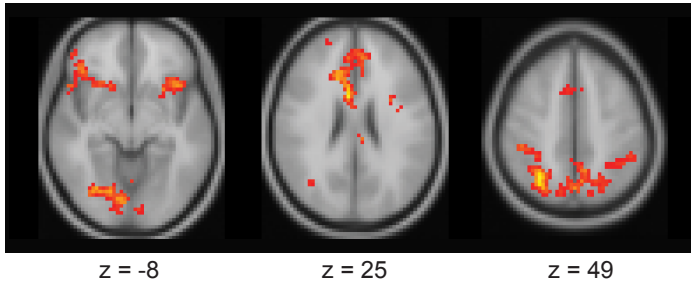
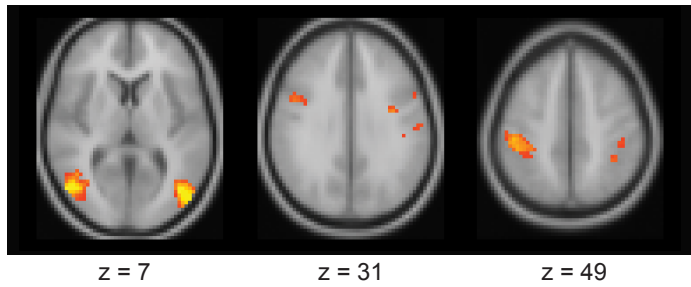


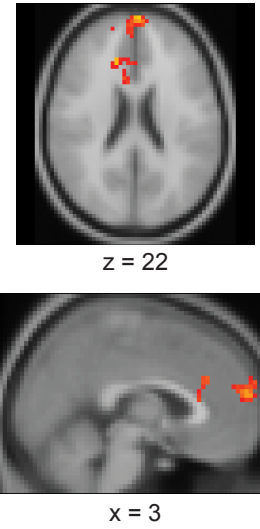
(A) Imitate Congruency (ImI>ImC)



(B) Cue Type Main Effect (Imitate > Spatial)



(C) Interaction
(ImI>ImC) - (SpI>SpC)



Supplementary Figure 1: SPM GLM results. (A) The imitative congruency effect ($p < 0.01$ voxels, cluster corrected $p < 0.05$); (B) main effect of cue type ($p < 0.001$, uncorrected) and (C) interaction contrasts ($p < 0.01$ voxels, cluster corrected $p < 0.05$) from the group GLM using SPM software. Neural systems are similar to those observed with FSL, but effects are not as robust.

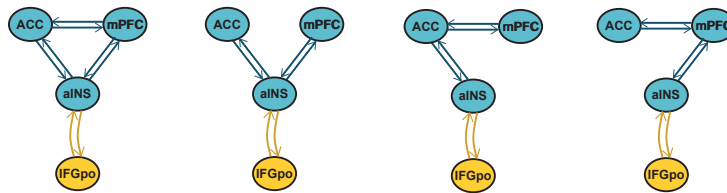
Supplementary Table 1: Local maxima from SPM-derived GLM.

Region	T	p-value (uncorrected)	p-value (cluster FWE)	MNI Coordinates		
				x	y	z
<i>Imitative Congruency Effect (Imitate Incongruent > Imitate Congruent): p<0.01, FWE cluster corrected p<0.05</i>						
R Frontal Pole	5.94	0.000	0.000	33	50	7
Paracingulate Gyrus (mPFC)	5.85	0.000		15	53	7
L Precentral Gyrus	5.68	0.000		-36	-4	31
Superior Parietal Lobule	5.38	0.000	0.000	24	-64	58
	5.35	0.000		30	-64	49
	5.02	0.000		24	-61	34
Cerebellum	4.78	0.000	0.000	-6	-82	-38
Occipital Fusiform Gyrus	4.15	0.000		18	-73	-8
	4.14	0.000		30	-70	-8
Anterior Insula	4.28	0.000	0.001	-30	32	1
	4.2	0.000		-39	17	-5
	4.09	0.000		-33	8	1
<i>Cue Type Main Effect (Imitate > Spatial): p<0.001 uncorrected</i>						
L Precentral/Inferior Frontal Gyrus, pars opercularis	3.86	0.001	0.995	-54	8	31
R Precentral Gyrus	4.58	0.000	0.171	48	5	31
L Precentral Gyrus	4.96	0.000	0.906	-36	-4	31
R Postcentral Gyrus	4.43	0.000	1	63	-13	40
L Postcentral/Supramarginal Gyrus	3.92	0.000	0.969	-57	-16	31
R Middle Temporal Gyrus	3.66	0.001	1	48	-22	-5
R Supramarginal Gyrus	5.37	0.000	0.001	45	-37	58
	5.23	0.000		42	-28	43
	4.32	0.000		39	-43	52
L Supramarginal Gyrus	6.93	0.000	0	-42	-28	43
	6.21	0.000		-48	-28	55
	5.58	0.000		-42	-34	52
R Anterior Intraparietal Sulcus	3.65	0.001	1	33	-58	34
	3.63	0.001	1	30	-61	37
Temporal Fusiform Gyrus	6.09	0.000	0.04	-42	-49	-17
R Occipital Fusiform Gyrus	4.1	0.000	0.969	27	-61	-5
R Lateral Occipital Cortex	10.1	0.000				
	1		0	51	-70	1
	6.37	0.000		33	-46	-23
	6.25	0.000		24	-46	-17
L Lateral Occipital Cortex	8.27	0.000	0	-48	-76	4
	6.96	0.000		-24	-73	-5
	5.81	0.000		-6	-88	-11
L Occipital Pole	6.47	0.000	0.004	-24	-88	22
L Cerebellum	4.87	0.000	0.443	-24	-52	-23
R Cerebellum	4.33	0.000	1	6	-67	-35
	4.31	0.000	0.995	18	-58	-44
	4.14	0.000	0.995	12	-67	-44
	4.06	0.000	0.758	21	-82	-14
	3.91	0.000	0.969	24	-70	-11
	3.71	0.001	1	21	-64	-35

