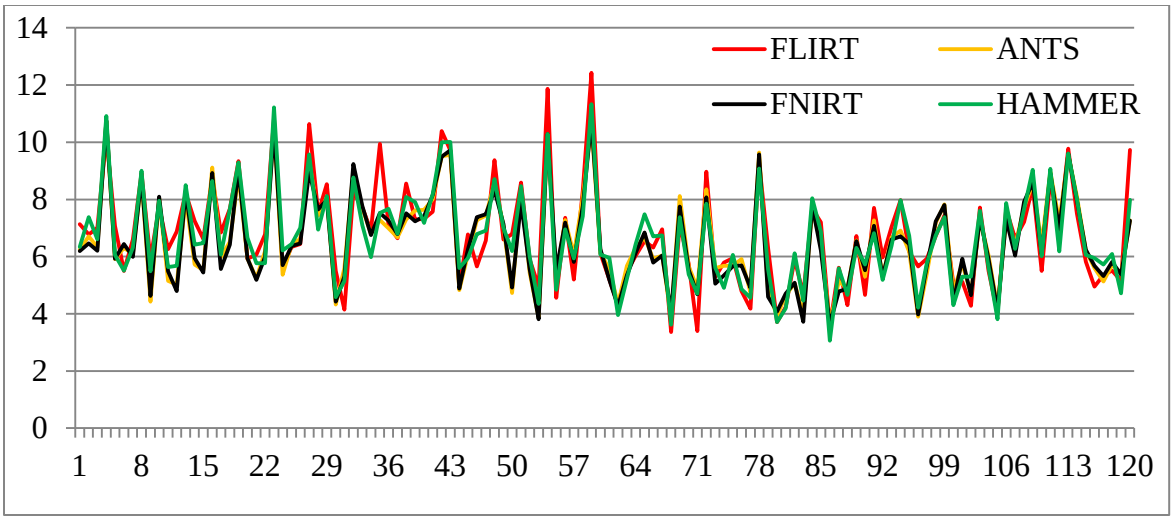
14
12
10
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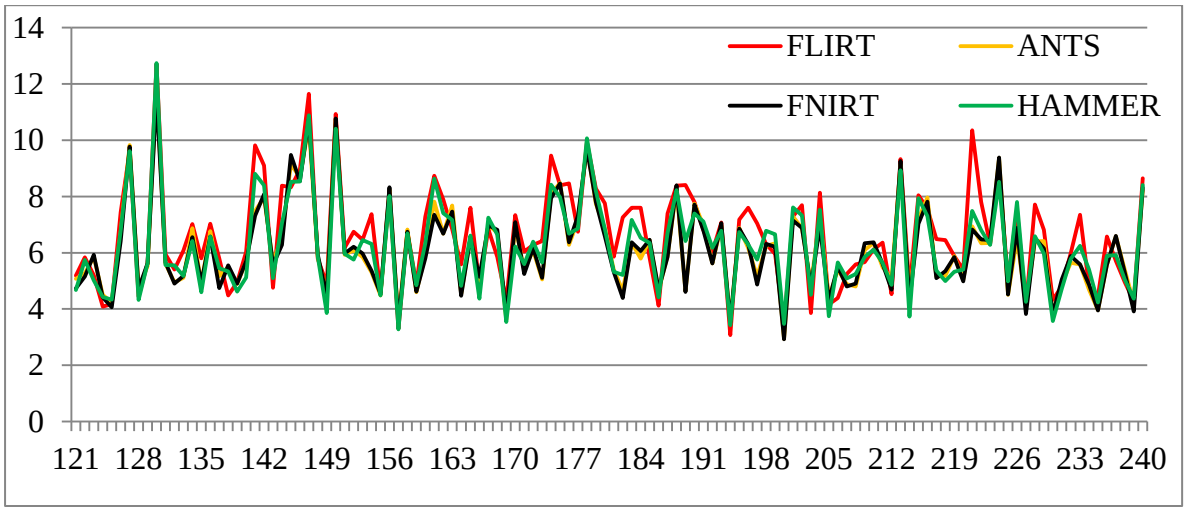
1 8 15 22 29 36 43 50 57 64 71 78 85 92 99 106 113 120
FLIRT
ANTS
FNIRT
HAMMER

(a)


