Connections of the human orbitofrontal cortex and inferior frontal gyrus

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Supplementary Material

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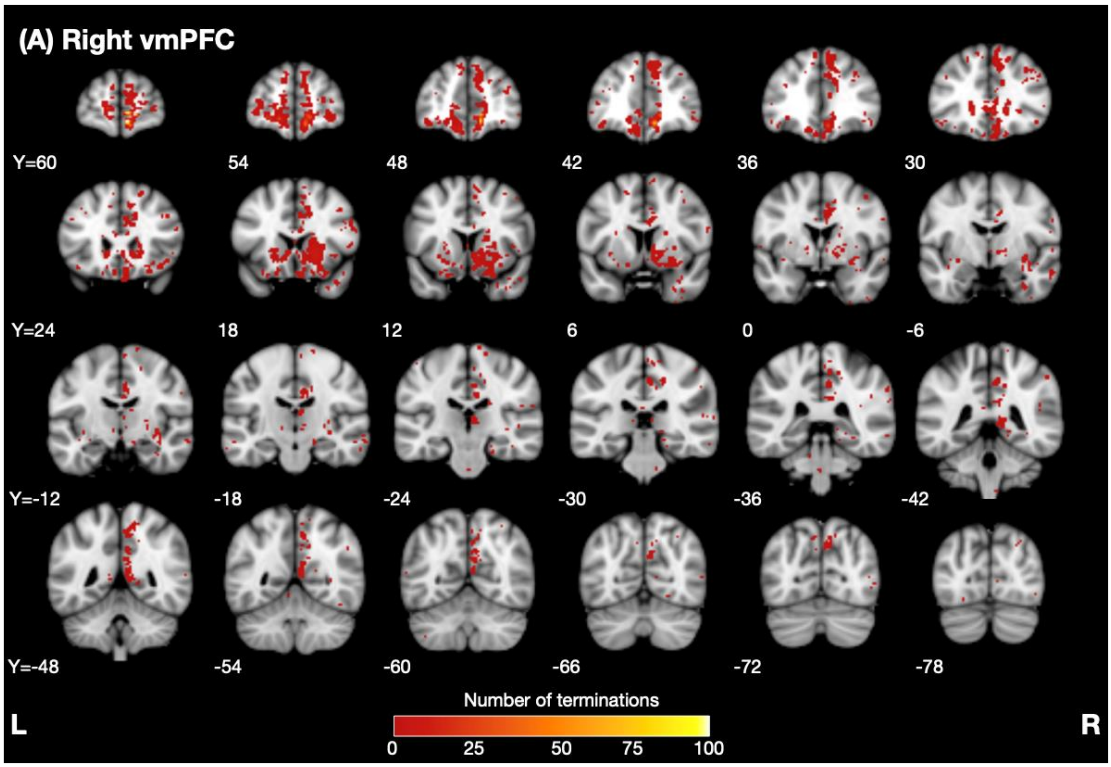
