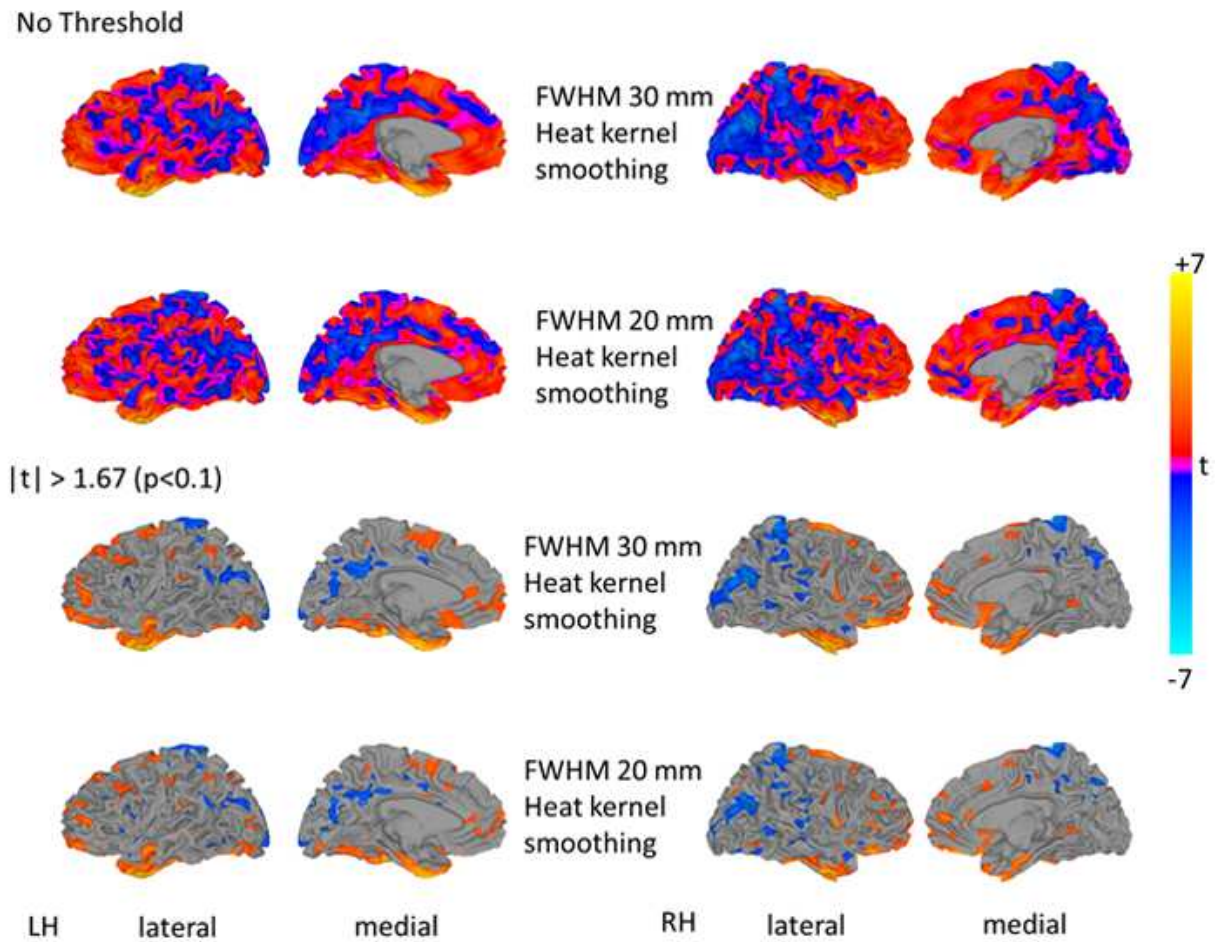


The Effect of Meditation on Brain Structure: Cortical Thickness Mapping and Diffusion Tensor Imaging

Kang DH, Jo HJ, Jung WH, Kim SH, Jung YH, Choi CH, Lee US, An SC, Jang JH, Kwon JS

