

1 High gamma response tracks different syntactic 2 structures in homophonous phrases

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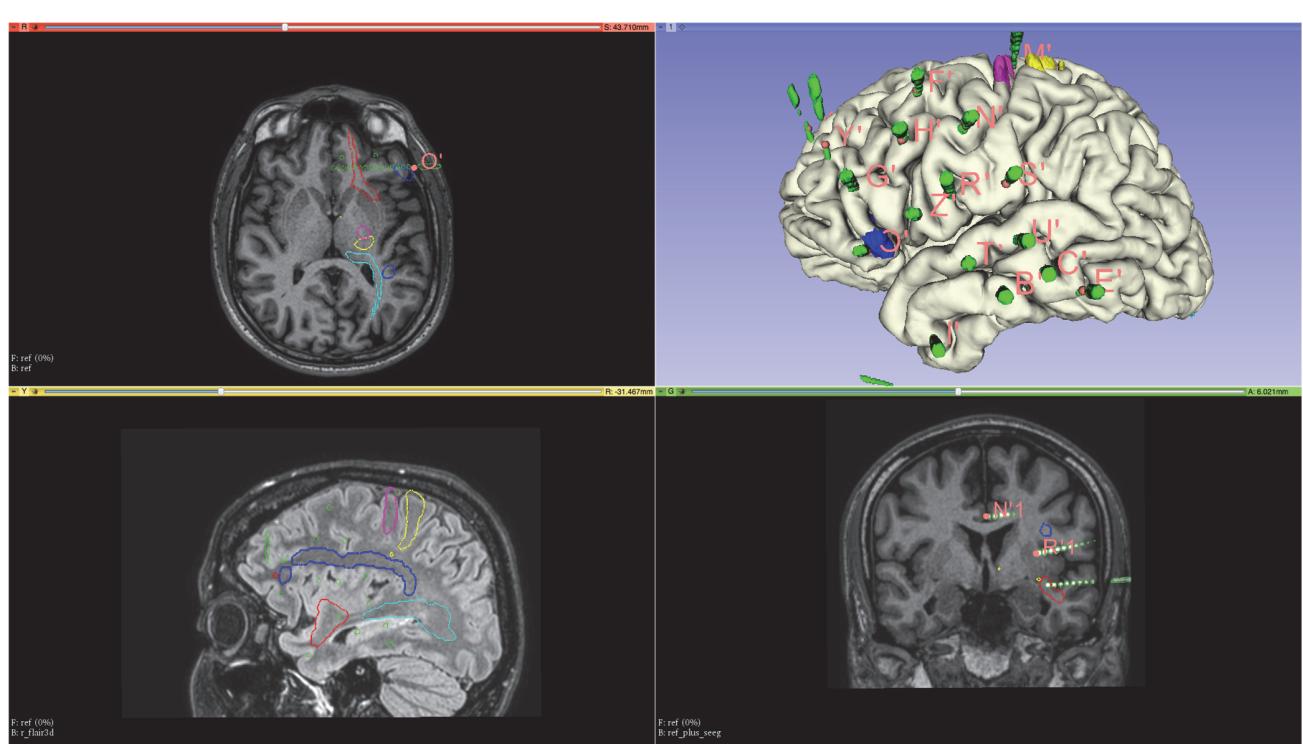
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21 Co-corresponding authors