14
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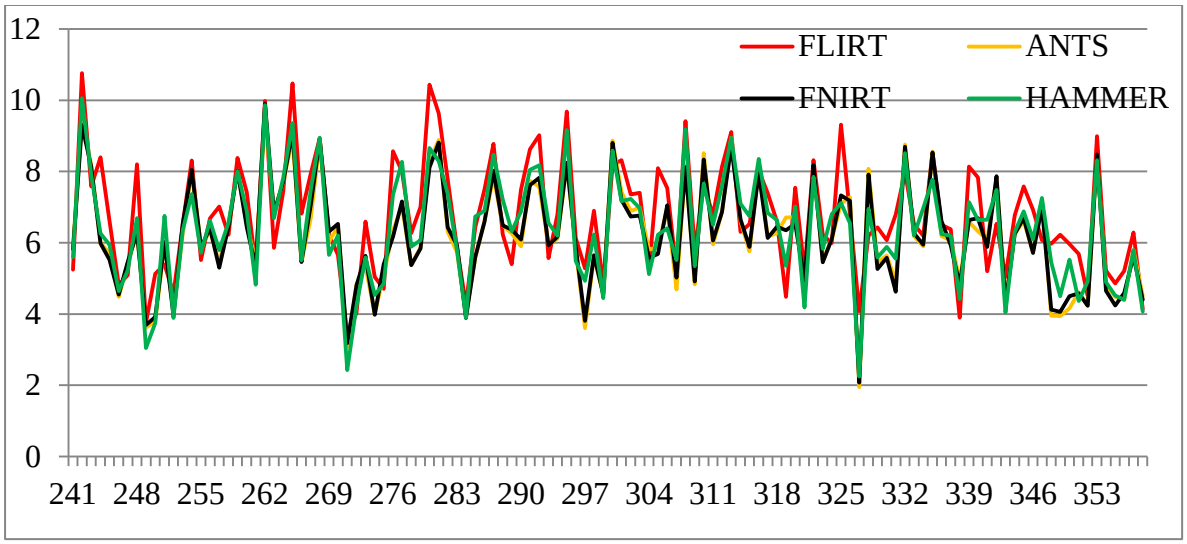
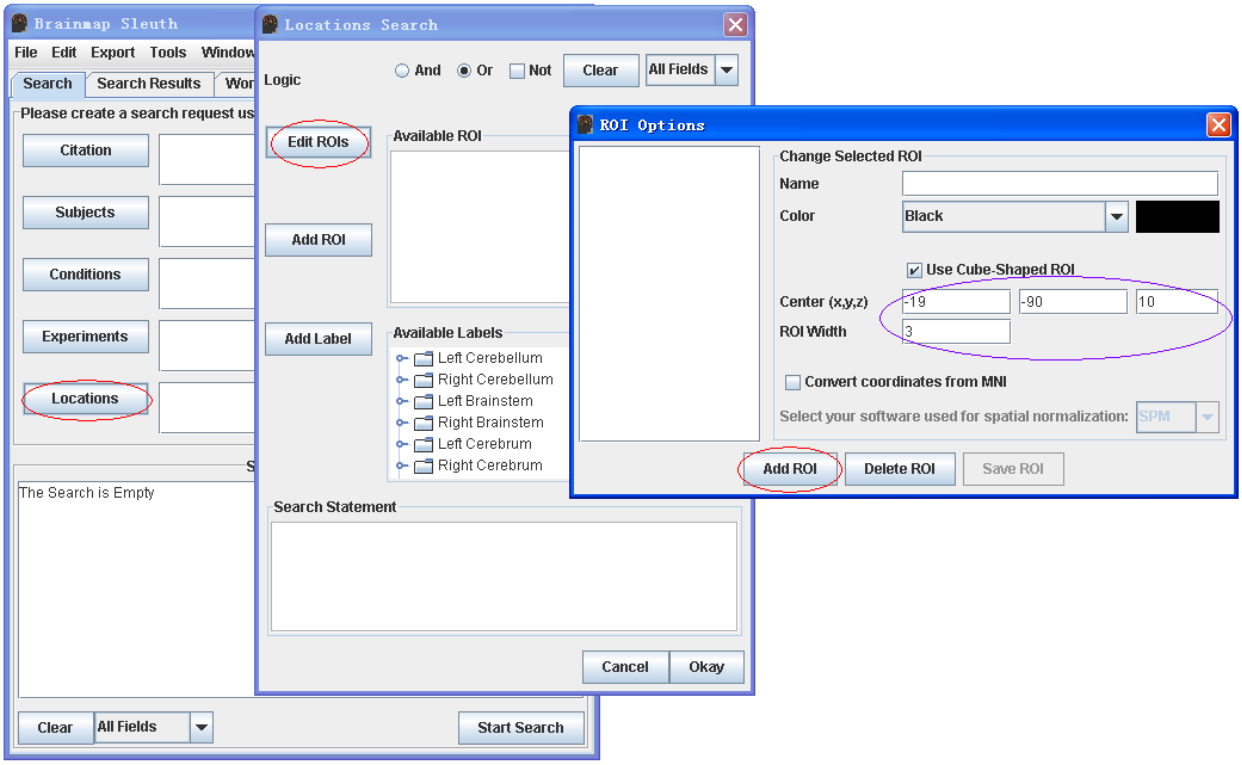
121 128 135 142 149 156 163 170 177 184 191 198 205 212 219 226 233 240
FLIRT
ANTS
FNIRT
HAMMER

(b)

