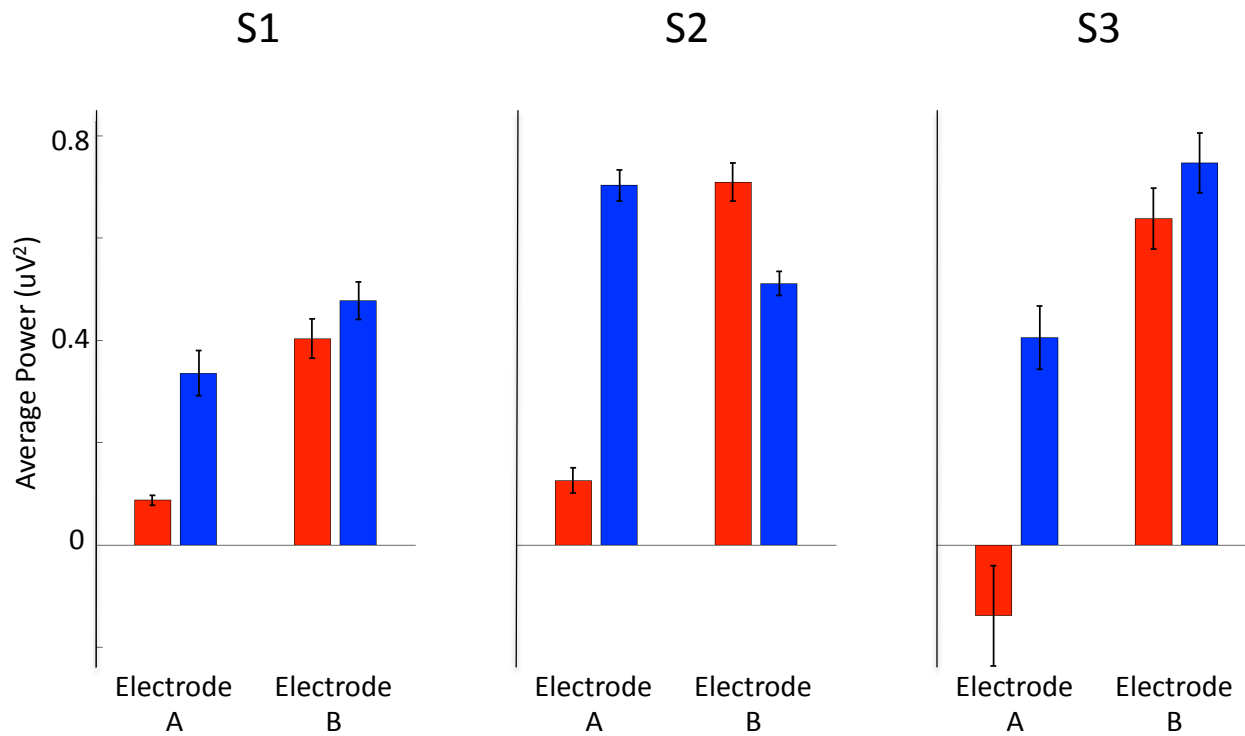


Supplemental Figure 1.

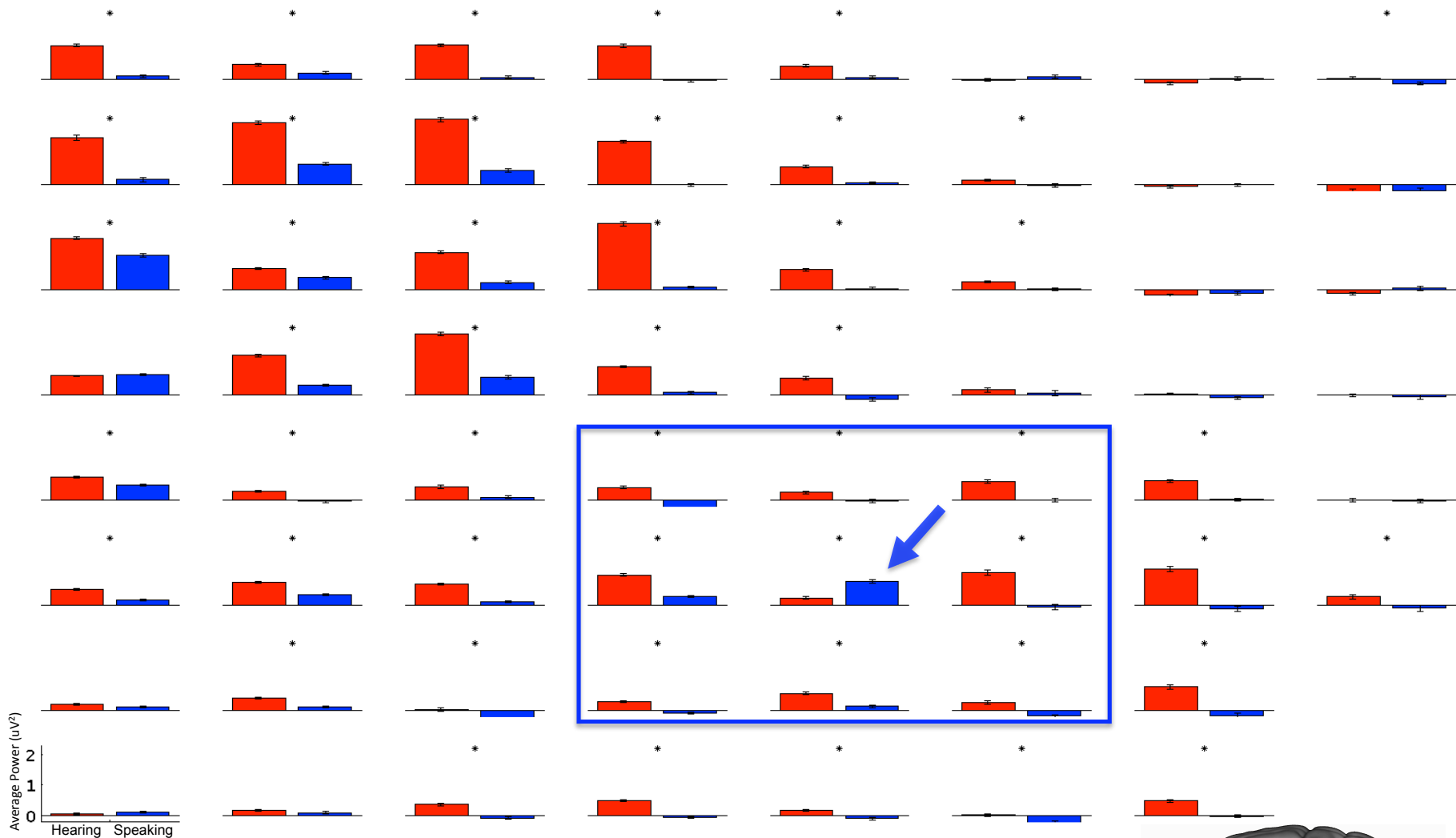
Left: Anatomical positions of electrode pairs reported in Figure 2; Red marks electrode A (word-specific site) and blue marks electrode B.

