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Supplementary information for

Intolerance of uncertainty modulates brain-to-brain synchrony during politically polarized perception

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Supplementary Results

Videos elicit synchronized BOLD responses across all participants. As a manipulation check, we first ran a conventional ISC analysis (1) to ensure that our stimuli elicited robust neural synchrony between all participants, which revealed significant involvement of brain regions associated with processing narrative video content, including visual and auditory cortex, medial and lateral prefrontal cortex, and medial temporal gyrus (33, 87; Figure S1).

Intolerance of uncertainty outperforms need for closure as a predictor of neural synchrony. Our experimental results reveal a tight relationship between intolerance of uncertainty and the processing of political information in the brain. However, IUS is not the only measure of cognitive rigidity. Indeed, recent work shows that many different 'cognitive personality traits' may affect political thought (4). Although we did not collect data on most of these metrics, we did include a short need for closure scale (NFC; 14, 85) in our survey battery. As expected for such similar constructs, there was a medium correlation between intolerance of uncertainty and need for closure ($r = 0.45$, $p < 0.001$). However, running the same analysis of neural synchrony with joint NFC as a predictor instead of joint IUS did not reveal any gray matter clusters where joint NFC interacted with ideological similarity. In our data, therefore, IUS is the better predictor of neural synchrony during the perception of polarizing political information. Full cross-correlations between IUS, NFC, Interpersonal Reactivity Index (IRI), and Social Dominance Orientation (SDO) are shown in Figure S4.

Table S1

Main effect of ideology similarity:

			Peak MNI				
	Region name	**Size (*k*)**	***x***	***y***	***z***	**Peak *β***	**Peak *p***
1	Temporal pole (L)	9	-54	21	-15	0.52	< 0.001
2	Medial orbitofrontal cortex (R)	6	12	24	-21	0.44	< 0.001

Interaction effect of ideology similarity and joint IUS:

		Size	**Peak MNI**				
	Region name	**(*k*)**	***x***	***y***	***z***	**Peak *β***	**Peak *p***
1	Area MT (L)	97	-36	-75	18	2.02	< 0.001
2	Frontal eye fields (R)	49	39	0	48	2.30	< 0.001
3	Area MT (R)	46	39	-69	21	2.16	< 0.001
4	Temporoparietal junction (R)	38	60	-45	36	1.89	< 0.001
5	Frontal eye fields (L)	26	-33	3	51	1.73	< 0.001
6	Orbitofrontal cortex (R)	13	36	33	-9	2.15	< 0.001
7	Temporoparietal junction (L)	12	-54	-48	36	2.16	< 0.001
8	Precuneus	10	-6	-42	45	1.95	< 0.001
9	Precuneus	6	0	-54	45	1.21	< 0.001
10	Frontal eye fields (L)	6	-33	0	60	1.78	< 0.001

***Table S1**. Voxel clusters where significant effects were found in the second IS-RSA, where we regress neural synchrony during video 3 (CNN Debate) onto ideology similarity (standardized), joint IUS, their interaction, and participant random intercepts. Clusters are listed for the main effect of ideology and the interaction effect between ideology and joint IUS. Size (k) refers to the number of voxels in the cluster.*

Table S2

Interaction effect of ideology pair and joint IUS:

		Size	Peak MNI				
	Region name	**(*k*)**	***x***	***y***	***z***	**Peak *F***	**Peak *p***
1	Area MT (L)	140	-36	-72	15	29.1	< 0.001
2	Area MT (R)	93	39	-69	21	19.6	< 0.001
3	Frontal eye fields (R)	45	39	0	48	23.3	< 0.001
4	Temporoparietal junction (L)	43	-54	-60	27	16.0	< 0.001
5	Frontal eye fields (L)	40	-39	3	54	15.3	< 0.001
6	Dorsomedial prefrontal cortex (R)	19	15	63	30	19.6	< 0.001
7	Temporoparietal junction (R)	16	60	-45	33	11.6	< 0.001
8	Orbitofrontal cortex (R)	15	36	33	-9	13.3	< 0.001
9	Precuneus (R)	13	6	-51	42	10.7	< 0.001
10	Temporoparietal junction (L)	11	-54	-48	36	13.1	< 0.001
11	Orbitofrontal cortex (L)	7	-33	27	-12	12.3	< 0.001
12	Postcentral gyrus (L)	7	-18	-33	69	11.2	< 0.001
13	Dorsolateral prefrontal cortex (R)	7	27	57	33	10.9	< 0.001
14	Inferior temporal gyrus (R)	5	63	-57	-12	15.4	< 0.001
15	Dorsomedial prefrontal cortex (L)	5	-18	60	33	14.0	< 0.001
16	Inferior temporal gyrus (L)	5	60	-51	-15	13.8	< 0.001
17	Cerebellum (L)	5	-33	-57	-33	13.0	< 0.001
18	Dorsomedial PFC (R)	5	21	57	36	11.6	< 0.001
19	Intraparietal sulcus (L)	5	-27	-72	39	9.8	< 0.001