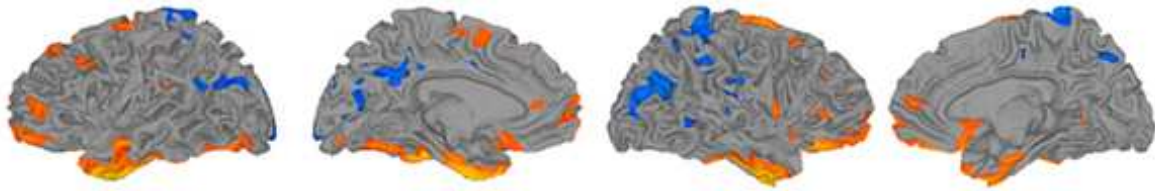
Supplementary Figure S1. Group differences in cortical thickness measurements according to smoothing kernel size.



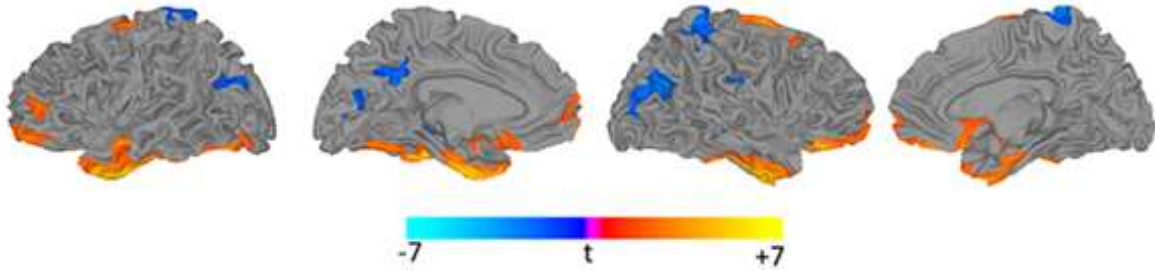
This supplementary figure is 30 mm and 20 mm results (with or without thresholds). There were no big differences within the ranges (20~30 mm). FWHM 20~30 mm is typical spatial kernel size in surface space and this is different from the smoothing kernel in 3D volume.

Supplementary Figure S2. Group differences in cortical thickness measurements before and after surface clustering.

Before clustering ($|t| > 1.97$)

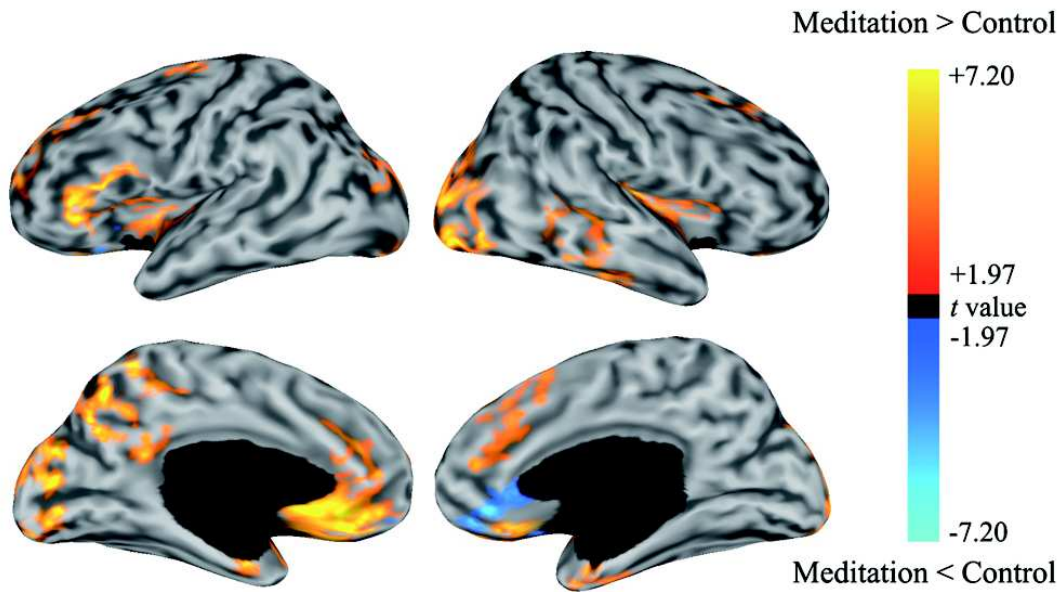


Alpha = 0.01 ($|t| > 1.97$, The number of continuous vertices $N > 214$)