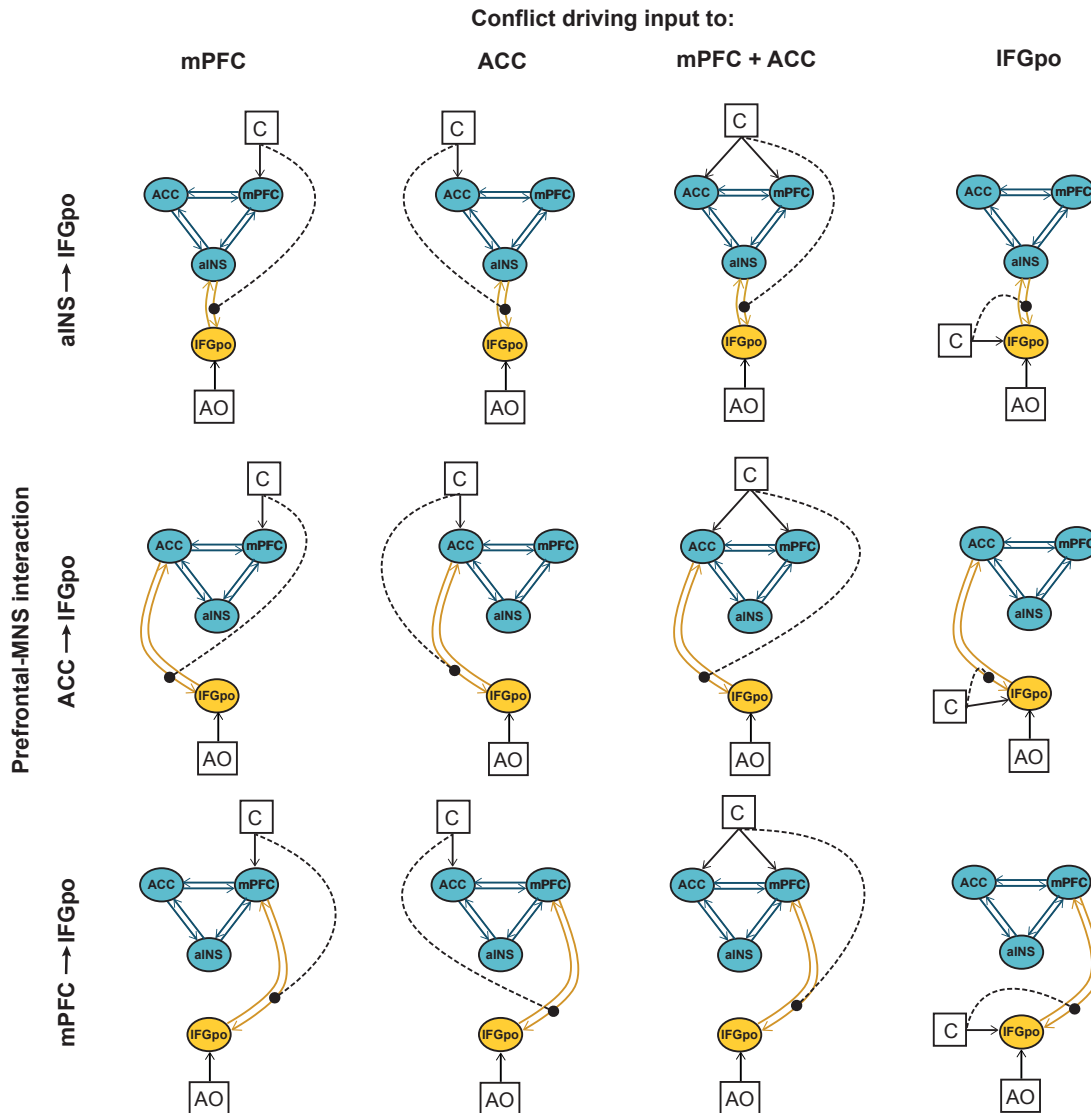
Cue type x Congruency Interaction (ImI – ImC) > (SpI-SpC): p<0.01, FWE cluster corrected p<0.05

Anterior Cingulate Cortex	5.11	0.000	0.03	15	29	19
	3.87	0.001		15	32	34
	3.8	0.001		-12	23	34
R Frontal Pole	5.06	0.000	0.034	18	56	13
Paracingulate Gyrus	4.5	0.000		-3	65	22
	4.06	0.000		3	59	16

(A) Base models: 4 prefrontal connectivity structures.