Table S2*. Voxel clusters where significant effects were found in the ANCOVA where neural synchrony during video 3 (CNN Debate) was regressed onto ideology pair (categorical variable, 3 levels, with CL as reference level), joint IUS, their interaction, and participant random intercepts. Clusters are listed for the interaction effect between ideology pair and joint IUS. Size (k) refers to the number of voxels in the cluster.*

Table S3

	Peak MNI									
ROI	***x***	***y***	***z***	**Term**	***β***	***SE***	***t***	***df***	***p***	
lTPJ	-54	-48	36	Ideology similarity	0.132	0.032	4.15	840.8	< 0.001	***
				Joint IUS	0.036	0.059	0.60	53.1	0.549	
				Ideology similarity × Joint IUS	0.185	0.033	5.64	839.8	< 0.001	***
rOFC	36	33	-9	Ideology similarity	0.114	0.030	3.78	833.6	< 0.001	***
				Joint IUS	0.146	0.067	2.17	60.9	0.034	*
				Ideology similarity × Joint IUS	0.164	0.031	5.22	832.8	< 0.001	***
Precuneus	-6	-42	45	Ideology similarity	0.054	0.032	1.70	838.6	0.090	
				Joint IUS	-0.083	0.063	-1.33	55.3	0.188	
				Ideology similarity × Joint IUS	0.156	0.033	4.73	837.7	< 0.001	***

Table S3*. Ideology similarity and joint IUS interact to drive neural synchrony during video 3 (CNN Debate) in the brain regions shown in Figure 3. Regression equation:* $z_{ij} = \gamma + X_{ij}\beta + \alpha_i + \alpha_j + \epsilon_{ij}$ *where* z_{ij} *is the neural synchrony between participants i and j standardized within ROI,* X_{ij} *contains main effects ideology similarity (continuous; standardized), joint IUS (standardized), and their interaction, and* α *are random subject intercepts.* * p < *0.05,* *** p < *0.001.*

Table S4

	Peak MNI									
ROI	***x***	***y***	***z***	**Term**	***β***	***SE***	***t***	***df***	***p***	
				Conservative pair	-0.022	0.123	-0.18	50.3	0.862	
				Liberal pair	0.310	0.122	2.54	48.2	0.014	*
				Joint IUS	-0.002	0.067	-0.03	121.0	0.978	
rOFC	36	33	-9	Conservative pair × Joint IUS	0.211	0.053	3.98	1715.8	< 0.001	***
				Liberal pair × Joint IUS	0.415	0.057	7.24	1709.2	< 0.001	***
	60	-45	33	Conservative pair	-0.221	0.143	-1.55	46.2	0.129	
				Liberal pair	0.541	0.142	3.82	45.0	< 0.001	***
				Joint IUS	-0.115	0.069	-1.66	193.3	0.098	
rTPJ				Conservative pair × Joint IUS	0.204	0.048	4.27	1710.9	< 0.001	***
				Liberal pair × Joint IUS	0.347	0.052	6.69	1715.3	< 0.001	***

Table S4*. Ideology pair (categorical) and joint IUS interact to drive neural synchrony during video 3 (CNN Debate) in the brain regions shown in Figure S3. Regression equation:* $z_{ij} = \gamma + X_{ij}\beta + \alpha_i + \alpha_j + \epsilon_{ij}$ *where* z_{ij} *is the neural synchrony between participants i and j standardized within ROI,* X_{ij} *contains main effects ideology pair (categorical; reference level CL, i.e. participant pair with a liberal and a conservative), joint IUS (standardized), and their interaction, and* α *are random subject intercepts.* * p < *0.05,* *** p < *0.001.*