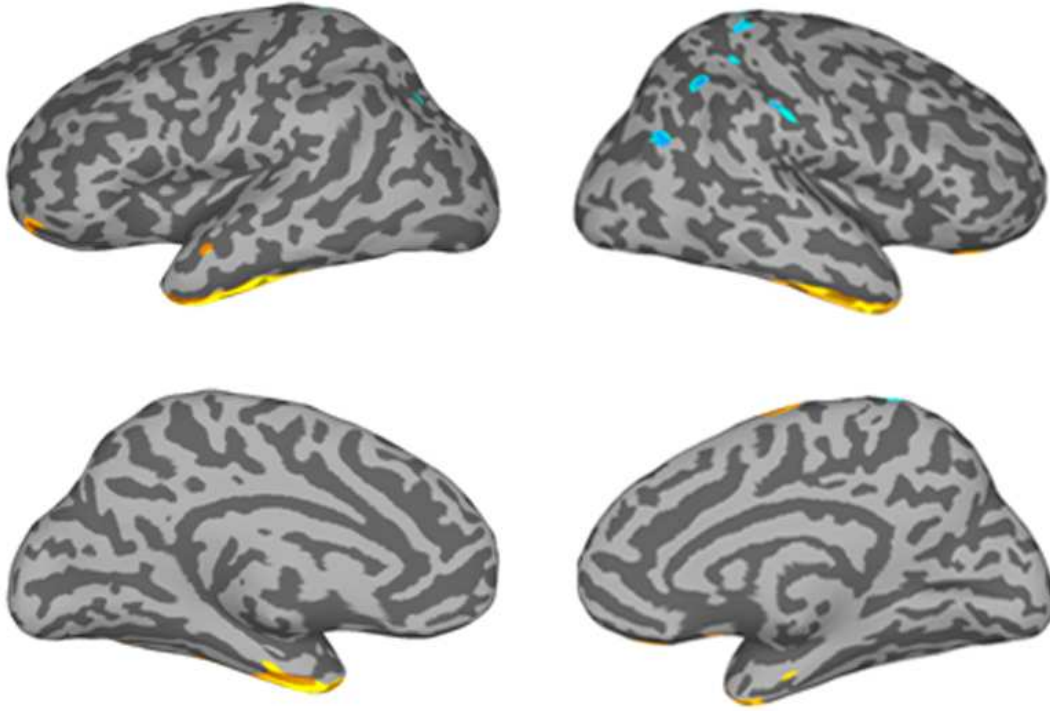
This supplementary figure is the results before and after clustering to help readers' understanding. The AlphaSim in surface space should be calculated by considering vertex number and the length of edges. We referred FreeSurfer's recommending tables for it included in FreeSurfer package. $N > 214$ means continuous 214 vertices are the minimum cluster size at a certain threshold level. In our surface models and cortical thickness results, the minimum size of clusters is 194 mm^2 .

Supplementary Figure S3. Clustering result of Figure 1B with the same threshold level to Figure 1A.



This supplementary figure presents clustering results after cortical representation of FA difference at the same threshold to the cortical thickness result in Figure 1A. This is not a stringent statistical test but an approximation via the cortical representation of volume data due to the difference in data spaces.