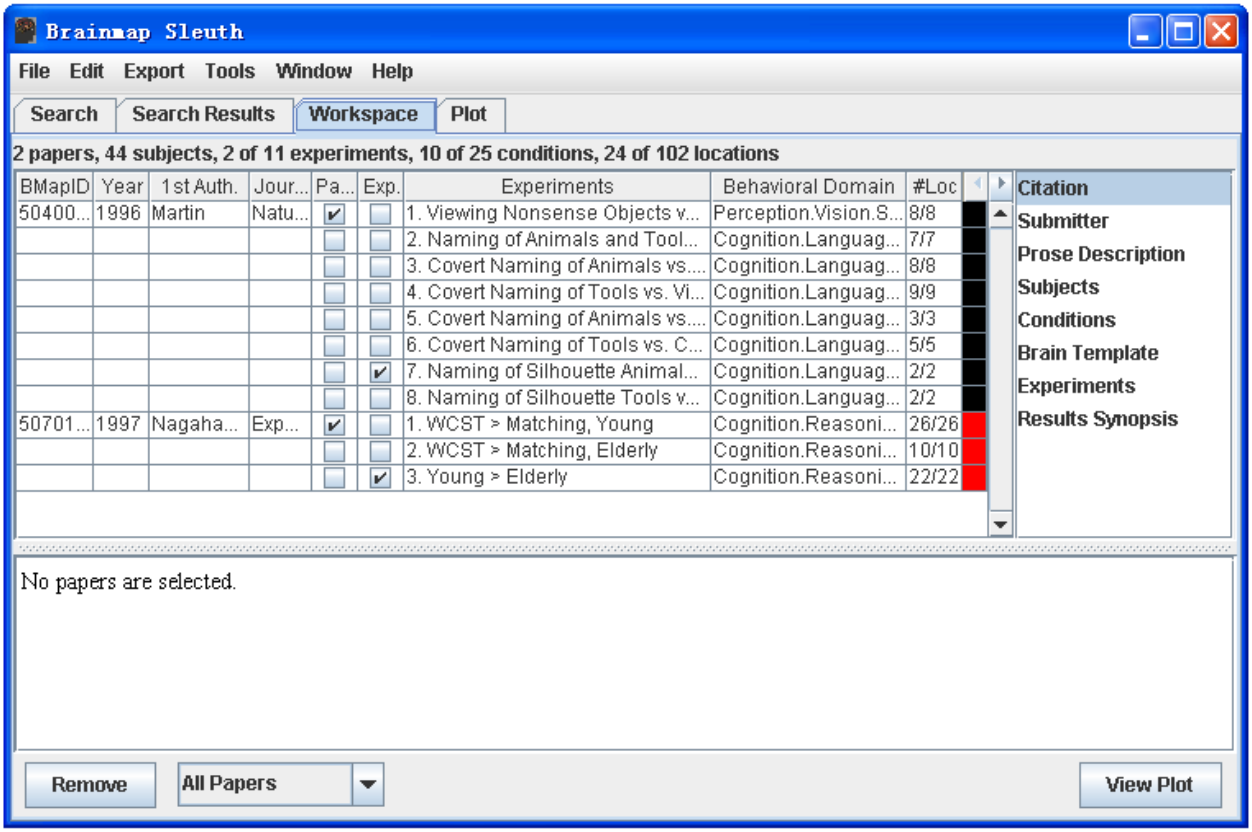


(c)

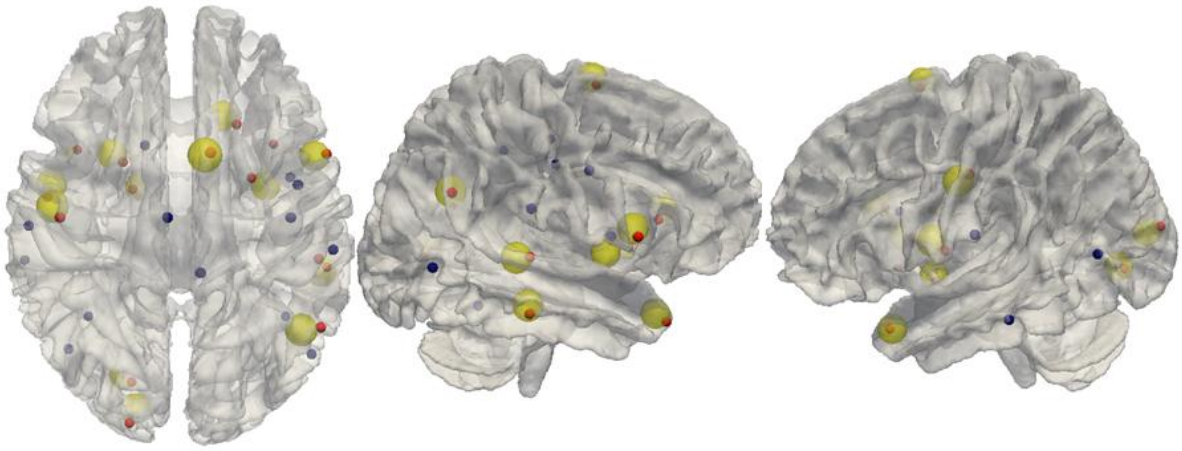
Supplemental Figure 1. Comparisons of four MRI image registration methods. The 358 DICCCOLs are split into three panels ((a)-(c)), in which each of the registration method's error is represented by a colored curve.