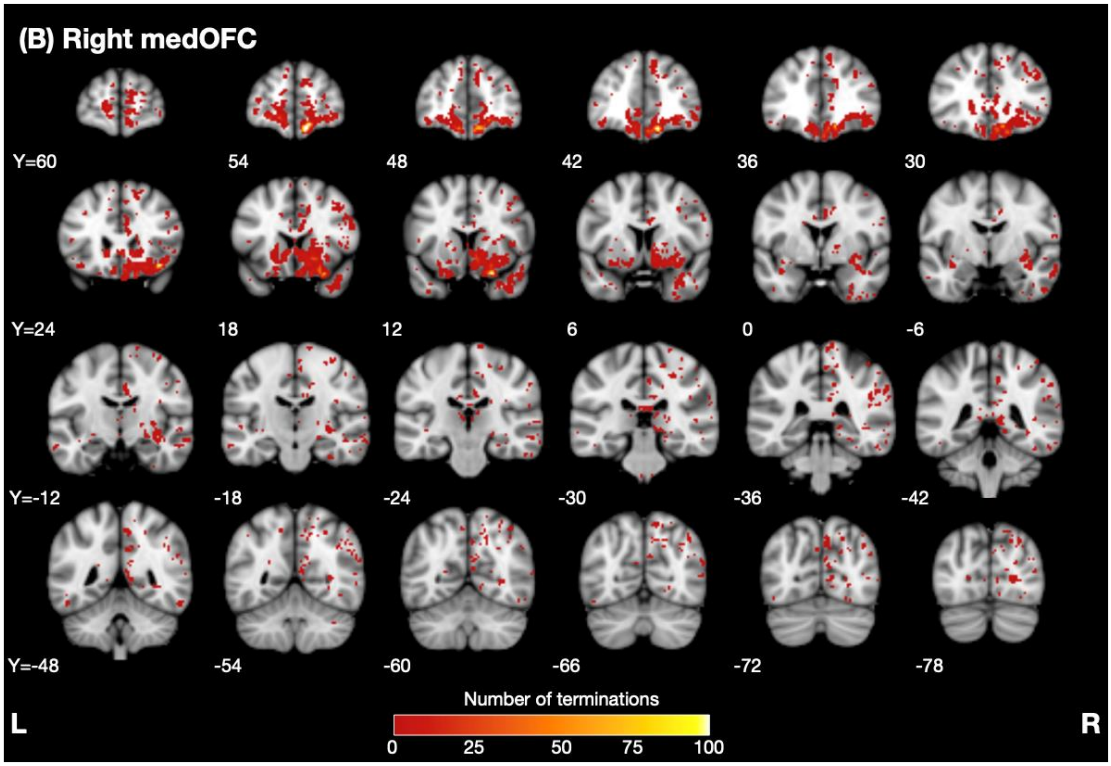
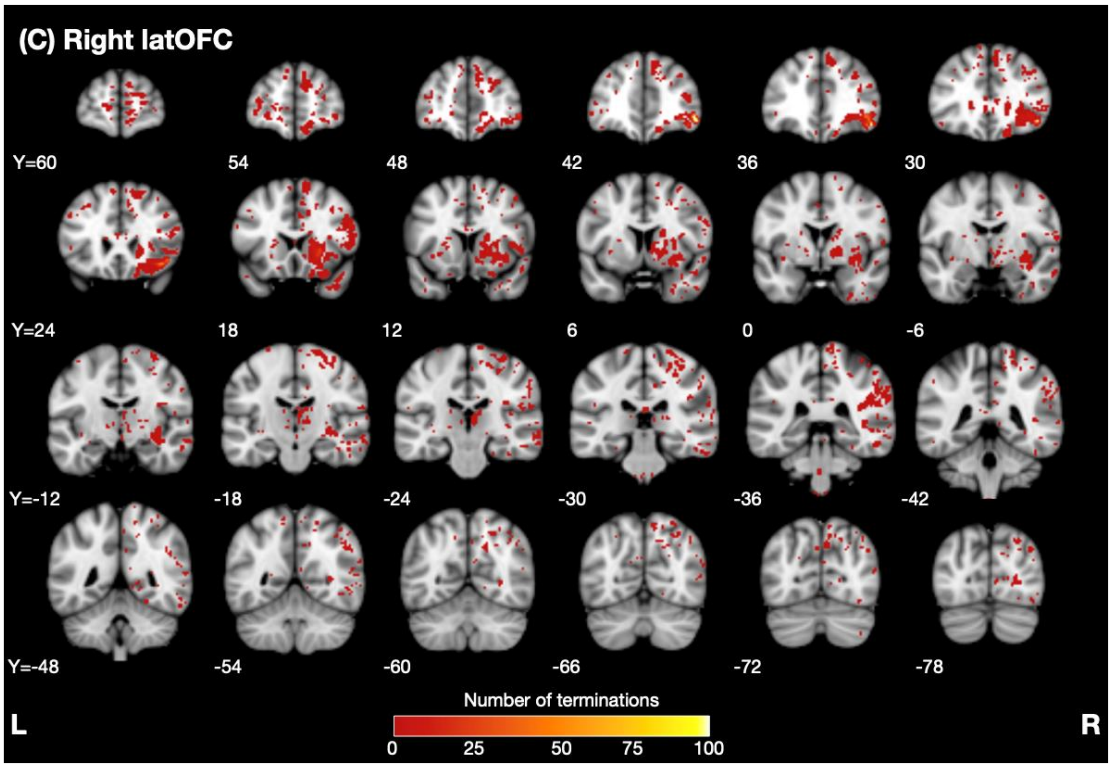
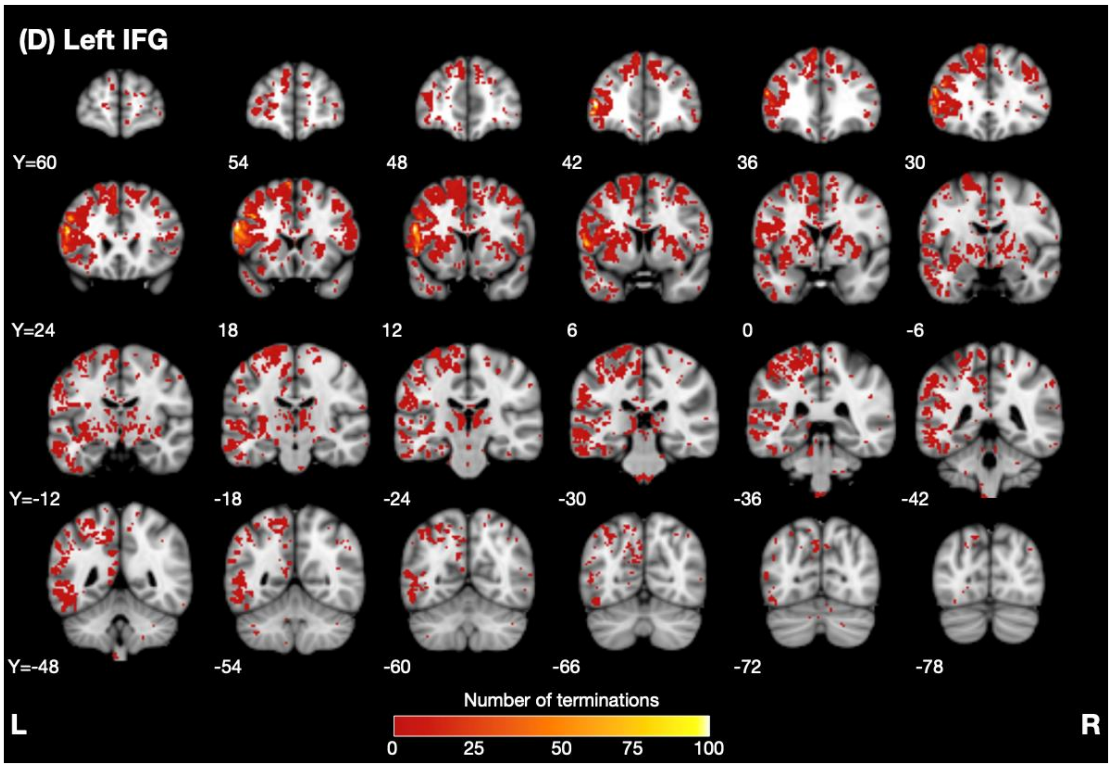
Fig. S1. The regions with streamline terminations for the connectivity of different regions of the orbitofrontal cortex and nearby areas for a second typical single subject shown in MNI space. Separate subdiagrams are provided for the (A) right ventromedial prefrontal cortex, (B) right medial orbitofrontal cortex, (C) right lateral orbitofrontal cortex, and (D) left and (E) right inferior frontal gyrus.