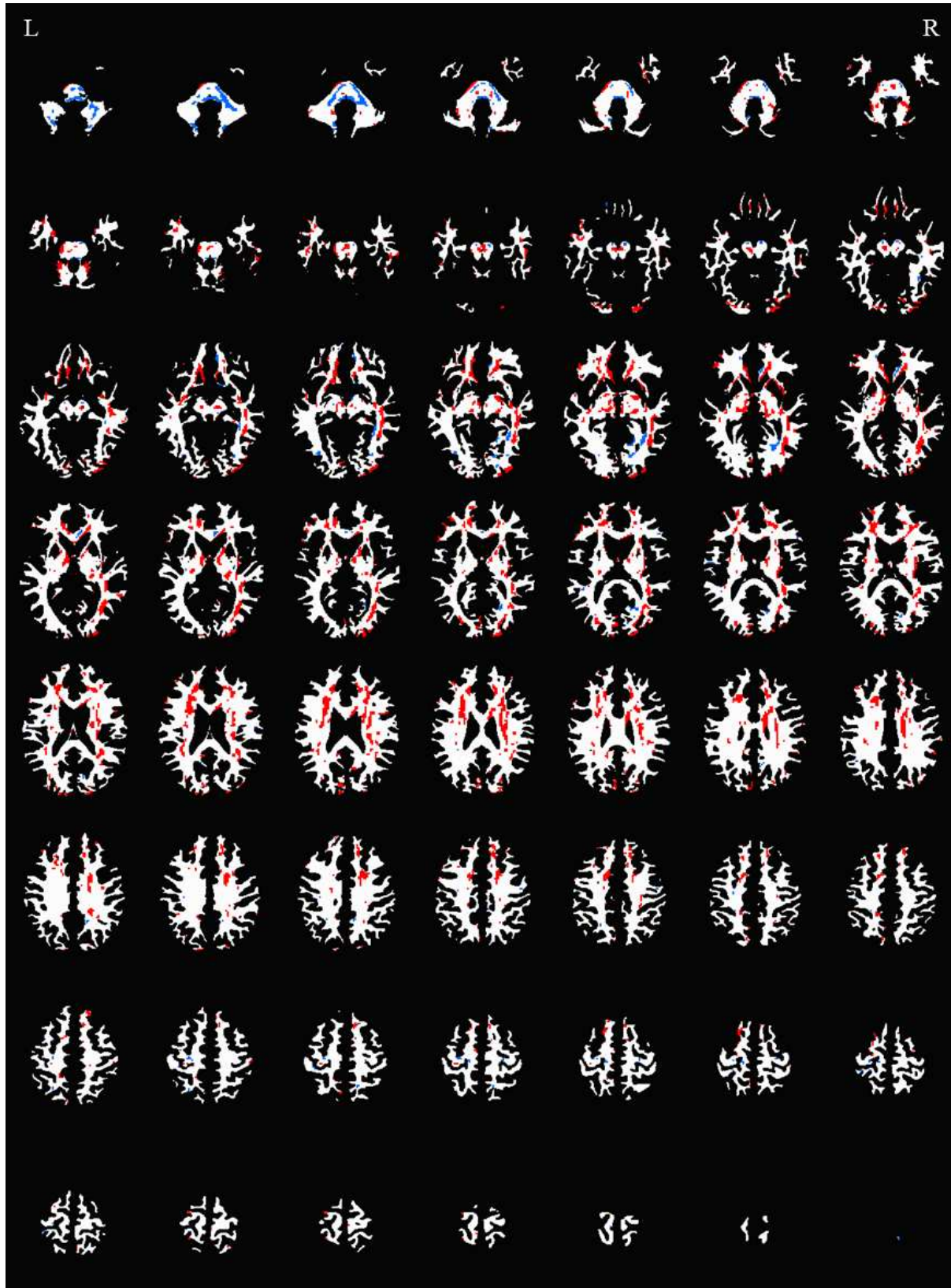
Supplementary Figure S4. The result based on FDR correction of Figure 1A (between-group differences in cortical thickness) with the same threshold level to Figure 1B.