Figure S1

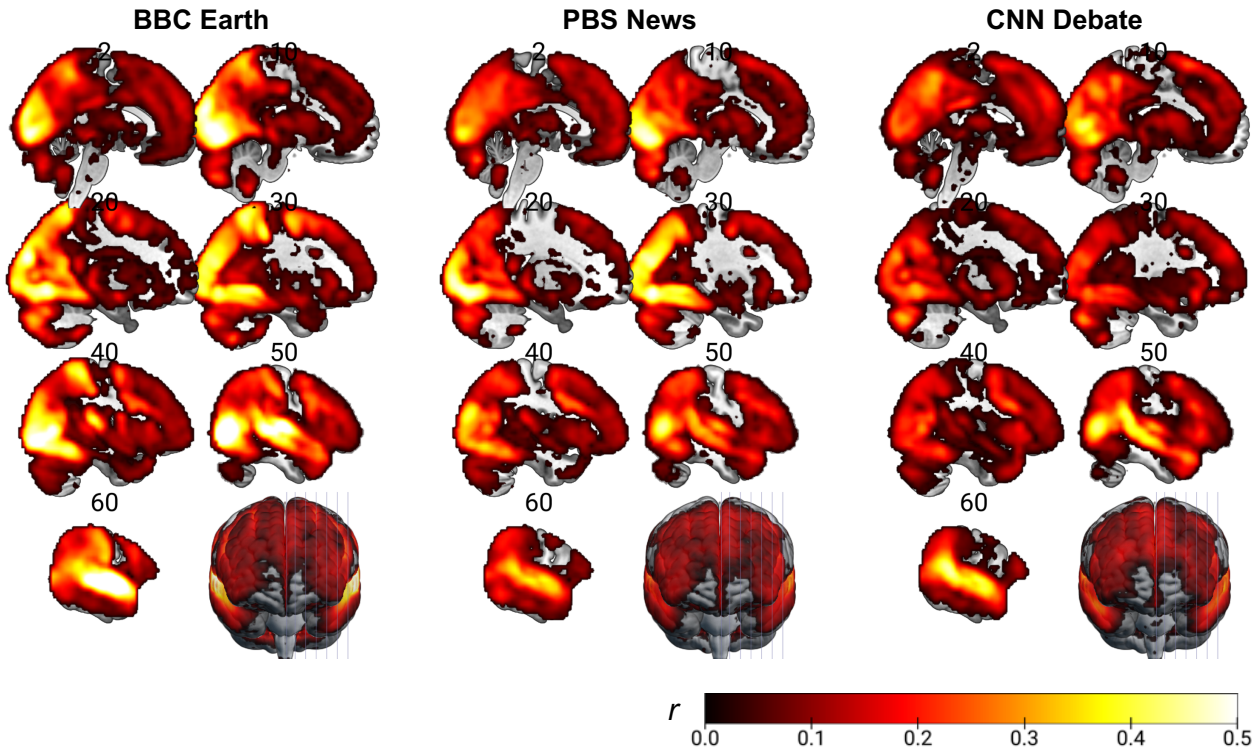

Figure S1. *Robust overall neural synchrony (inter-subject correlations) were observed for all three videos, with the strongest effects in visual and auditory brain regions. Effects are visualized here for the right hemisphere (MNI* x *coordinates 2, 10, 20, 30, 40, 50, and 60).* r *represents the mean correlation between the activity time course for a subject and the average time course for all other participants. Voxels are thresholded at p(FDR) < 0.001 based on permutation tests, following the procedure used in earlier work* (1).