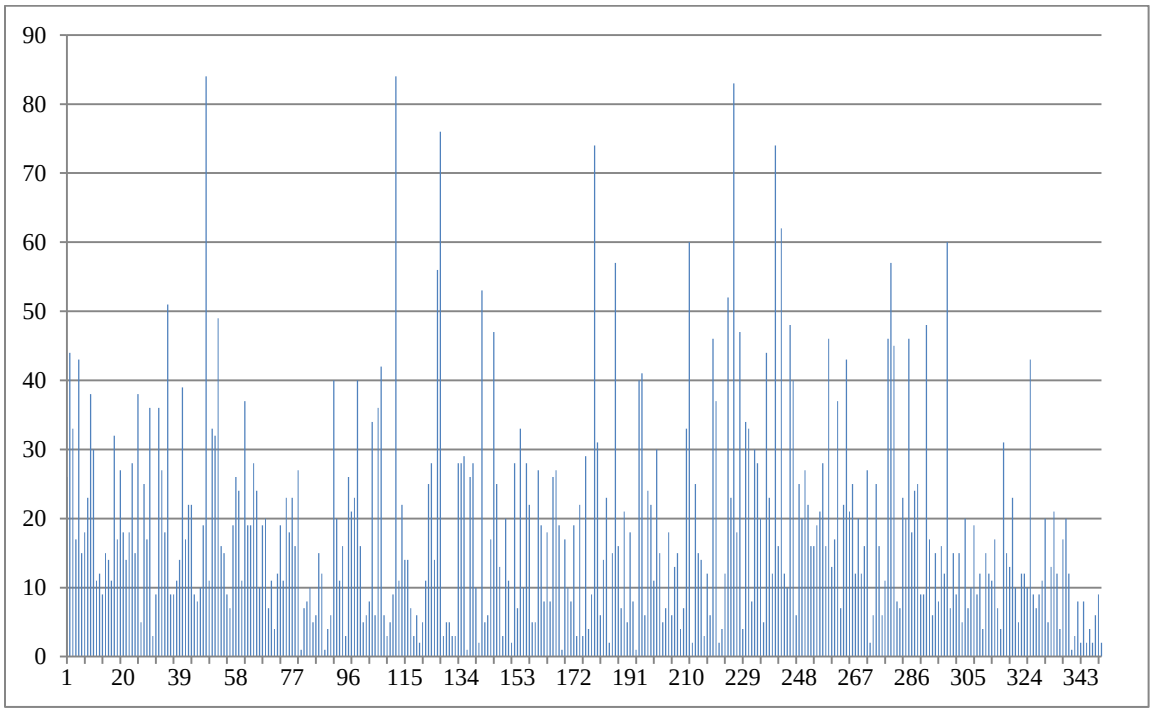
Supplemental Figure 2. Illustration of the BrainMap search using Sleuch.



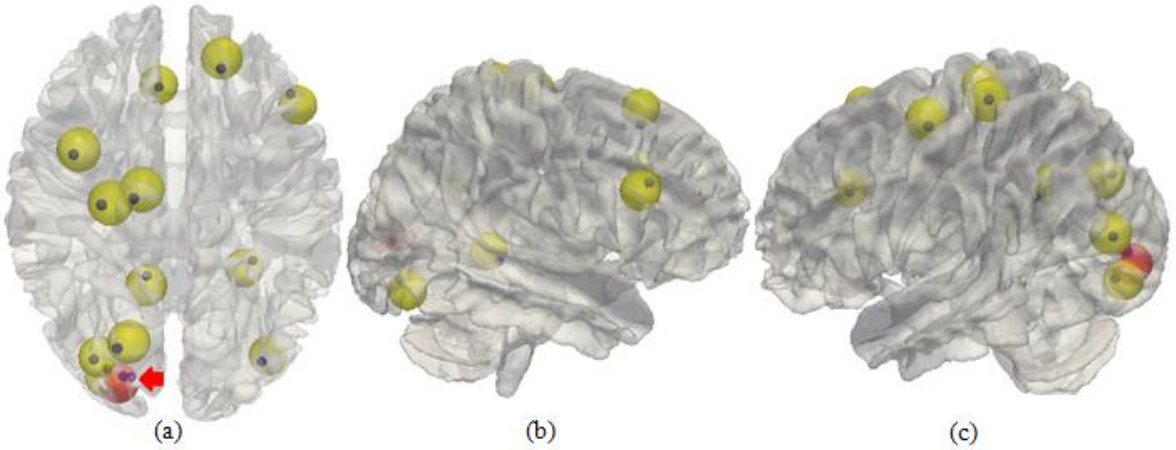
Supplemental Figure 3. The screenshot of the search results by Sleuch for the first DICCCOL.



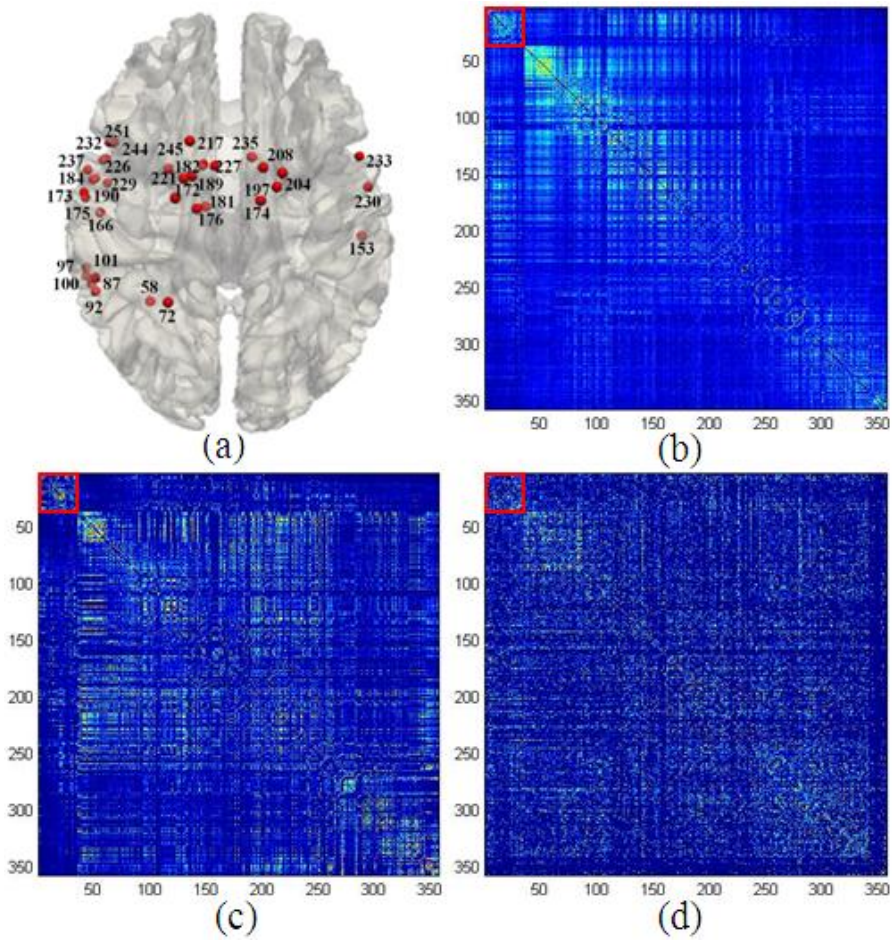
Supplemental Figure 4. The representation of fMRI activation foci by DICCCOLs. The red spheres show the fMRI activation foci that can be represented by DICCCOLs (yellow sphere with 8 mm neighborhood). The blue spheres represent fMRI foci that cannot be represented by DICCCOLs.