Subj 2




(B) Right medOFC
Y=60
54
48
42
36
30
Y=24
18
12
6
0
-6
Y=-12
-18
-24
-30
-36
-42
Y=-48
-54
-60
-66
-72
-78
Number of terminations
0
25
50
75
100
L
R


(C) Right latOFC
Y=60
54
48
42
36
30
Y=24
18
12
6
0
-6
Y=-12
-18
-24
-30
-36
-42
Y=-48
-54
-60
-66
-72
-78
Number of terminations
0
25
50
75
100
L
R


(D) Left IFG
Y=60
54
48
42
36
30
Y=24
18
12
6
0
-6
Y=-12
-18
-24
-30
-36
-42
Y=-48
-54
-60
-66
-72
-78
Number of terminations
0
25
50
75
100
L
R

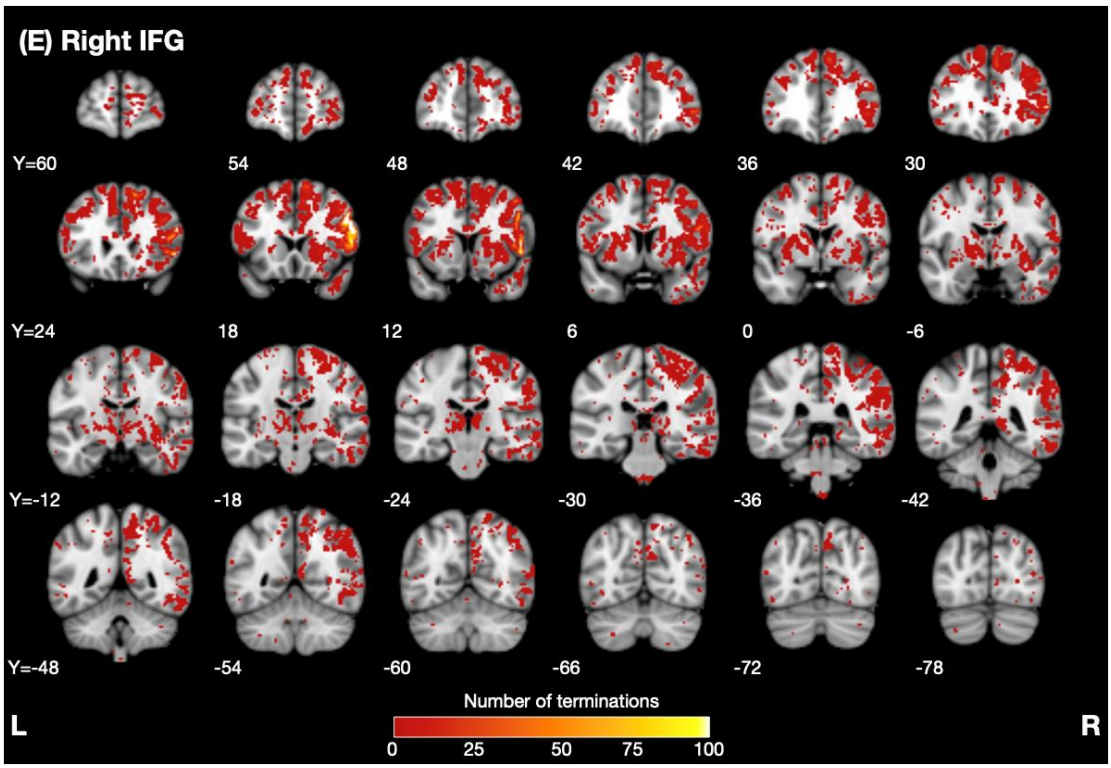

(E) Right IFG
Y=60
54
48
42
36
30
Y=24
18
12
6
0
-6
Y=-12
-18
-24
-30
-36
-42
Y=-48
-54
-60
-66
-72
-78
Number of terminations
0
25
50
75
100
L
R

Fig. S2. Matrix of connectivity across the 50 participants for each of the 18 AAL3 areas in the 4 regions of interest (rows), with other AAL3 areas (columns). Only significant connections are shown, tested as described in the Methods. The connectivity matrix shows the 140 areas in the AAL3 atlas excluding the cerebellar areas. The names of the AAL3 areas are shown in Tables S1 and S2.