Figure S2

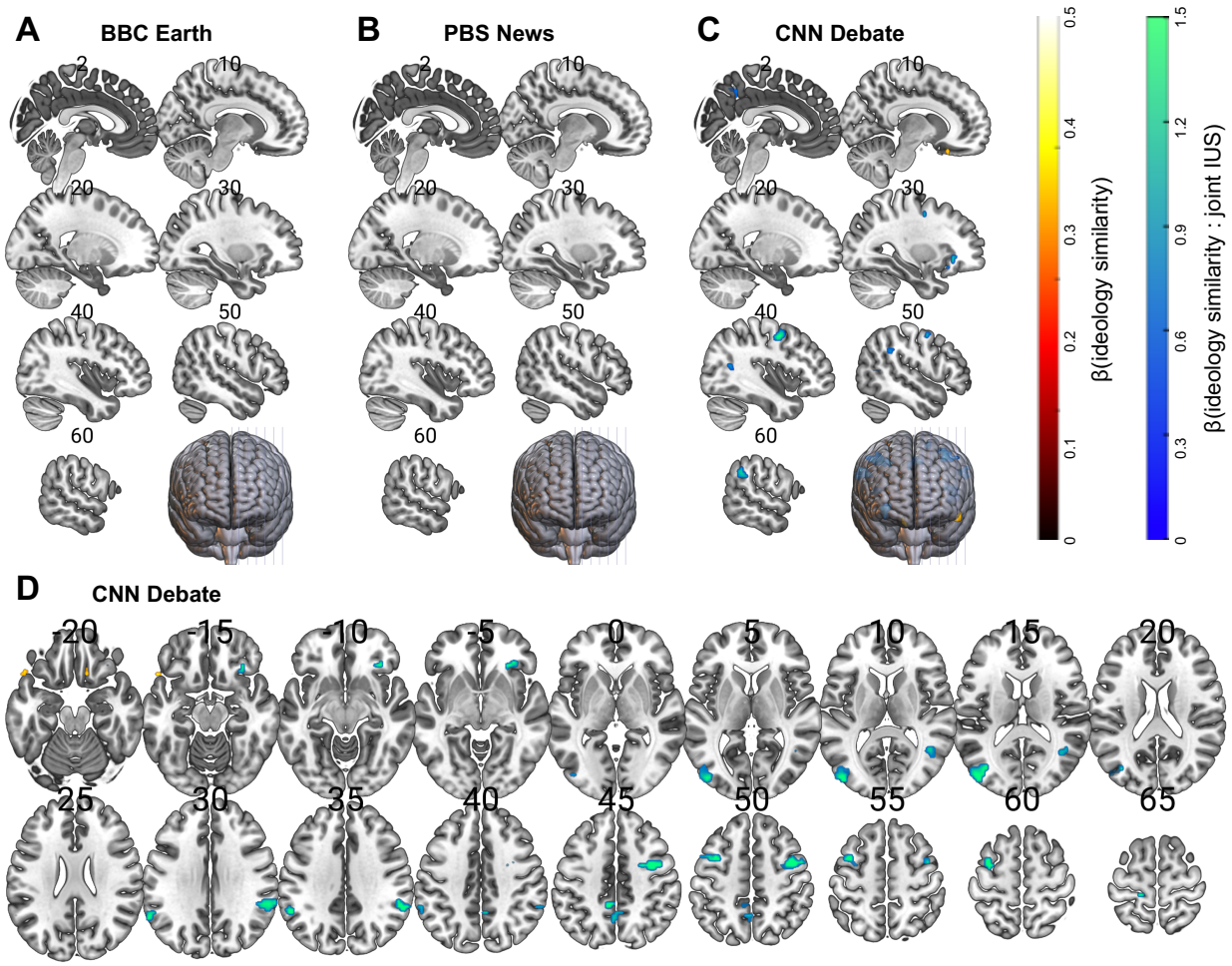

Figure S2*. Thresholded beta maps of main effect of ideology similarity and interaction effect between ideology similarity and joint intolerance of uncertainty (joint IUS) for videos 1 (A), 2 (B), and 3 (C/D). This analysis reveals that the effect of ideology on neural synchrony during video 3 is largely mediated by intolerance of uncertainty. Axial slices of the debate video beta map (D) added for improved visibility of the active clusters. Numbers represent MNI* x *coordinates in A-C and z coordinates in D.*