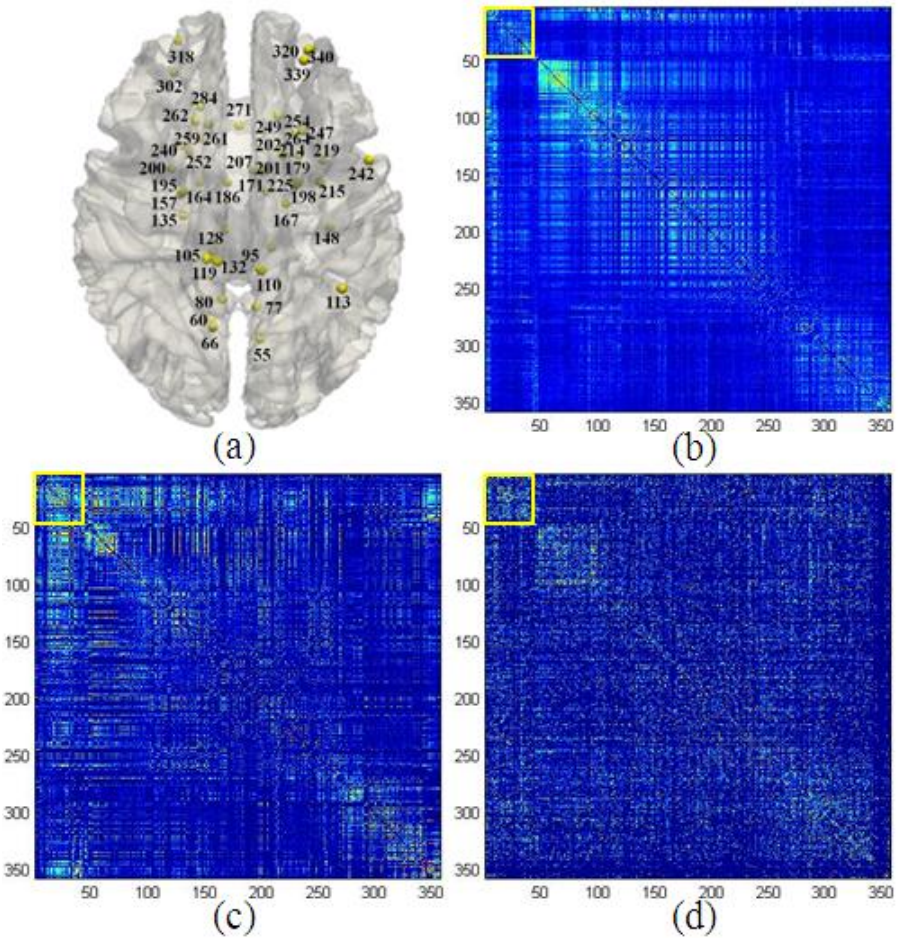
Supplemental Figure 5. The histogram of the numbers of functional networks associated with DICCCOLs. The horizontal axis represents the DICCCOL index (from 1 to 358), while the vertical axis is the number of functional networks associated with each ROI. The index of DICCCOLs in the surface are shown in Figure 5.