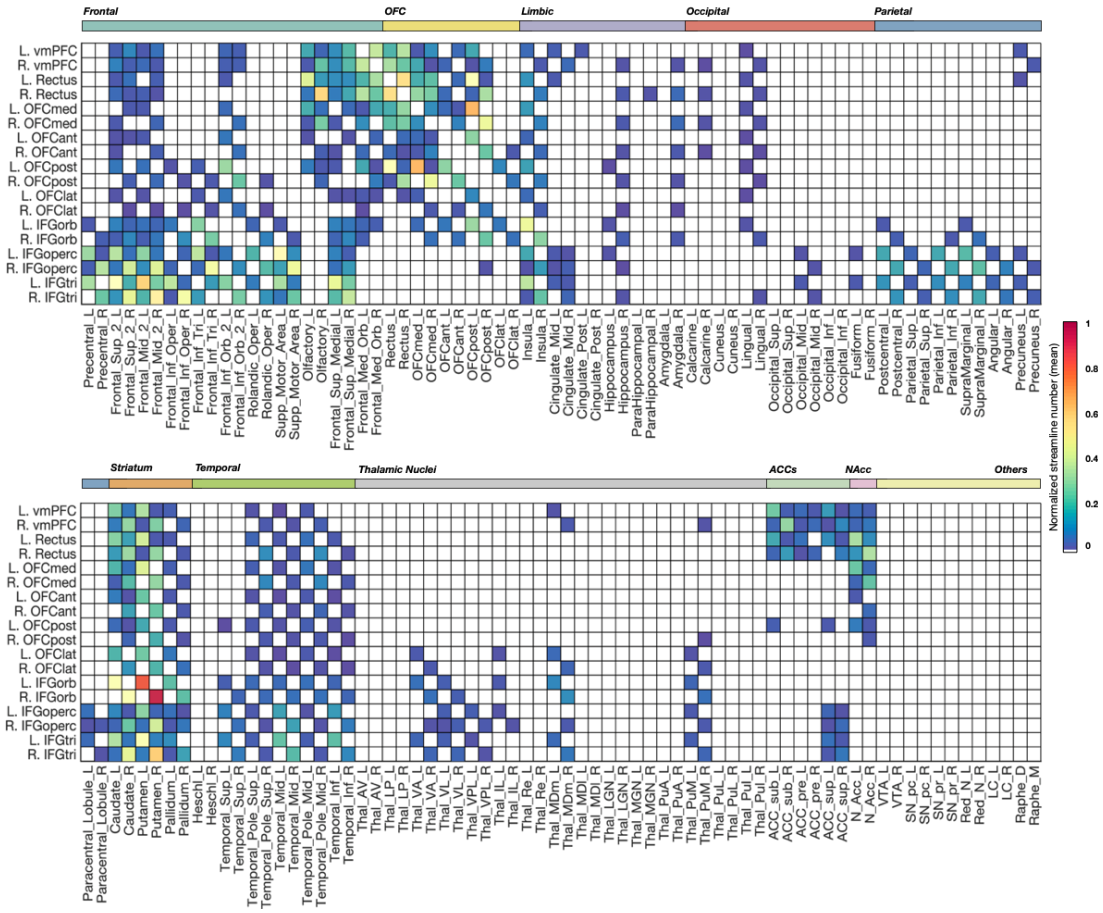


Fig. S3. Pearson correlation matrix between the connectivity of each of the 18 AAL3 areas (rows) in the 4 ROIs with other AAL3 brain areas (columns) across 50 participants.