Figure S3

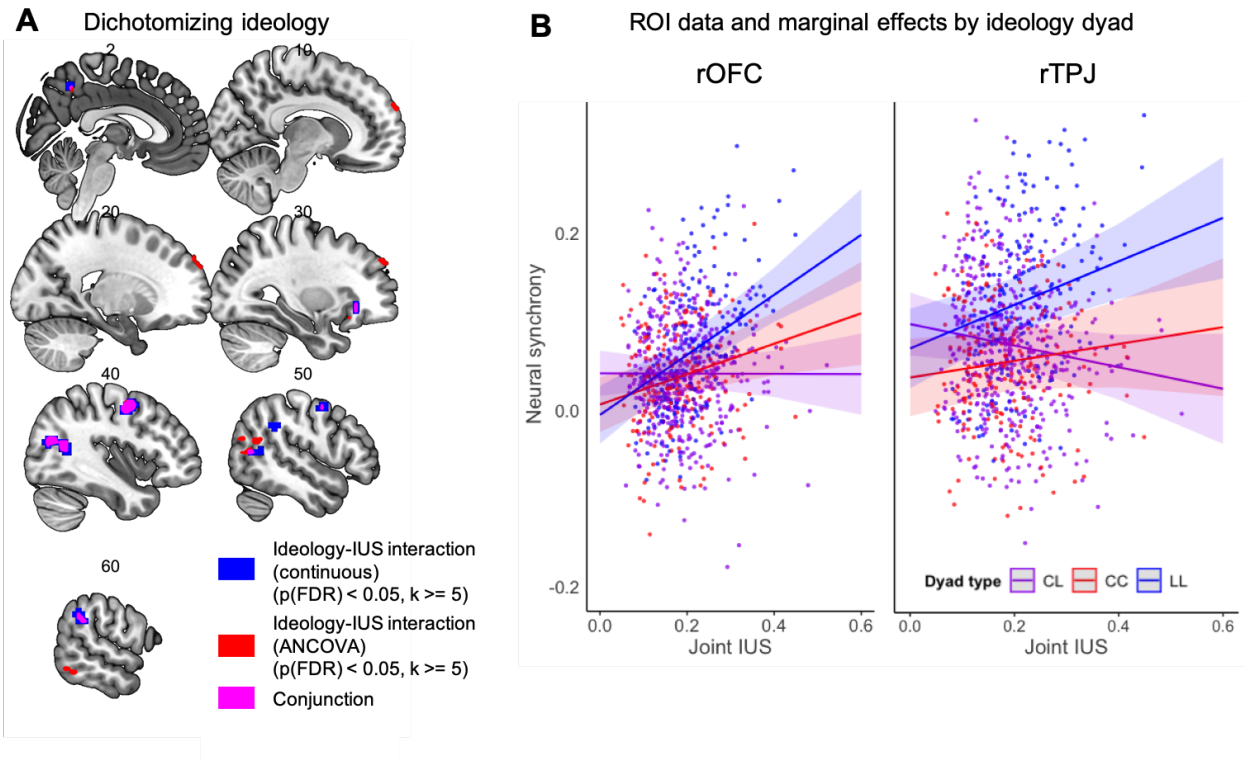

Figure S3. *ANCOVA results. A. Comparison between ideology-IUS interaction clusters from the dyadic regression with ideology similarity as continuous predictor (blue) versus the dyadic regression with ideology pair as categorical predictor (ANCOVA; red). Much overlap (magenta) was found between the two activation maps. Slice numbers represent MNI* x *coordinates. B. ROI data with regression slopes (fixed effects) for joint IUS in the three ideology pair levels CL (between-group), CC (dyad with two conservatives), and LL (dyad with two liberals). In the clusters shown, the joint IUS slope was significantly different at* p < *0.05 between CC and CL as well as between LL and CL (Dunnett-adjusted p-values). Solid lines represent the marginal effects of joint IUS with shaded bands representing 95% confidence intervals. Regression coefficients are reported in Table S4.*

