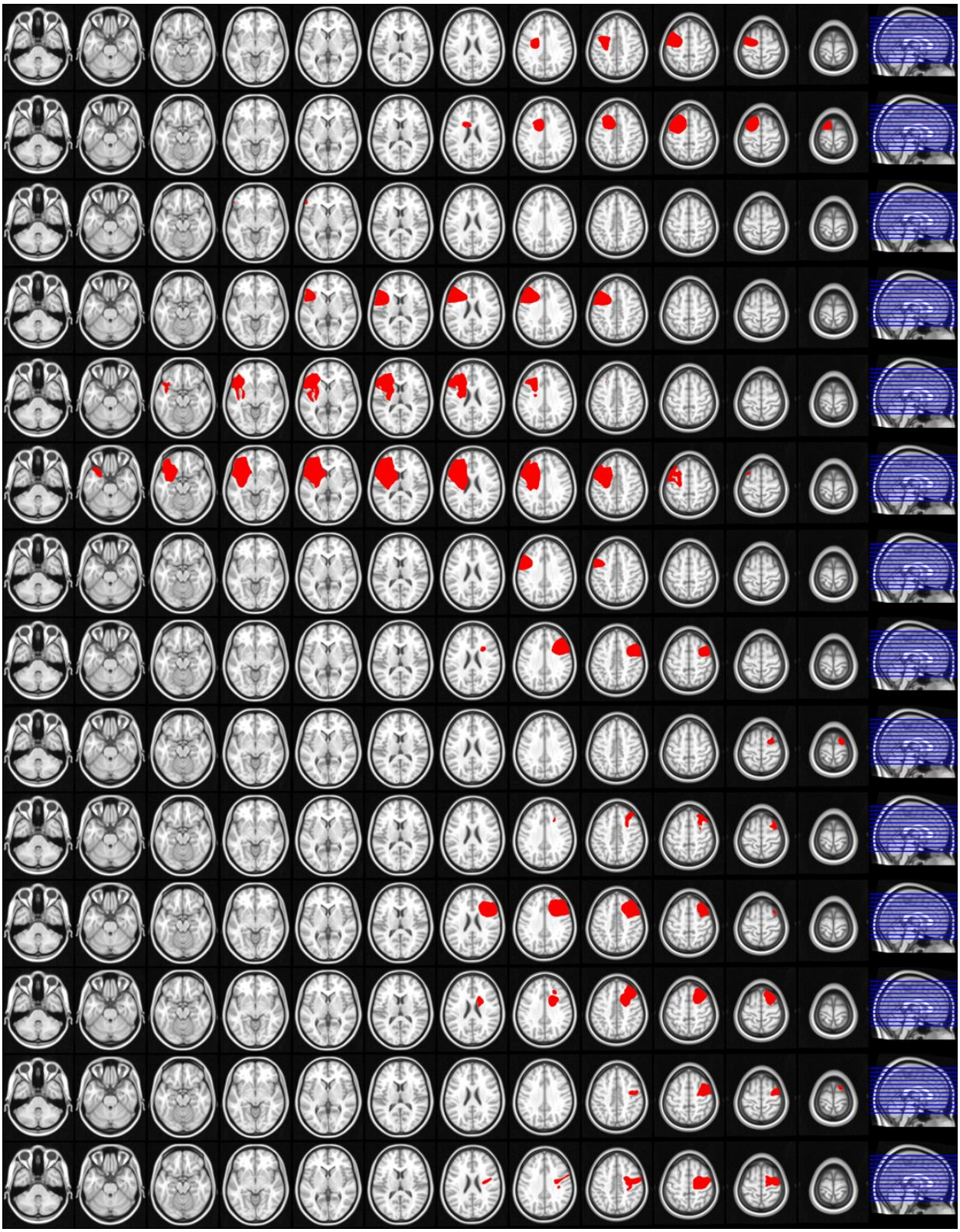

Figure S1. Individual PFC patient lesion reconstructions. ***Related to Figure 1A and STAR Methods.***
Individual computerized reconstructions of structural scans for all 14 PFC patients. Red = lesion site.