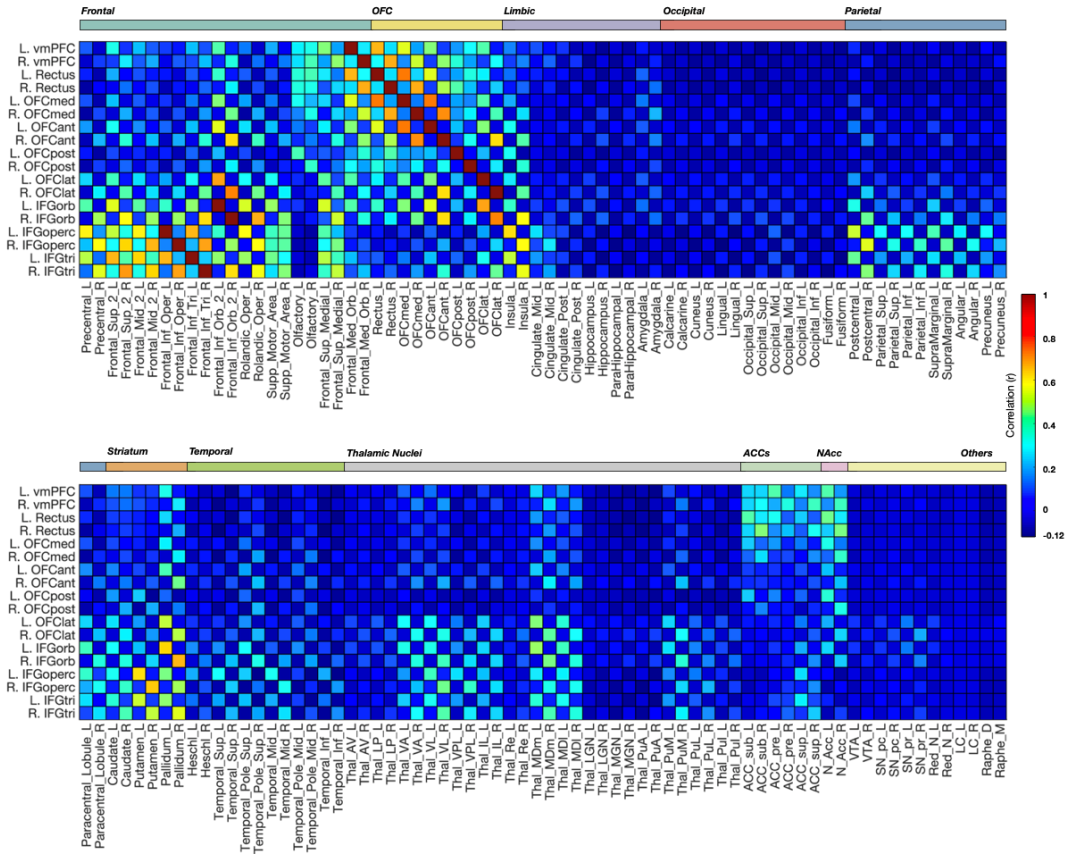


Fig. S4. Tractography diagrams for five regions of interest for the same subject as in Fig. 1. Separate diagrams are provided for the (A) right ventromedial prefrontal cortex, (B) right medial orbitofrontal cortex, (C) right lateral orbitofrontal cortex, and (D) left and (E) right inferior frontal gyrus, and (F) an overlay of five tractographies in superior, posterior and right lateral views from left to right. For (A) to (E), the tractography diagrams are colour coded based on the streamline orientations, where red, green and blue corresponded to transverse, anteroposterior and superoinferior streamlines.