Figure S4

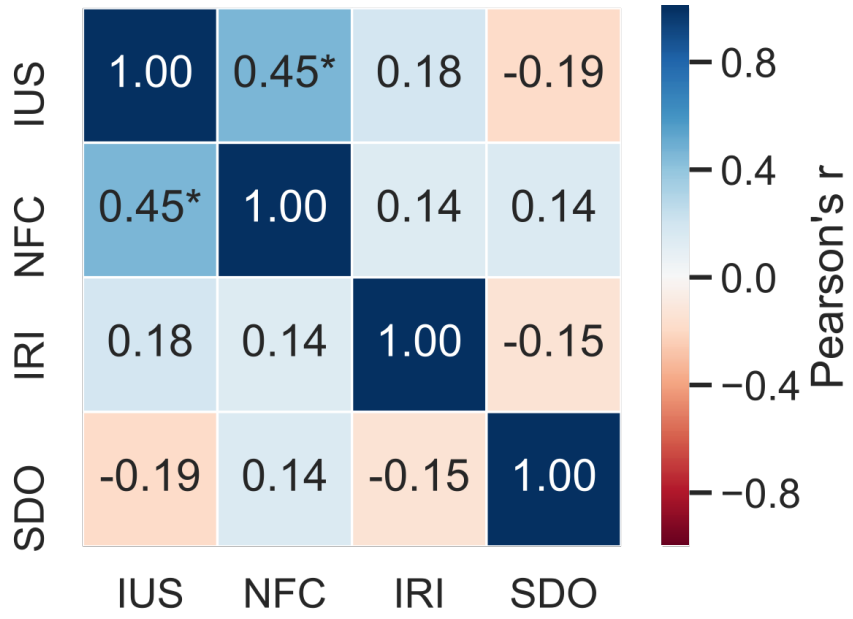

Figure S4. *Correlations between individual difference measures Intolerance of Uncertainty (IUS), Need for Closure (NFC), Interpersonal Reactivity Index (IRI), and Social Dominance Orientation (SDO).* * p < *0.05.*

Figure S5

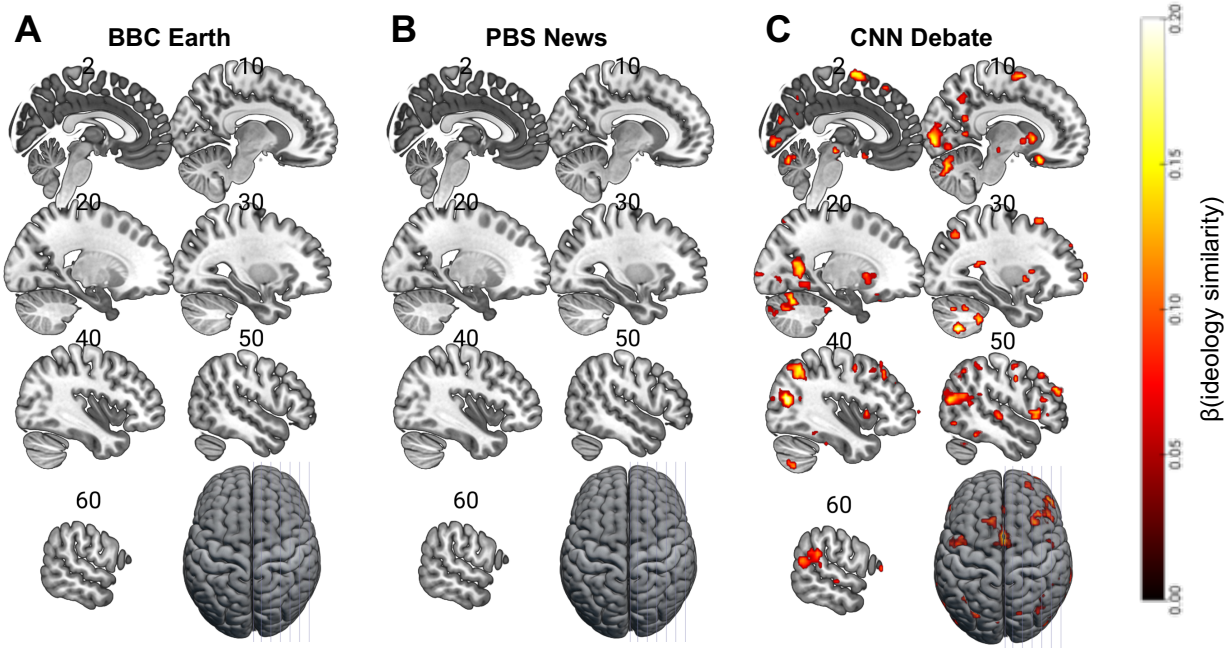

Figure S5*. Thresholded beta maps for the effect of ideology similarity on neural synchrony after controlling for inter-subject similarity in age, gender, undergraduate student status, sampling source (from the university or from the community), and scan day (participants were scanned across a ~6-month period). Numbers represent MNI* x *coordinates.*