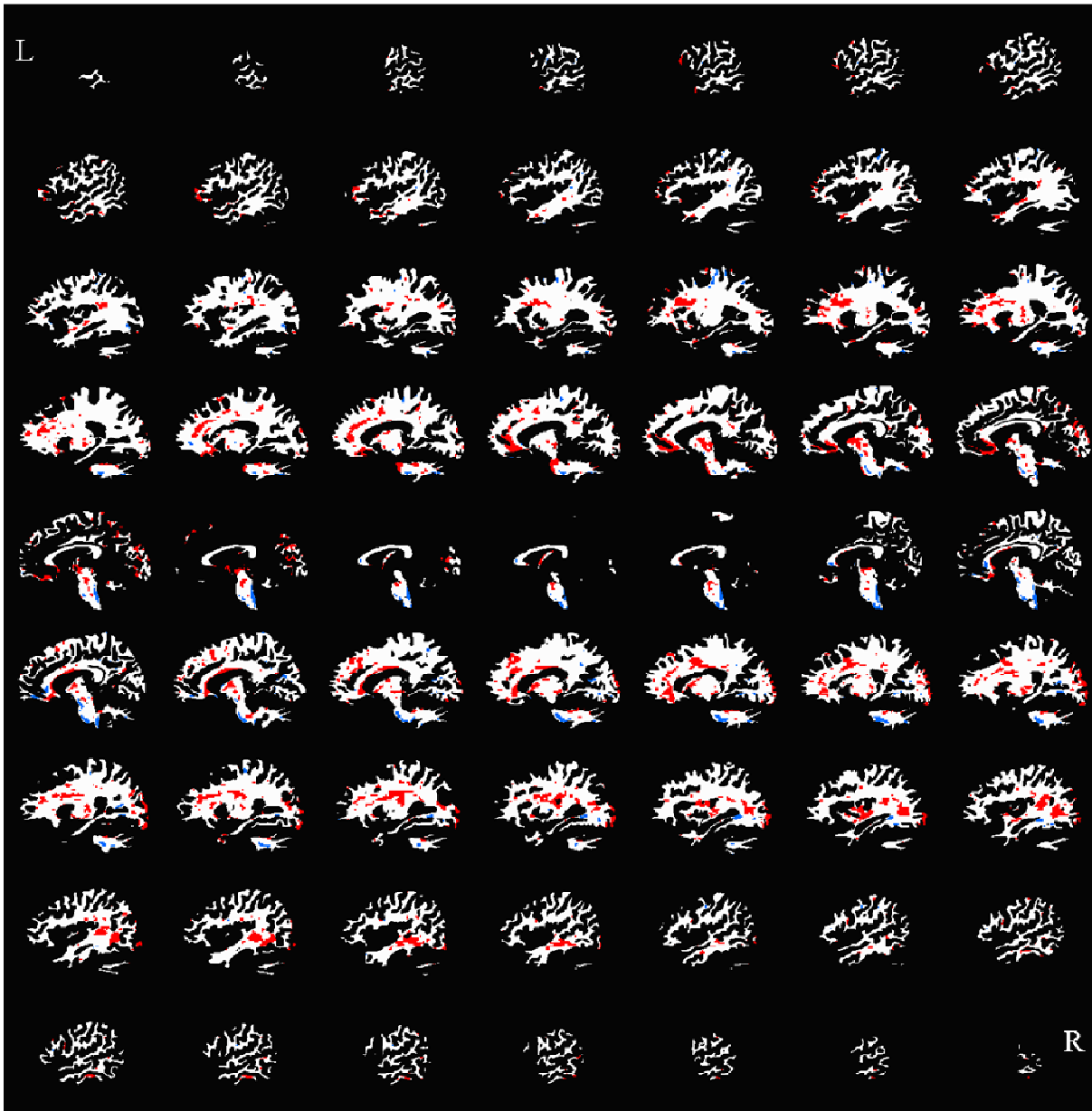
This supplementary figure presents the result of between-group differences in cortical thickness at the same threshold (FDR $q < 0.05$) to the FA result in Figure 1B. This is a stringent statistical test.