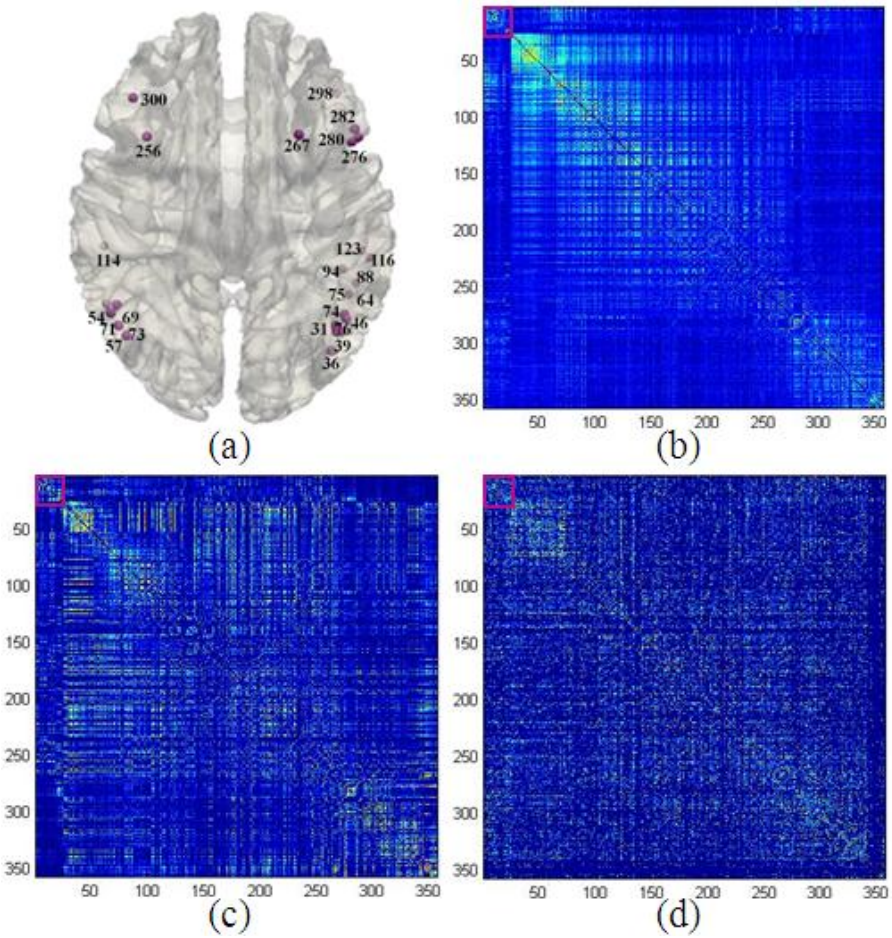
Supplemental Figure 6. The duplicate functional roles for DICCCOL #9 (red sphere) in the fMRI experiment. Yellow spheres represent DICCCOLs with 8 mm neighborhood. The blue spheres show the fMRI activation foci in the experiments.



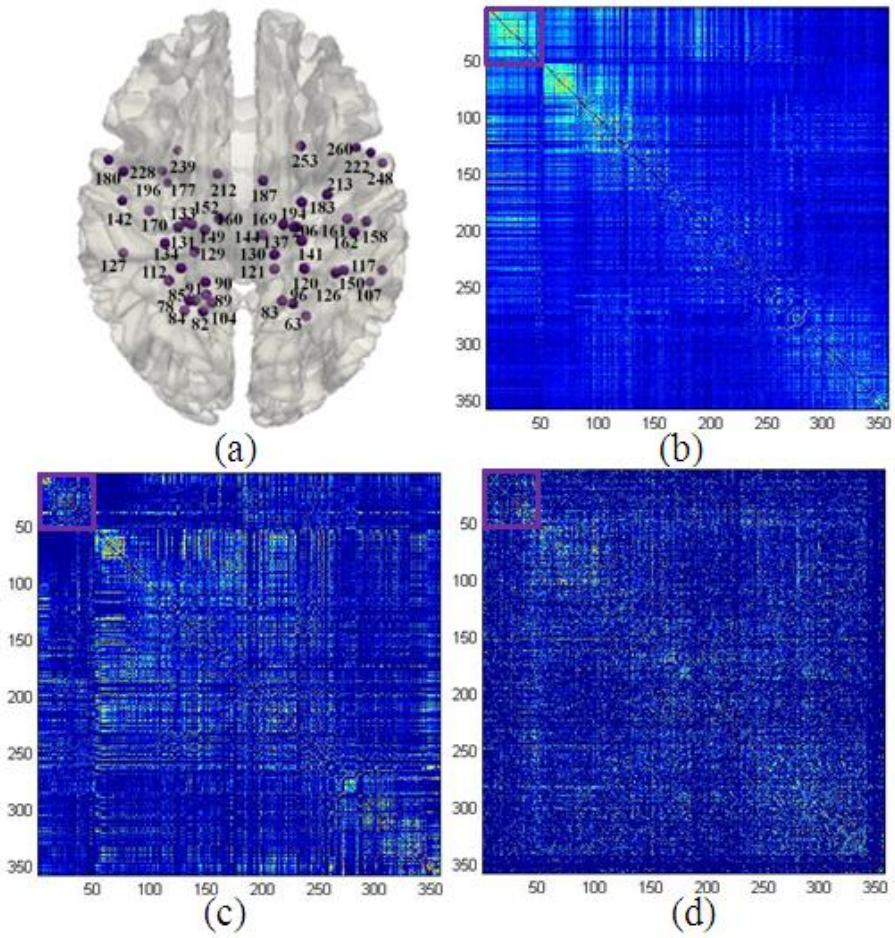
Supplemental Figure 7. (a) Visualization of the distribution of DICCCOLs in cluster #1 on the cortical surface. The DICCCOL IDs are labeled around the red bubbles. (b) The resting state connectivity. (c) The DTI-derived structural connectivity. (d) Functional connectivity matrix derived from the co-activations reported in the BrainMap database.