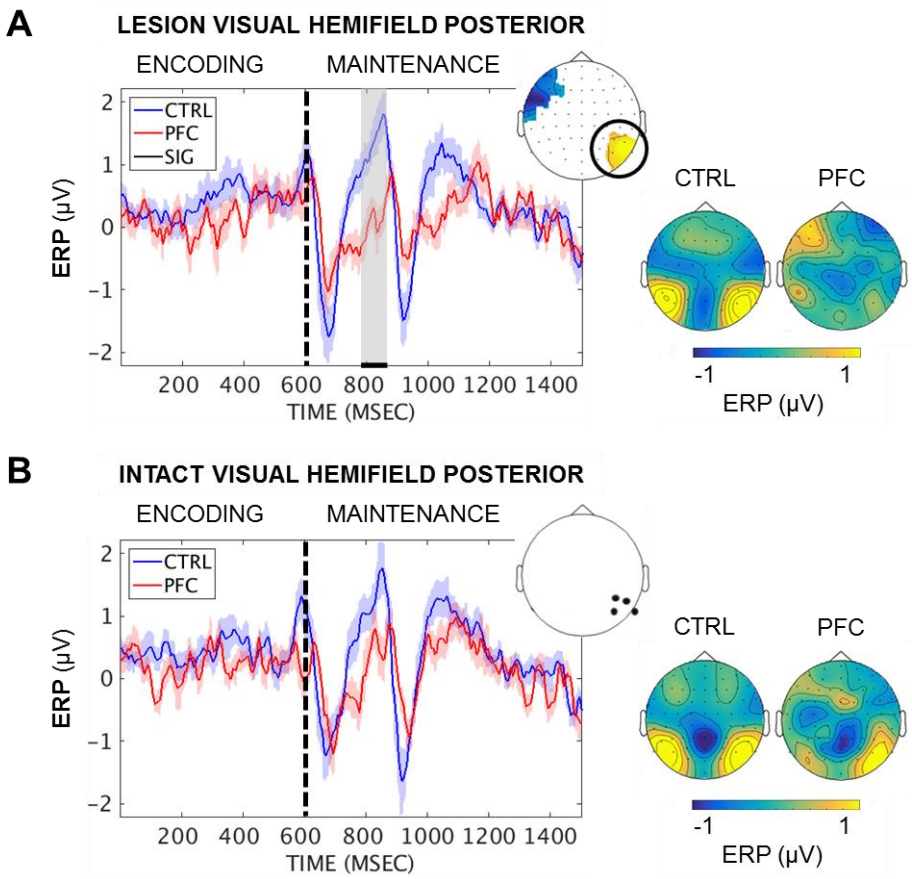

Figure S2. Neurologically dissociable ERPs following presentation to lesioned visual hemifield. ***Related to Figures 1A-1B.***

(A) Mean ERPs over encoding and maintenance in posterior channels by group when stimuli were presented to the lesioned visual hemifield. Patients exhibited attenuated positive-polarity signals in posterior channels early during the maintenance period (Group $p_{cluster}$ = 0.03). *Left panel:* Significant effects are marked in black/gray and masked per channel on the BioSemi-64 topography (inset). *Right panel:* Scalp distributions of ERPs are presented for the period of significant effects. Shading = SEM; POSTERIOR, channels P6-P8-P10-PO8 (inset); CTRL, controls; PFC, PFC patients; SIG, significant result.

(B) Equivalent to (**A**): No significant ERP effects were observed when stimuli were presented to the intact visual hemifield (Group $p_{cluster}$ > 0.33).