Supplementary Figure S5. White matter regions in volume space showing the statistical differences in FA value between meditation practitioners and control subjects.

<Axial images>



<Sagittal images>



This supplementary figure shows FA difference in white matter structures deeper than the locations close to cortex that is used in the manuscript. The group statistics result ($p < 0.01$) was mapped on the white matter tissue map of N27 template brain. Red colors indicate higher FA values in meditators than controls, while blue colors indicate higher FA values in controls than meditators.

Supplementary Table S1. Brain regions with significant fractional anisotropy differences between meditation practitioners and control subjects.

Brain region	Area (mm ²)	Mean <i>t</i> -value	Mean <i>p</i> -value	Peak <i>t</i> -value	Peak <i>p</i> -value	Talairach coordinates
Left hemisphere						
Genu of cingulate cortex (forceps minor)	2643.08	3.278	0.002	7.94	<0.0001	-10, 27, -4
Frontal pole	1013.29	2.676	0.0103	4.369	<0.0001	-45, 36, 12
Cuneus	1007.09	2.943	0.0051	5.429	<0.0001	-5, -81, 27
Precuneus	790.28	2.596	0.0126	5.165	<0.0001	-4, -59, 42
Frontal pole (forceps minor)	764.38	2.538	0.0146	5.74	<0.0001	-22, 47, 14
Inferior temporal cortex	735.66	2.691	0.0099	4.547	<0.0001	-23, -86, -17
Temporal pole (UNC)	543.22	2.435	0.0188	3.658	0.0007	-34, 12, -21
Lateral occipital cortex (IFOF)	465.07	2.46	0.0177	3.685	0.0006	-28, -77, 10
Precuneus	365.57	2.62	0.0119	4.279	<0.0001	-4, -49, 55
Precentral cortex	296.17	2.476	0.017	3.968	0.0003	-26, -13, 64
Parahippocampal cortex	254.59	2.614	0.0121	3.934	0.0003	-20, -4, -24
Posterior cingulate cortex (forceps major)	237.76	2.527	0.015	3.527	0.001	-6, -44, 18
Superior longitudinal fasciculus	204.15	2.567	0.0136	3.351	0.0016	-27, 11, 18
Right hemisphere						
Inferior temporal cortex (IFOF)	2476.51	2.928	0.0053	5.568	<0.0001	26, -89, -17
Inferior temporal cortex (tSLF)	1139.94	2.681	0.0102	4.704	<0.0001	52, -28, -17
Insula	847.28	2.727	0.009	5.375	<0.0001	30, -23, 12
Anterior cingulate cortex (cingulum)	639.44	2.504	0.0159	3.922	0.0003	14, 30, 21
Subcallosal cortex	565.65	2.942	0.0051	4.698	<0.0001	1, -12, 9
Temporal pole	457.07	2.525	0.0151	3.934	0.0003	24, 6, -32
Subcallosal cortex	435.99	1.404	0.167	5.928	<0.0001	6, 24, -11
Paracingulate cortex	398.36	-2.547	0.0143	-4.075	0.0002	8, 42, -7
Superior corona radiation	391.54	2.495	0.0162	3.971	0.0003	19, 5, 40
Orbitofrontal cortex (UNC/anterior corona radiation)	343.83	2.556	0.014	4.092	0.0002	16, 29, -12
Anterior thalamic radiation	298.24	2.610	0.0122	4.564	<0.0001	9, -30, 8
Cuneus	31.99	-3.598	0.008	-3.938	0.0003	15, -60, 12

Abbreviations: UNC, uncinate fasciculus; IFOF, inferior fronto-occipital fasciculus; tSLF, temporal part of superior longitudinal fasciculus. Coordinates for the voxel central to each cluster were labeled with Talairach atlas, Harvard-Oxford cortical and subcortical structural atlases, Johns Hopkins University DTI-based WM atlas, and Johns Hopkins University white matter tractography atlas.