cortex; FSL = FMRIB Software Library; L= Left; LPFC = Lateral Prefrontal Cortex; msPFC = medial superior Prefrontal Cortex; PCC = Posterior Cingulate Cortex; R= Right.

Table S4B. Regions implicated in dysfunction, and which defined quantified regional and composite circuit clinical scores for task-evoked circuits: region labels, coordinate definitions and metrics, computational steps and formulas used to generate global scores

Negative Affect Circuit: Sad			
Circuit Type	**Condition**	**Task Contrast**	**Neurosynth Search Criteria**
Task-evoked	Conscious Facial Emotion Viewing	Sad vs Neutral based on standardized facial emotion stimuli	Term = "threat" Number of studies = 170 Search Date = 6.4.17
Region label	**Region anatomy**	**Z Value**	**Template coordinates and definitions**
N1	pgACC*	6.3	6, 42, 4
N2	aI L	17.4	-36, 20, -4
N3	aI R	16.1	38, 22, -4
N4	Amygdala L	28.4	AAL
N5	Amygdala R	25.2	AAL
Computed inputs	**Anatomical combinations**	**Input Metric**	**Global Circuit Clinical Formula**
A_{N1}	pgACC*	BOLD activation	
A_{N2}	aI L	BOLD activation	
A_{N3}	aI R	BOLD activation	
A_{N4}	Amygdala L	BOLD activation	
A_{N5}	Amygdala R	BOLD activation	
$C_{N1,N2}$*	[pgACC to aI L + aI L to pgACC]/2	PPI	$(A_{N1} + A_{N2} + A_{N3} + A_{N4} + A_{N5} – C_{N1,N2} – C_{N1,N3} + C_{N1,N4} + C_{N1,N5})/9$
$C_{N1,N3}$*	[pgACC to aI R + aI R to pgACC]/2	PPI	
$C_{N1,N4}$*	[pgACC to Amygdala L + Amygdala L to pgACC]/2	PPI	
$C_{N1,N5}$*	[pgACC to Amygdala R + Amygdala R to pgACC]/2	PPI	
Negative Affect Circuit: Threat Conscious			
Circuit Type	**Condition**	**Task Contrast**	**Neurosynth Search Criteria**
Task-evoked	Conscious Facial Emotion Viewing	Fear/Anger vs Neutral based on standardized facial emotion stimuli	Term = "threat" Number of studies = 170 Search Date = 6.4.17
Region label	**Region anatomy**	**Z Value**	**Template coordinates and definitions**
T1	dACC	8.2	6, 22, 32
T2	Amygdala L	28.4	AAL
T3	Amygdala R	25.2	AAL
Computed inputs	**Anatomical combinations**	**Input Metric**	**Global Circuit Clinical Formula**
A_{T1}	dACC	BOLD activation	
A_{T2}	Amygdala L	BOLD activation	
A_{T3}	Amygdala R	BOLD activation	
$C_{T1,T2}$	[dACC to Amygdala L + Amygdala L to dACC]/2	PPI	$(-A_{T1} + A_{T2} + A_{T3} - C_{T1,T2} - C_{T1,T3})/5$
$C_{T1,T3}$	[dACC to Amygdala R + Amygdala R to dACC]/2	PPI	
Negative Affect Circuit: Threat Nonconscious			
Circuit Type	**Condition**	**Task Contrast**	**Neurosynth Search Criteria**
Task-evoked	Nonconscious Facial Emotion Viewing	Fear/Anger vs Neutral based on standardized facial emotion stimuli	Term = "threat" Number of studies = 170 Search Date = 6.4.17
Region label	**Region anatomy**	**Z Value**	**Template coordinates and definitions**
T1	sgACC†	5.6	4, 26, -10
T2	Amygdala L	28.4	AAL
T3	Amygdala R	25.2	AAL
Computed inputs	**Anatomical combinations**	**Input Metric**	**Global Circuit Clinical Formula**
A_{T1}	sgACC†	BOLD activation	
A_{T2}	Amygdala L	BOLD activation	
A_{T3}	Amygdala R	BOLD activation	
$C_{T1,T2}$ †	[sgACC to Amygdala L + Amygdala L to sgACC]/2	PPI	$(-A_{T1} + A_{T2} + A_{T3} - C_{T1,T2} - C_{T1,T3})/5$
$C_{T1,T3}$†	[sgACC to Amygdala R + Amygdala R to sgACC]/2	PPI	
Positive Affect Circuit: Happy			
Circuit Type	**Condition**	**Task Contrast**	**Neurosynth Search Criteria**
Task-evoked	Conscious Facial Emotion Viewing	Happy vs Neutral based on standardized facial emotion stimuli	Terms = "monetary reward"; "reward" Number of studies = 84; 671 Search Date = 6.4.17
Region label	**Region anatomy**	**Z Value**	**Template coordinates and definitions**
P1	vMPFC	13.1	-2, 56, -8