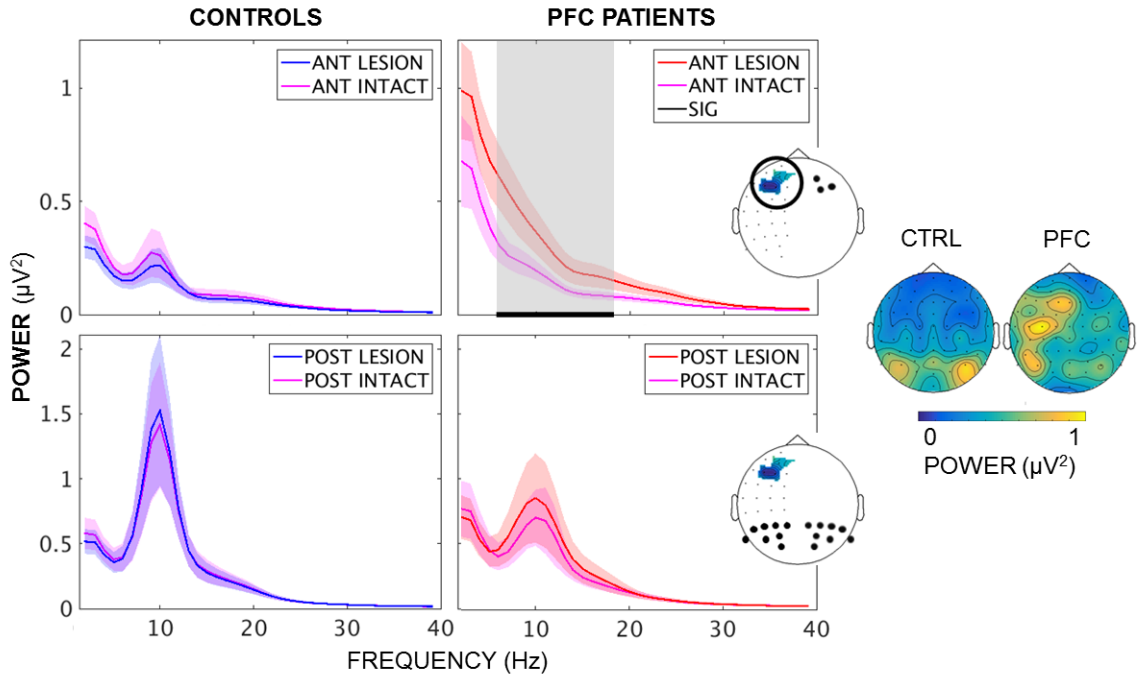

Figure S3. Baseline spectral slope effects in lesioned PFC. ***Related to Figures 1A-1B.***
Mean raw spectral power over the 500-msec pretrial baseline period in the lesioned versus intact hemisphere as a function of group. *Left panel:* Controls exhibited clear alpha-band (~10 Hz) peaks in PFC (top) and parieto-occipital regions (bottom) that did not differ between hemispheres. In contrast, PFC patients did not show an alpha peak in anterior channels in either hemisphere, but the spectral slope was steepened so that elevated power was detected between 6-18 Hz in channels over the lesion (AF3-F3-F5), relative to the homologous, intact-hemisphere channels (Group × Hemisphere $p_{cluster}$ = 0.004). Significant effects are marked in black/gray and masked per channel on the BioSemi-64 topography (inset). While the parieto-occipital alpha peak appears attenuated in patients relative to controls, the contrast did not survive statistical testing (Group uncorrected $p > 0.05$). *Right panel:* Scalp distributions of raw power are presented for the range of significant effects. Shading = SEM; ANT LESION, channels AF3-F3-F5 (inset); ANT INTACT, channels AF4-F4-F6; POST LESION, channels P1-P3-P5-P7-P9-PO3-PO7-O1; POST INTACT, channels P2-P4-P6-P8-P10-PO4-PO8-O2; SIG, significant result; CTRL, controls; PFC, PFC patients.