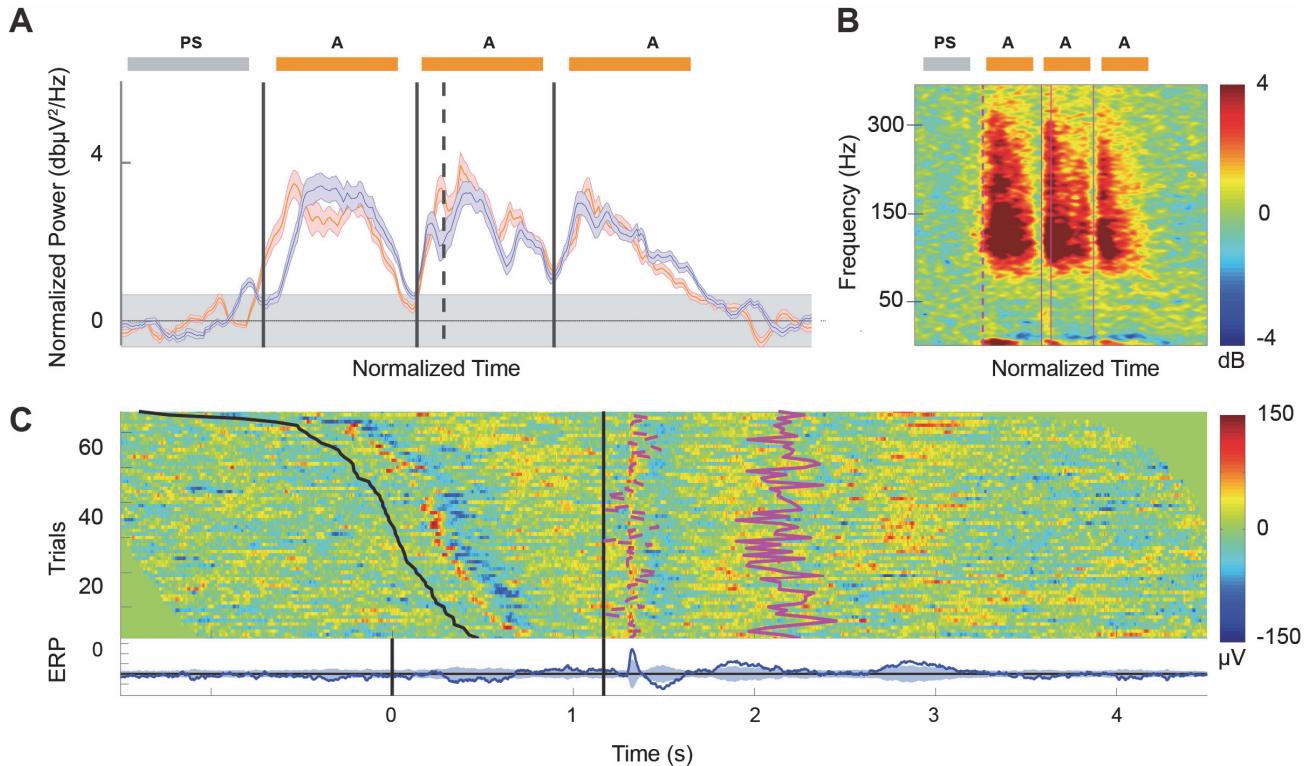
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1 **Supplemental Data Items**



3 **Ext. Data Figure 1:** Example of Multimodal and interactive scene assembled with 3D Slicer software of patient
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2 **Ext. Data Figure 2:** Heschl ERPIimage and Time Frequency. A) Band-specific (150 -300 Hz) ERSP (bERSP) for
3 VPs (red) and NPs (blue) respectively for a Heschl contact. The four vertical bars separate the auditory stimuli
4 (A) from the prestimulus interval (PS) and respectively indicate the beginning of the phrase, the beginning of
5 the Art/Cl, the beginning of the word immediately following Art/Cl (Verb/Noun), the beginning of the word
6 after. B) Time-warped Event-Related Spectral Perturbation (ERSP) of verb and noun phrases pooled together.
7 The four vertical bars have the same meaning as in the baseline-normalized power plots (panel A). C) Event-
8 related single-trial potential image (ERPIimage) time-locked to the stimulus presentation. Trials are aligned to
9 the beginning of Art/Cl (continuous black vertical line). The first black line indicates the beginning of the
10 phrase for each trial. The following two pink lines respectively indicate the beginning of the word immediately
11 following Art/Cl (Verb/Noun) and the beginning of the word after, for each trial.