P2	Striatum L	14.0	FSL
P3	Striatum R	7.9	FSL
Computed inputs	**Anatomical combinations**	**Input Metric**	**Global Circuit Clinical Formula**
A_{P1}	vMPFC	BOLD activation	
A_{P2}	Striatum L	BOLD activation	$(-A_{P1} - A_{P2} - A_{P3})/3$
A_{P3}	Striatum R	BOLD activation	
Cognitive Control Circuit			
Circuit Type	**Condition**	**Task Contrast**	**Neurosynth Search Criteria**
Task-evoked	Go-NoGo task	No-Go vs. Go	Terms = "cognitive control" Number of studies = 428 Search Date = 6.4.17
Region label	**Region anatomy**	**Z Value**	**Template coordinates and definitions**
C1	dACC	20.0	0, 18, 46
C2	DLPFC L	20.4	-44, 6, 32
C3	DLPFC R	12.4	44, 34, 22
Computed inputs	**Anatomical combinations**	**Input Metric**	**Global Circuit Clinical Formula**
A_{C1}	dACC	BOLD activation	
A_{C2}	DLPFC L	BOLD activation	
A_{C3}	DLPFC R	BOLD activation	
$C_{C1,C2}$	[dACC to DLPFC L + DLPFC L to dACC]/2	PPI	$(-A_{C1} - A_{C2} - A_{C3} - C_{C1,C2} - C_{C1,C3})/5$
$C_{C1,C3}$	[dACC to DLPFC R + DLPFC R to dACC]/2	PPI	

Notes: Z-scores and coordinates refer to peaks of meta-analytic Z values. Note that PPI values were computed using each region in the pair as a seed region and results averaged. Coordinates are in MNI atlas space and subcortical regions are defined by overlap with the AAL or FSL atlas. For the computation of circuit score formulas, some inputs have been inverted according to the theoretical direction of dysfunction. Designs, stimuli and conditions underlying the task contrasts are outlined in more detail in the main text.

Abbreviations: AAL = Automatic Anatomical Labeling; C = Connectivity; BOLD = Blood Oxygenated Level Dependent; FSL = FMRIB Software Library; MNI = Montreal Neurological Institute; PPI = Psychophysiological Interaction.

Anatomical Abbreviations: AAL = Automated Anatomical Labeling atlas; aI = anterior Insula; aIPL = anterior Inferior Parietal Lobule; dACC = dorsal Anterior Cingulate Cortex; DLPFC = Dorsolateral Prefrontal Cortex; L= Left; LPFC = Lateral Prefrontal Cortex; vMPFC = ventromedial Prefrontal Cortex; pgACC = pregenual Anterior Cingulate Cortex; PCC = Posterior Cingulate Cortex; sgACC = subgenual Anterior Cingulate Cortex; SPL = Superior Parietal Lobule; R= Right.

*The pgACC peaks were defined by decreasing the minimum cluster distance in the 3dCluster algorithm.
†Although the sgACC did not meet our quality control metrics for temporal signal-to-noise ratio, given both the difficulty of imaging this region and its importance of this region to defining the negative affect circuit elicited by implicit threat stimuli and to prior imaging findings in depression, we report supplementary analyses including this region.