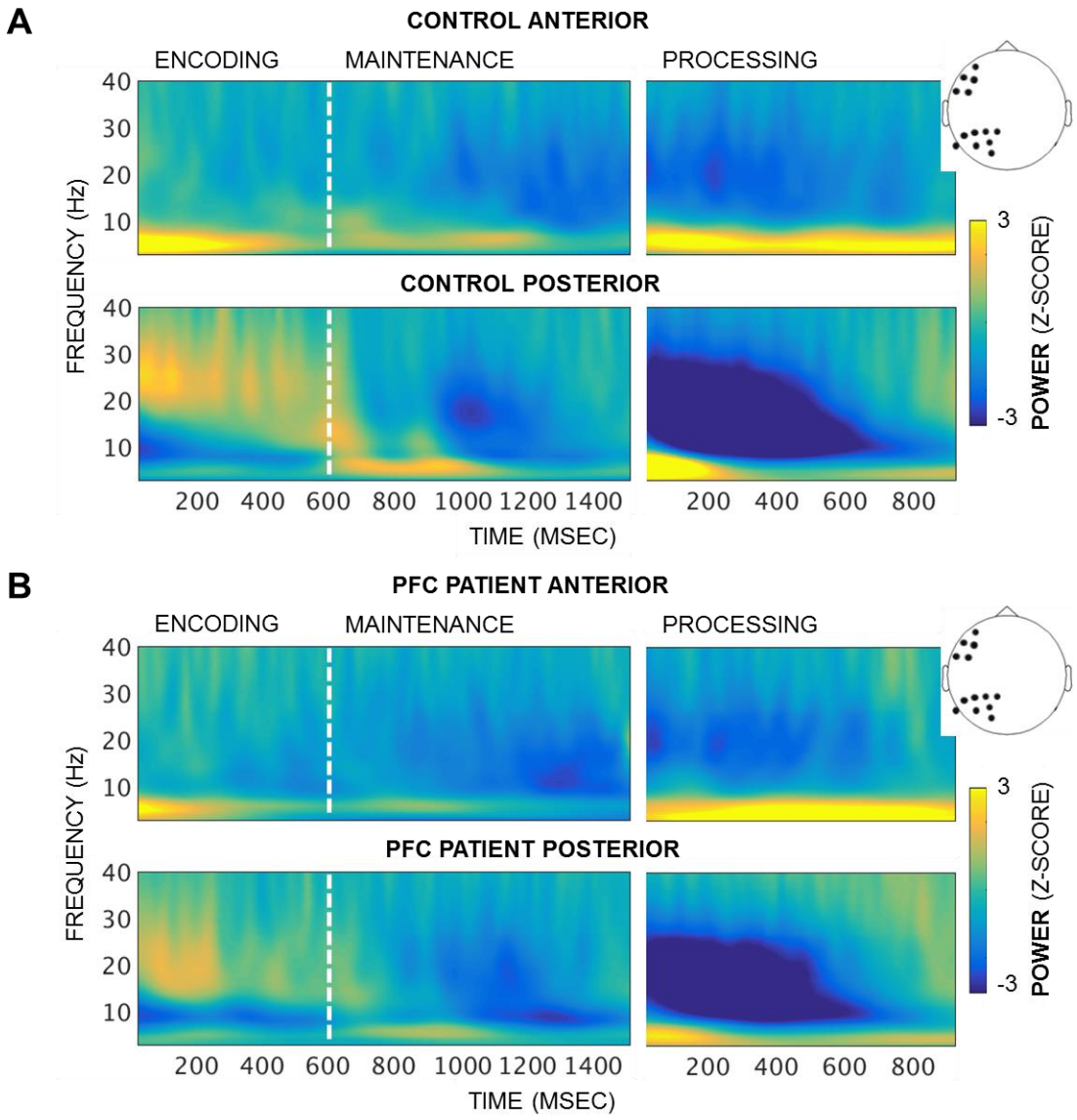

Figure S4. Task-induced power at encoding-maintenance and active processing. ***Related to Figure 2.***

(A) Mean task-induced power over encoding, maintenance, and active processing in controls. Single-subject analyses revealed anterior delta-theta (2-7 Hz) activity that peaked during active processing ($z > 3.29$ vs. pretrial baseline, $p < 0.001$). Posterior beta-gamma (12-35 Hz) activity and narrowband alpha desynchronization at encoding were followed by alpha-beta (9-24 Hz) decreases at maintenance ($|z| > 1.96$, $p < 0.05$) and active processing ($z < –3.29$, $p < 0.001$). ANTERIOR, channels AF7-F5-F7-FC5-FT7 (inset); POSTERIOR, channels P1-P3-P5-P7-P9-PO3-PO7-O1.