(B) Connection & input variations (depicted on fully connected prefrontal structure). Dotted line depicts modulating input. Each model diagram represents 1 of 8 similar models (4 prefrontal connectivity structures shown in (A) x 2 structures with modulating input present or absent).



Supplementary Figure 2: DCM model space. (A) 4 prefrontal connectivity families were tested first to identify the most plausible structure. (B) The full model space was created by crossing 12 connectivity structures (3 prefrontal→MNS connections depicted in rows x 4 prefrontal structures shown in A), 4 potential targets for conflict as driving input (columns 1-4), and the presence or absence of conflict as a modulator of prefrontal→MNS connectivity (dotted lines). Inputs in all models are depicted in boxes (C=conflict; AO=action observation). The frontal node of the mirror neuron system is depicted in yellow (IFGpo=inferior frontal gyrus, pars opercularis) and prefrontal control network in blue (ACC=anterior cingulate; aINS=anterior insula; mPFC=medial prefrontal cortex).

Supplementary Table 2: Local maxima from significant clusters for imitative congruency effect (ImI – ImC).

Region	Z	MNI Coordinates		
		x	y	z
Frontal Orbital Cortex	3.81	42	34	-8
		48	22	-14
		46	26	-10
Middle Frontal Gyrus	3.73	40	32	20
Frontal Pole	3.56	32	46	-2
Anterior Cingulate Gyrus	3.51	10	38	6
Frontal Orbital Cortex	3.57	-30	22	-16
		-30	22	-20
Inferior Frontal Gyrus	3.44	-34	18	22
Insular Cortex	3.83	-38	16	-2
		-32	18	-4
Precentral Gyrus	3.49	-30	8	26
Superior Parietal Lobule	3.39	32	-62	48
		32	-62	52
		30	-56	52
		34	-68	42
		18	-66	64
Precuneus Cortex	3.32	-2	-64	56
Lingual Gyrus	3.4	12	-82	-6
		12	-78	-6
Intracalcarine Cortex	3.37	10	-82	0
Cerebellum	3.71	-2	-84	-32
		-10	-80	-44
		-2	-82	-38

Regions surviving $z > 2.3$, cluster corrected (FWE $z < 0.05$) are reported. MNI refers to Montreal Neurological Institute x, y and z coordinates and the highest probability region according to the Harvard-Oxford probabilistic atlas was used for anatomical localization.

Supplementary Table 3: Local maxima from significant clusters for main effect of cue type (Imitate – Spatial).

Region	Z	MNI Coordinates		
		x	y	z
R Middle Frontal Gyrus	3.6	42	24	26
		48	28	28
		34	12	46
R Inferior Frontal Gyrus, pars opercularis	3.92	36	12	26
		46	14	28
L Inferior Frontal Gyrus, pars opercularis	3.56	-38	20	20
		-34	12	24
		-48	16	28
R Precentral Gyrus	3.32	40	4	24
L Precentral Gyrus	3.46	-40	2	28
		-32	8	28
		-34	4	22
L Lateral Occipital Cortex	6.25	-46	-84	10
		-48	-76	8
		-48	-80	8
		-48	-78	-2
R Lateral Occipital Cortex	6.06	50	-72	0
		50	-72	4
		-34	4	22

Regions surviving $z > 2.3$, cluster corrected (FWE $z < 0.05$) are reported. MNI refers to Montreal Neurological Institute x, y and z coordinates and the highest probability region according to the Harvard-Oxford probabilistic atlas was used for anatomical localization.

Supplementary Table 4: Local maxima from significant clusters for cue type x congruency interaction (ImI-ImC) – (SpI – SpC).

Region	Z	MNI Coordinates		
		x	y	z
Frontal Pole	3.48	20	58	16
		16	58	10
Paracingulate Gyrus	3.47	-4	48	28
		0	52	22
		14	50	6
Cingulate Gyrus, anterior division	3.04	6	28	22
Inferior Frontal Gyrus, pars opercularis	3.16	-36	20	18
		-38	16	16
Frontal Orbital Cortex	3.12	-30	24	-16
Insular Cortex	3.18	-32	18	-6

Regions surviving $z > 2.3$, cluster corrected (FWE $z < 0.05$) are reported. MNI refers to Montreal Neurological Institute x, y and z coordinates and the highest probability region according to the Harvard-Oxford probabilistic atlas was used for anatomical localization.