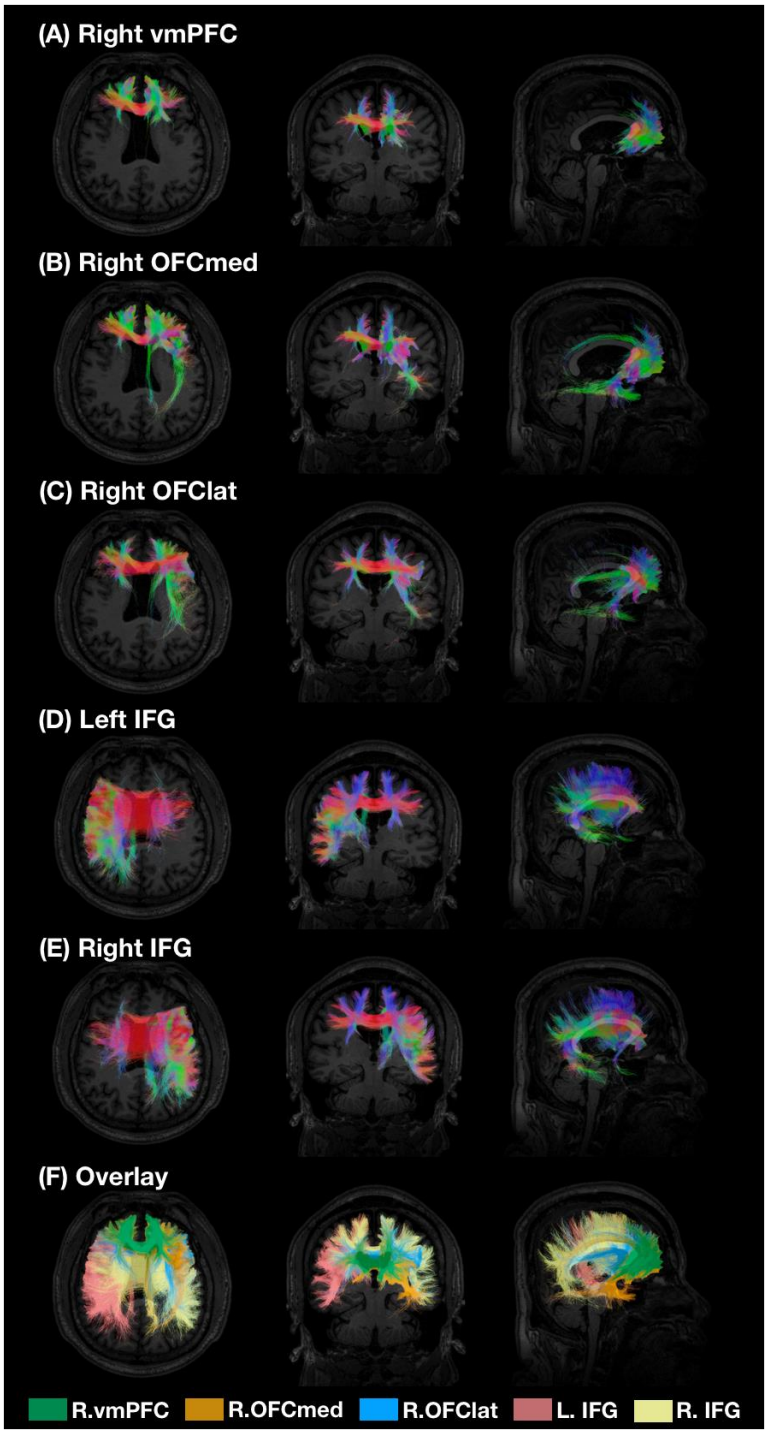


Table S1. The anatomical regions defined in each hemisphere and their label in the automated anatomical labelling atlas AAL2 (Rolls et al. 2015). The regions that have been redefined in AAL3 are shown in italics. Column 4 provides a set of possible abbreviations for the anatomical descriptions. The cerebellum is not included here.

NO.	ANATOMICAL DESCRIPTION	LABEL aal2.nii.gz	POSSIBLE ABBREVIATION
1,2	Precentral gyrus	Precentral	PreCG
3, 4	Superior frontal gyrus, dorsolateral	Frontal_Sup	SFG
5, 6	Middle frontal gyrus	Frontal_Mid	MFG
7, 8	Inferior frontal gyrus, opercular part	Frontal_Inf_Oper	IFGoperc
9, 10	Inferior frontal gyrus, triangular part	Frontal_Inf_Tri	IFGtriang
11, 12	IFG pars orbitalis,	Frontal_Inf_Orb	IFGorb
13, 14	Rolandic operculum	Rolandic_Oper	ROL
15, 16	Supplementary motor area	Supp_Motor_Area	SMA
17, 18	Olfactory cortex	Olfactory	OLF
19, 20	Superior frontal gyrus, medial	Frontal_Sup_Med	SFGmedial
21, 22	Superior frontal gyrus, medial orbital	Frontal_Med_Orb	PFCventmed
23, 24	Gyrus rectus	Rectus	REC
25, 26	Medial orbital gyrus	OFCmed	OFCmed
27, 28	Anterior orbital gyrus	OFCant	OFCant
29, 30	Posterior orbital gyrus	OFCpost	OFCpost
31, 32	Lateral orbital gyrus	OFClat	OFClat
33, 34	Insula	Insula	INS
35, 36	*Anterior cingulate & paracingulate gyri*	Cingulate_Ant	ACC
37, 38	Middle cingulate & paracingulate gyri	Cingulate_Mid	MCC
39, 40	Posterior cingulate gyrus	Cingulate_Post	PCC
41, 42	Hippocampus	Hippocampus	HIP
43, 44	Parahippocampal gyrus	ParaHippocampal	PHG
45, 46	Amygdala	Amygdala	AMYG
47, 48	Calcarine fissure and surrounding cortex	Calcarine	CAL
49, 50	Cuneus	Cuneus	CUN
51, 52	Lingual gyrus	Lingual	LING
53, 54	Superior occipital gyrus	Occipital_Sup	SOG
55, 56	Middle occipital gyrus	Occipital_Mid	MOG
57, 58	Inferior occipital gyrus	Occipital_Inf	IOG
59, 60	Fusiform gyrus	Fusiform	FFG
61, 62	Postcentral gyrus	Postcentral	PoCG
63, 64	Superior parietal gyrus	Parietal_Sup	SPG
65, 66	Inferior parietal gyrus, excluding supramarginal and angular gyri	Parietal_Inf	IPG
67, 68	SupraMarginal gyrus	SupraMarginal	SMG
69, 70	Angular gyrus	Angular	ANG
71, 72	Precuneus	Precuneus	PCUN
73, 74	Paracentral lobule	Paracentral_Lobule	PCL
75, 76	*Caudate nucleus*	Caudate	CAU