(B) Equivalent to (**A**): Similar power effects were observed in PFC patients. No significant main effects of Group were observed ($p_{cluster} > 0.10$).

Table S1. Individual PFC patient demographics and working memory accuracy. ***Related to Figure 1A and STAR Methods.***

	Lesion Information				Demographic Information				Accuracy	
	Hem.	Etiology	Size (cm^3)	Years Elapsed	Age	Gender	Years Edu.	IQ	Lesion VHF	Intact VHF
1	L	Astrocytoma Grade II	27.44	3.50	48	F	16	101	0.88	0.85
2	L	Cavernous hemangioma	46.86	1.33	54	M	10	109	0.65	0.68
3	L	Astrocytoma Grade II	0.57	8.42	46	M	17	127	0.98	0.98
4	L	Stroke	54.94	1.08	34	M	18	116	0.83	0.85
5	L	Stroke	77.61	15.0	64	F	18	113	0.91	0.88
6	L	Stroke	185.56	18.0	57	F	20	115	0.97	0.94
7	L	Stroke	11.11	0.92	71	F	14	109	0.81	0.92
8	R	Ganglioglioma	30.81	11.75	22	F	9	101	0.97	0.92
9	R	DNET	4.74	11.50	20	F	14	104	0.86	0.96
10	R	Cavernous hemangioma	10.84	0.75	41	M	15	118	0.88	0.92
11	R	Cavernous hemangioma	56.83	9.50	37	M	12	91	0.79	0.70
12	R	Astrocytoma Grade II	38.09	1.50	29	F	12	104	0.92	0.89
13	R	Cavernous hemangioma	14.87	10.50	62	F	15	124	0.92	0.88
14	R	Stroke	32.22	13.0	64	F	18	114	0.82	0.80

The lesioned visual hemifield corresponds to the right visual hemifield for left-hemisphere lesioned patients and left visual hemifield for right-hemisphere lesioned patients. Hem, hemisphere; Edu, education; VHF, visual hemifield; DNET, Dysembryoplastic neuroepithelial tumor.

Table S2. ANCOVA results for patients indicate no effects of lesion or demographic information on working memory accuracy. ***Related to Figure 1A and STAR Methods.***