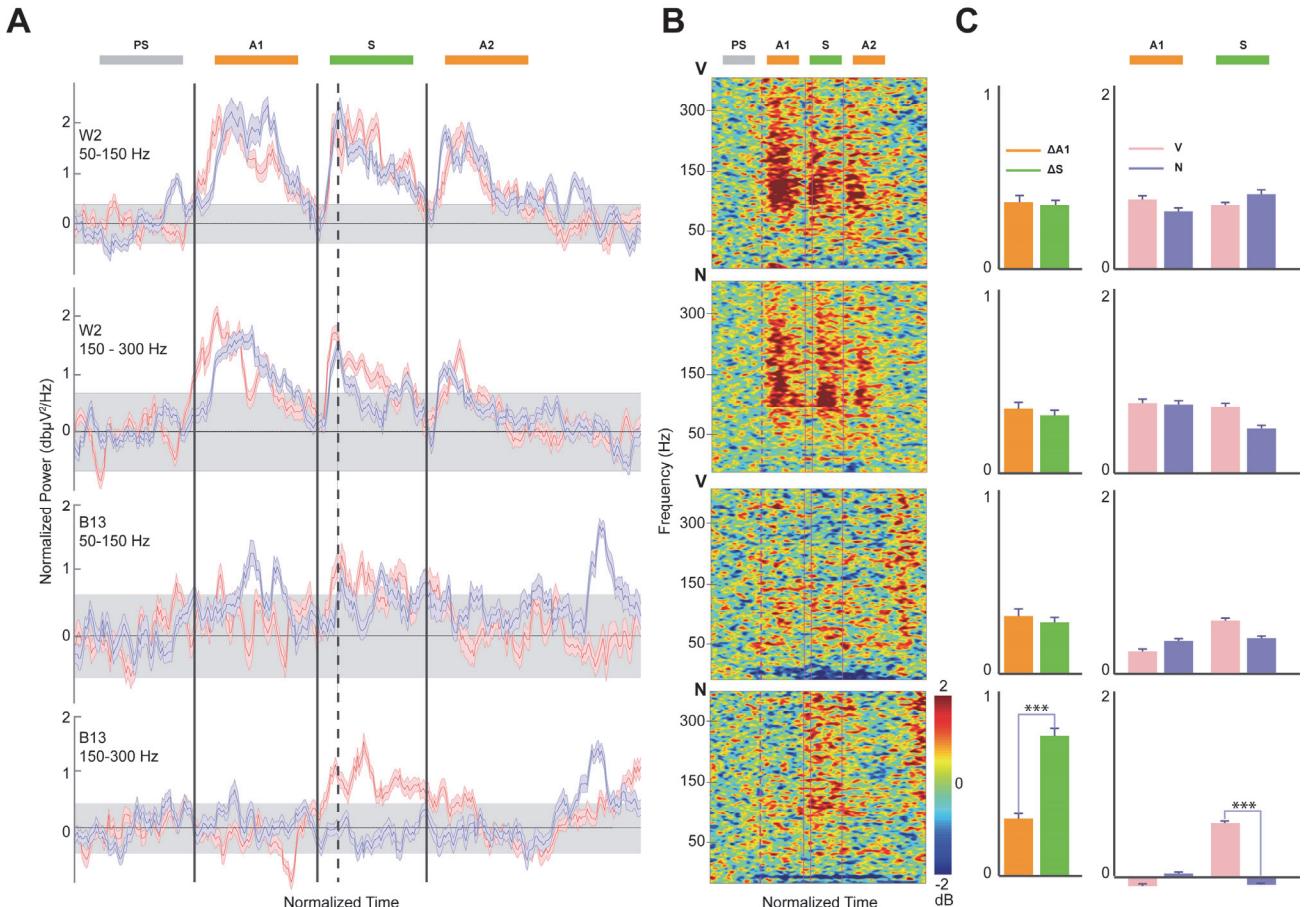
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2 **Ext. Data Figure 3.** Band-specific ERSP relative to the [50 - 150] Hz and [150 - 300] Hz frequency intervals for a
3 responsive contact (B_{13}) and a non-responsive contact (Heschl - nonspecific auditory response). VPs are
4 represented in pink, NPs in blue. The four vertical bars separate the regions pertaining to the auditory stimuli
5 (A_1 , S , A_2) from those within the pre-stimulus interval (PS). They respectively indicate the beginning of the
6 phrase, the beginning of the Art/Cl, the beginning of the first word immediately following Art/Cl (Verb/Noun),
7 the beginning of the word after. A_1 and A_2 refer to the auditory stimuli respectively before and after the tROI
8 (Art/Cl + N/V syntax construct). B) Time-warped Event-Related Spectral Perturbation (ERSP) respectively for
9 VPs and NPs. The four vertical bars and indicators have the same meaning as in the baseline-normalized power
10 plots (panel A). C) From left to right the bars represent (i) the absolute value of the normalized power difference
11 between VPs and NPs in the intervals A_1 (orange) and S (green), (ii) the absolute value of the normalized power
12 of VPs (pink) and NPs (blue) in the intervals A_1 and S respectively. *** = $p < 0.001$