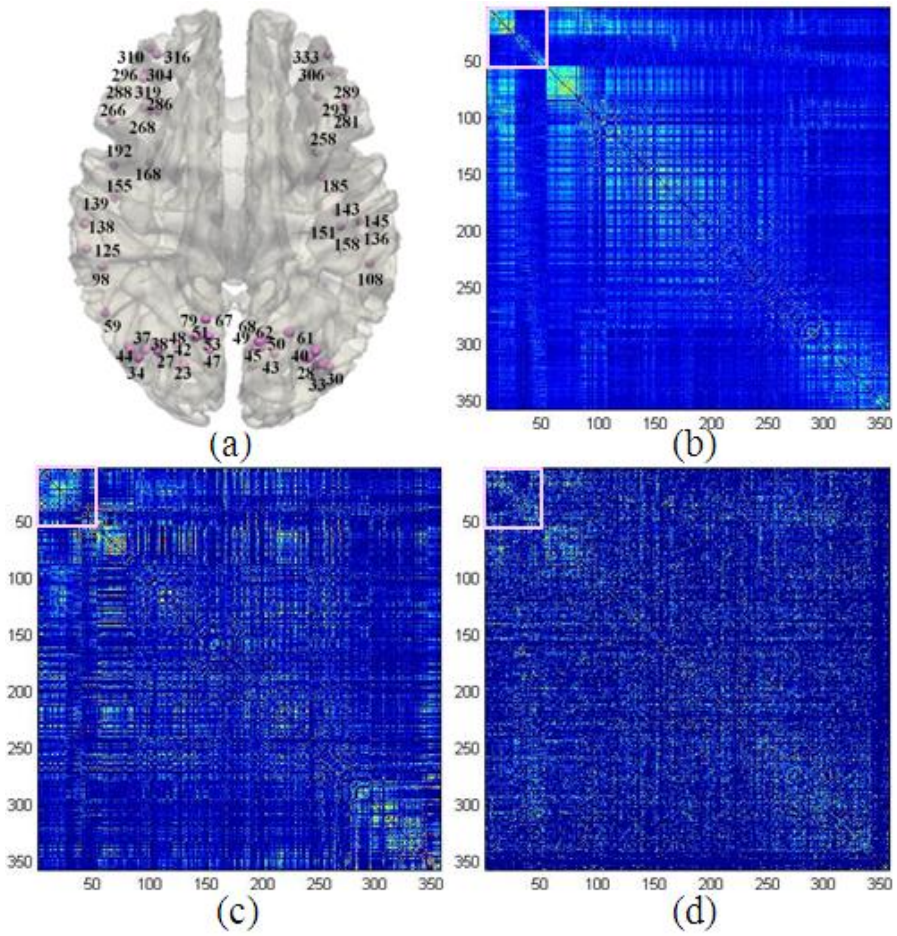
Supplemental Figure 8. (a) Visualization of the DICCCOLs of functional networks in cluster #2. The DICCCOL IDs are labeled around the yellow bubbles. (b) The resting state connectivity. (c) The DTI-derived structural connectivity. (d) Functional connectivity matrix derived from the co-activations reported in the BrainMap database.



Supplemental Figure 9. (a) The representation of DICCCOLs in cluster #3 on the cortical surface. The DICCCOL IDs are labeled around the purple bubbles. (b) The resting state connectivity. (c) The DTI-derived structural connectivity. (d) Functional connectivity matrix derived from the co-activations reported in the BrainMap database.



Supplemental Figure 10. (a) Visualization of the DICCCOLs in cluster #5 on the cortical surface. The DICCCOL IDs are labeled around the blue bubbles. (b) The resting state connectivity. (c) The DTI-derived structural connectivity. (d) Functional connectivity matrix derived from the co-activations reported in the BrainMap database.



Supplemental Figure 11. (a) Visualization of the DICCCOLs in cluster #8 on cortical surface. The DICCCOL IDs are labeled around the pink bubbles. (b) The resting state connectivity. (c) The DTI-derived structural connectivity. (d) Functional connectivity matrix derived from the co-activations reported in the BrainMap database.

Supplemental Table 1. The large-scale 1110 (publications) × 358 (DICCCOL IDs) matrix. It is available online at: http://www.cs.uga.edu/~tliu/Supplemental_Table_1.xlsx

Supplemental Table 2. The distances (in mm) of 15 warped working memory ROIs by four image registration methods (FLIRT, ANTS, FNIRT, and HAMMER) to the benchmark data.

Brain Regions	**FLIRT**	**ANTS**	**FNIRT**	**HAMMER**
Left Insula	4.28	4.15	4.03	4.24
Left Medial Frontal Cortex	6.51	6.48	6.50	6.87
Left Occipital Pole	5.91	5.88	5.84	5.07
Left ParacingulateGyrus	5.47	5.49	5.44	5.80
Left Precentral Gyrus	4.60	4.48	4.32	5.08
Left Precuneus	5.38	5.50	5.45	5.14
Left Superior Frontal Gyrus	5.29	5.36	5.70	6.00
Left Inferior Parietal Lobe	4.11	4.05	4.09	4.94
Right Dorsolateral Prefrontal	7.14	7.30	7.92	7.81
Right Insula	4.05	3.82	4.22	3.54
Right Lateral Occipital Gyrus	5.47	4. 36	3.08	4. 54
Right ParacingulateGyrus	5.34	5.30	5.65	5.19
Right Precuneus	5.44	5.61	4.84	5.95
Right Superior Frontal Gyrus	6.88	6.04	5.83	6.05
Right Inferior Parietal Lobule	5.54	5.75	5.19	5.06
Average	5.42	5.37	5.20	5.48

Supplemental Table 3. The representation procedure of associating fMRI activation foci to DICCCOLs. The brain behavior of this fMRI experiment functional network #6） is Action.Execution and Emotion.Happiness. The fMRI activations in red can be associated with DICCCOLs, while others in black cannot be associated with any DICCCOL using 8 mm as the threshold in this fMRI experiment.