Factor/Covariate	*F*-Statistic	DF	Partial η^2	*P*-Value
Hemisphere	1.05	1,2	0.34	0.41
Etiology	0.00	1,2	0.00	0.99
Size	0.29	1,2	0.13	0.65
Elapsed	0.17	1,2	0.08	0.72
Age	4.38	1,2	0.69	0.17
Gender	5.33	1,2	0.73	0.15
Education	0.00	1,2	0.00	0.98
IQ	2.56	1,2	0.56	0.25
Hemisphere × Etiology	0.02	1,2	0.01	0.90
Hemisphere × Gender	0.58	1,2	0.23	0.53
Etiology × Gender	0.14	1,2	0.07	0.74
Visual Hemifield	0.01	1,2	0.01	0.92
Visual Hemifield × Hemisphere	0.49	1,2	0.20	0.56
Visual Hemifield × Etiology	0.03	1,2	0.02	0.87
Visual Hemifield × Size	0.65	1,2	0.25	0.51
Visual Hemifield × Elapsed	0.69	1,2	0.26	0.49
Visual Hemifield × Age	0.37	1,2	0.15	0.61
Visual Hemifield × Gender	0.53	1,2	0.21	0.54
Visual Hemifield × Education	0.10	1,2	0.05	0.78
Visual Hemifield × IQ	0.00	1,2	0.00	1.00
Visual Hemifield × Hemisphere × Etiology	0.31	1,2	0.13	0.64
Visual Hemifield × Hemisphere × Gender	0.17	1,2	0.08	0.72
Visual Hemifield × Etiology × Gender	0.84	1,2	0.30	0.46
Condition	0.31	2,4	0.14	0.75
Condition × Hemisphere	2.01	2,4	0.50	0.25
Condition × Etiology	0.98	2,4	0.33	0.45
Condition × Size	1.07	2,4	0.35	0.42
Condition × Elapsed	0.37	2,4	0.16	0.71
Condition × Age	0.26	2,4	0.12	0.78
Condition × Gender	0.17	2,4	0.08	0.85
Condition × Education	0.48	2,4	0.20	0.65
Condition × IQ	0.28	2,4	0.12	0.77
Condition × Hemisphere × Etiology	2.44	2,4	0.55	0.20
Condition × Hemisphere × Gender	0.32	2,4	0.14	0.75
Condition × Etiology × Gender	0.20	2,4	0.09	0.83
Visual Hemifield × Condition	0.60	2,4	0.23	0.59
Visual Hemifield × Condition × Hemisphere	0.11	2,4	0.05	0.90
Visual Hemifield × Condition × Etiology	0.54	2,4	0.21	0.62
Visual Hemifield × Condition × Size	0.31	2,4	0.13	0.75
Visual Hemifield × Condition × Elapsed	0.10	2,4	0.05	0.90
Visual Hemifield × Condition × Age	1.22	2,4	0.38	0.39
Visual Hemifield × Condition × Gender	0.86	2,4	0.30	0.49
Visual Hemifield × Condition × Education	0.14	2,4	0.07	0.87
Visual Hemifield × Condition × IQ	0.62	2,4	0.24	0.58
Visual Hemifield × Condition × Hemisphere × Etiology	0.54	2,4	0.21	0.62
Visual Hemifield × Condition × Hemisphere × Gender	0.09	2,4	0.04	0.92
Visual Hemifield × Condition × Etiology × Gender	0.01	2,4	0.01	0.99

Working memory accuracy data for PFC patients (n = 14) were submitted to a repeated-measures mixed ANCOVA with 2 Visual Hemifield (lesion, intact) and 3 Condition (identity, spatial relation, temporal relation) within-subject factors, controlling for all between-subject factors (i.e., lesion hemisphere, etiology, and volume, years elapsed since lesion incident, and patient age, gender, education, and IQ; see Table S1). No significant effects were observed.

Table S3. Linear mixed-effects model results for all subjects reveal a main effect of Group on working memory accuracy. ***Related to Figures 1C-1D.***

Fixed Effect	*F*-Statistic	DF	Cohen's *d*	*P*-Value
Group	4.70	1,196	0.78	0.03*
Visual Hemifield	3.63	1,196	0.68	0.06
Condition	3.62	1,196	0.68	0.06
Group × Visual Hemifield	3.17	1,196	0.64	0.08
Group × Condition	2.53	1,196	0.57	0.11
Visual Hemifield × Condition	4.55	1,196	0.77	0.03*
Group × Visual Hemifield × Condition	4.16	1,196	0.73	0.04*

Fixed Effect	*F*-Statistic	DF	Cohen's *d*	*P*-Value
Group	16.77	1,202	1.47	0.00**

Fixed Effect	*F*-Statistic	DF	Cohen's *d*	*P*-Value
Visual Hemifield	0.46	1,200	0.24	0.50
Condition	1.74	1,200	0.47	0.19
Visual Hemifield × Condition	0.39	1,200	0.23	0.53

Working memory accuracy data for all subjects (n = 34) were submitted to a linear mixed-effects model with 2 Group (patient, control), 2 Visual Hemifield (lesion, intact), and 3 Condition (identity, spatial relation, temporal relation) fixed effects, and 34 Subject random effects. The Group main effect, and Visual Hemifield × Condition and three-way interaction effects passed an uncorrected α-threshold of 0.05, but they did not survive the Bonferroni correction for multiple comparisons ($\alpha_{corr} \approx 0.0071$). The same data were re-submitted to two models – one with Group as the only fixed effect, and the other with only Visual Hemifield and Condition fixed effects – to confirm that patients were significantly impaired at the task (Group $p < 7\times10^{-5}$). * = uncorrected $p < 0.05$; ** = significant result.