Figure S6

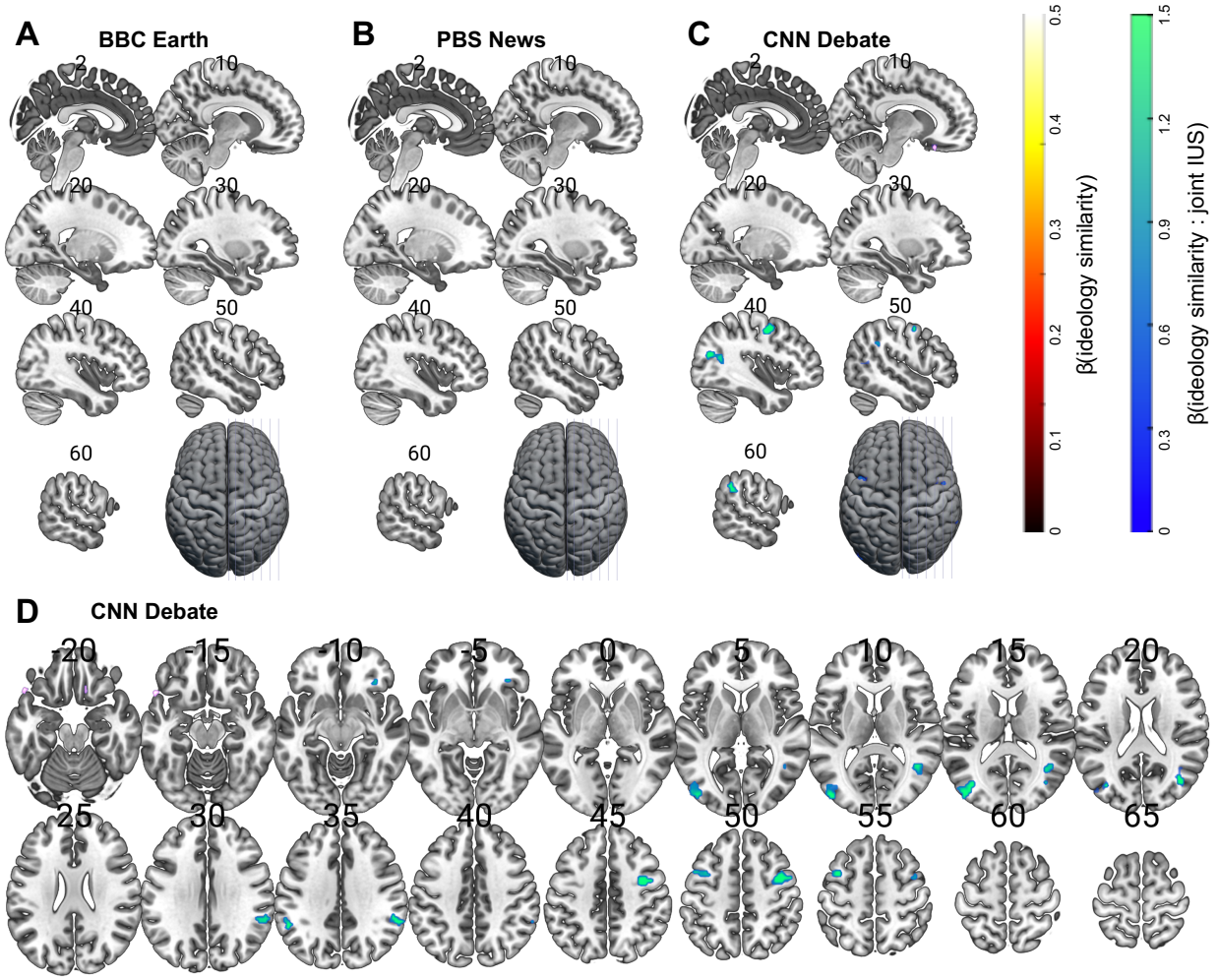

Figure S6*. Thresholded beta maps for the main effect of ideology similarity, as well as its interaction effect with joint IUS, on neural synchrony after controlling for inter-subject similarity in age, gender, undergraduate student status, sampling source (from the university or from the community), and scan day (participants were scanned across a ~6-month period). Axial slices (D) added for improved visibility of the active clusters for the debate video. Numbers represent MNI x coordinates in A-C and z coordinates in D.*

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