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ID	Tot implanted contacts (tot implanted electrodes)	RC num	SITE OF SC lead number (electrodes num)											
			Orbital cortex		Superior frontal gyrus (areas 8-9)		SMA (area 6)		Middle frontal gyrus		Inferior frontal gyrus (areas 44-45)		Frontal cingulate gyrus (area 24)	
			DH	NDH	DH	NDH	DH	NDH	DH	NDH	DH	NDH	DH	NDH
s03	0	264 (19)	59				1		1		5		13(8)	3
s06	168 (13)	0	18	1					2		1		6(3)	2
s09	0	232 (19)	11	1				2	1		4(2)			
s10	225 (16)	0	71						1				5	(42)
s11	219 (17)	0	18				1		2		3(2)		13 (3)	
s12	0	210 (15)	2	1					1				8	(2)
s13	210 (18)	0	6		1						4(2)		2	
s17	0	206 (15)	5								1			
s21	0	205 (15)	43								3		3	
s23	25 (3)	200 (14)	9							4(2)		4		

1 **Ext. Data Table 1:** Responsive contacts. Highlights of responsive contacts in the whole population of patients that completed the study. RC:
2 Responsive Contacts; SMA: Supplementary Motor Area; DH: Dominant Hemisphere; NDH: Non-Dominant Hemisphere. 6 leads (3 electrodes) in
3 patient s10 showed an auditory response into the mesial cortex of occipital lobe.

4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

	Noun-phrase			Verb-phrase		
	Article			Pronoun		
	<i>valid</i>	<i>miss %</i>	<i>mean</i>	<i>valid</i>	<i>miss %</i>	<i>mean</i>
freq. Repubblica form	30	3.23	1.45	0.50	21	32.26
freq. ITWAC form	31	0	1.46	0.48	22	29.03
freq. Repubblica lemma	30	3.23	1.14	0.86	31	0
freq. ITWAC lemma	31	0	1.39	0.68	31	0
	Noun			Verb		
	<i>valid</i>	<i>miss %</i>	<i>mean</i>	<i>st.dev.</i>	<i>valid</i>	<i>Miss %</i>
freq. Repubblica form	31	0	3.90	0.76	18	41.94
freq. ITWAC form	31	0	3.78	0.57	23	25.81
freq. Repubblica lemma	31	0	3.67	1.09	31	0
freq. ITWAC lemma	31	0	3.90	0.72	31	0

1 **Ext. Data Table 2:** Surprise values analyses. Number of valid cases, percentage of missing, mean and the standard deviation relative to the
2 surprisal value, separately for the two experimental conditions (Noun-phrase, Verb-phrase).
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	Low Surprisal	High Surprisal	tot (n)
noun-phrase	26	5	31
verb-phrase	5	26	31
tot (n)	31	31	

1 **Ext Data Table 3:** distribution of the surprisal values of articles and clitics on the basis of the median ($M = 1.9097$) obtained from the occurrence of
 2 the lemma in the ITWAC database.
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Number of patients	10
Gender	5 male and 5 female
Median age at SEEG	32 (range 17-44)
Median years of scholarization	13 (range 0-17)
Median age of onset of epilepsy	16 (range 2-30)
Median duration of epilepsy (years)	15 (range 3-30)

Ext. Data Table 4: Demographic data. Summary of demographic data of patients that successfully completed the study. SEEG: Stereo-Electro-Encephalography.