77, 78	*Lenticular nucleus, Putamen*	Putamen	PUT
79, 80	Lenticular nucleus, Pallidum	Pallidum	PAL
81, 82	*Thalamus*	Thalamus	THA
83, 84	Heschl's gyrus	Heschl	HES
85, 86	Superior temporal gyrus	Temporal_Sup	STG
87, 88	Temporal pole: superior temporal gyrus	Temporal_Pole_Sup	TPOsup
89, 90	Middle temporal gyrus	Temporal_Mid	MTG
91, 92	Temporal pole: middle temporal gyrus	Temporal_Pole_Mid	TPOmid
93, 94	Inferior temporal gyrus	Temporal_Inf	ITG

Table S2. The extra anatomical regions defined AAL3 (Rolls et al. 2020) in each hemisphere and their label. Column 4 provides a set of possible abbreviations for the anatomical descriptions. In AAL3, the label shown in column 3 is followed by the number shown in column 1. In most cases, the first number in a row is for the left hemisphere, and the second number is for the right hemisphere. This does not apply to the raphe nuclei, which are midline structures.

NO.	ANATOMICAL DESCRIPTION	LABEL AAL3.nii.gz	POSSIBLE ABBREVIATION
121, 122	Thalamus, Anteroventral Nucleus	Thal_AV	tAV
123, 124	Lateral posterior	Thal_LP	tLP
125, 126	Ventral anterior	Thal_VA	tVA
127, 128	Ventral lateral	Thal_VL	tVL
129, 130	Ventral posterolateral	Thal_VPL	tVPL
131, 132	Intralaminar	Thal_IL	tIL
133, 134	Reuniens	Thal_Re	tRe
135, 136	Mediodorsal medial magnocellular	Thal_MDm	tMDm
137, 138	Mediodorsal lateral parvocellular	Thal_MDl	tMDl
139, 140	Lateral geniculate	Thal_LGN	tLGN
141, 142	Medial Geniculate	Thal_MGN	tMGN
143, 144	Pulvinar anterior	Thal_PuA	tPuA
145, 146	Pulvinar medial	Thal_PuM	tPuM
147, 148	Pulvinar lateral	Thal_PuL	tPuL
149, 150	Pulvinar inferior	Thal_PuI	tPuI
151, 152	Anterior cingulate cortex, subgenual	ACC_sub	ACCsub
153, 154	Anterior cingulate cortex, pregenual	ACC_pre	ACCpre
155, 156	Anterior cingulate cortex, supracallosal	ACC_sup	ACCsup
157, 158	Nucleus accumbens	N_Acc	Nacc
159, 160	Ventral tegmental area	VTA	VTA
161, 162	Substantia nigra, pars compacta	SN_pc	SNpc
163, 164	Substantia nigra, pars reticulata	SN_pr	SNpr
165, 166	Red nucleus	Red_N	RedN
167, 168	Locus coeruleus	LC	LC
169	Raphe nucleus, dorsal	Raphe_D	RapheD
170	Raphe nucleus, median	Raphe_M	RapheM

References

Rolls ET, Huang CC, Lin CP, Feng J, Joliot M. 2020. Automated anatomical labelling atlas 3. Neuroimage 206:116189.

Rolls ET, Joliot M, Tzourio-Mazoyer N. 2015. Implementation of a new parcellation of the orbitofrontal cortex in the automated anatomical labeling atlas. Neuroimage 122:1-5.