Index	Original activation foci in fMRI experiment	Corresponding DICCCOL coordinates	Corresponding DICCCOL index	Distance (mm)
1	(46,111,112)	(43,115,110)	142	5.39
2	(130,111,110)	(137,107,116)	158	10.05
3	(133,123,106)	(144,122,107)	230	11.09
4	(38,119,84)	(40,124,87)	190	6.16
5	(32,108,93)	(32,118,96)	173	10.44
6	(147,136,81)	(142,135,83)	222	5.48
7	(100,133,133)	(98,132,136)	235	3.74
8	(85,111,112)	(80,125,120)	212	16.88
9	(97,91,113)	(97,102,131)	144	21.10
10	(141,71,109)	(134,70,108)	75	7.14
11	(147,99,99)	(144,88,106)	107	13.38
12	(46,140,47)	(46,139,47)	246	1.00
13	(130,143,39)	(132,139,44)	241	6.71
14	(26,94,62)	(34,96,60)	114	8.49
15	(46,60,82)	(37,70,84)	59	13.60
16	(144,95,80)	(145,90,81)	108	5.19
17	(150,91,60)	(149,91,63)	116	3.16
18	(52,71,61)	(51,89,55)	124	19.00
19	(133,71,61)	(140,75,62)	64	8.12
20	(70,32,86)	(72,37,83)	1	6.16
21	(70,45,67)	(67,48,69)	5	4.69
22	(141,58,82)	(130,49,81)	24	14.25
23	(133,127,79)	(136,137,83)	260	11.18
24	(76,139,86)	(63,136,80)	239	14.63
25	(112,148,76)	(106,151,79)	249	7.35
26	(67,133,78)	(63,136,80)	239	5.39
27	(118,127,73)	(124,124,70)	215	7.35
28	(70,123,58)	(73,124,60)	195	3.74

Supplemental Table 4. The 20 randomly selected functional networks associated with the DICCCOL #48.

Network index	Brain domain	Network index	Brain domain
16	Cognition, Emotion	88	Cognition
33	Cognition.Language.Orthography	114	Cognition.Attention, Perception.Vision
34	Cognition.Language.Orthography	164	Action.Motor Learning
35	Cognition.Time, Cognition.Language.Orthography	165	Cognition.Attention, Perception.Vision.Motion
38	Cognition.Attention, Perception.Vision.Motion	167	Perception.Vision.Shape, Pharmacology.Alcohol, Cognition.
40	Cognition.Language.Orthography	175	Cognition, Emotion
41	Cognition.Time, Cognition.Language.Orthography	347	Action.Motor Learning
42	Cognition.Attention	363	Cognition, Emotion, Cognition.Memory.Explicit
43	Cognition.Attention, Perception.Vision.Motion	402	Cognition.Language.Phonology
70	Cognition.Memory.Explicit	452	Emotion

Supplemental Table 5. The top 20 DICCCOL ROIs with the largest number of networks.

DICCCOL index	Brodmann areas	Number of networks	DICCCOL index	Brodmann areas	Number of networks
48	Brodmann area 7	84	281	Brodmann area 9	57
113	Brodmann area 40	84	127	Brodmann area 40	56
228	Brodmann area 4	83	142	Brodmann area 4	53
128	Left Cerebrum. Sub-lobar.Thalamus. Gray Matter.Pulvinar,	76	226	Brodmann area 3	52
180	Brodmann area 6	74	35	Brodmann area 18	51
242	Brodmann area 6	74	52	Brodmann area 19	49
244	Brodmann area 9	62	247	Right Cerebrum. Sub-lobar. Lentiform Nucleus. Gray Matter.Putamen	48
213	Brodmann area 6	60	293	Brodmann area 46	48
300	Brodmann area 9	60	146	Brodmann area 22	47
187	Brodmann area 6	57	230	Brodmann area 6	47

Supplemental Table 6. The bottom 30 DICCCOLs with the least numbers of associated functional networks.

ROI index	Num of networks	Brodmann areas	ROI index	Num of networks	Brodmann areas
133	3	Brodmann area 4	149	3	Brodmann area 4
174	3	.Brodmann area 6	218	3	.Brodmann area 38
344	3	Brodmann area 11	274	2	Brodmann area 6
358	2	Brodmann area 10	121	2	Brodmann area 4
141	2	Brodmann area 3	152	2	Brodmann area 4
185	2	Right Cerebrum.Sub-lobar.Claustrum.Gray Matter.	214	2	Brodmann area 34
223	2	Brodmann area 21	346	2	Brodmann area 10
351	2	Brodmann area 10	354	2	.Brodmann area 10
81	1	Brodmann area 30	89	1	.Brodmann area 7
137	1	Brodmann area 4	169	1	Brodmann area 6
194	1	.Brodmann area 43	343	1	Brodmann area 11
65	0	Brodmann area 30	206	0	Brodmann area 4
342	0	Brodmann area 10	348	0	Brodmann area 10
349	0	.Brodmann area 10	350	0	Brodmann area 10
352	0	Left Cerebrum.Frontal Lobe.Medial Frontal Gyrus.Gray Matter	357	0	Brodmann area 10

Supplemental Table 7. The supplemental table 7 can be downloaded at:

http://www.cs.uga.edu/~tliu/Supplemental_Table_7.xlsx