Right: Anatomical positions of electrode pairs reported in Figure 4; Red marks electrode A (self-speech site) and blue marks electrode B.



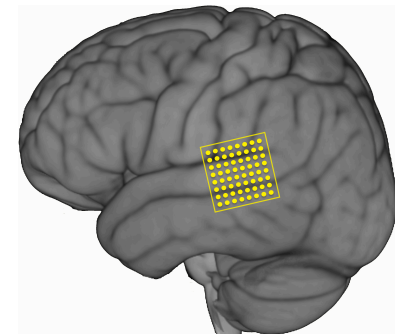
Supplemental Figure 2.

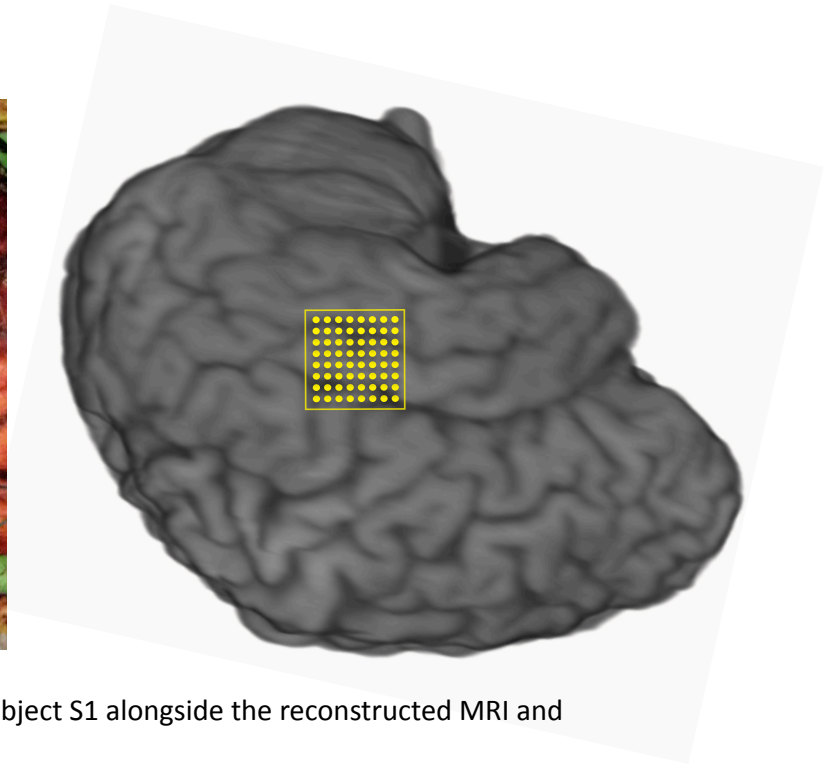
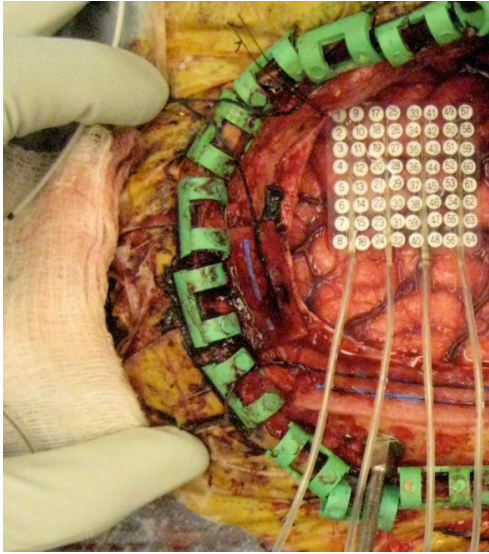
Average power estimates for each electrode and condition (phonemes marked in red and words marked in blue). For each subject a main effect of condition was significant (S1: $F(1,698) = 22.7$, $p < 0.001$; S2: $F(598) = 30.2$, $p < 0.001$; S3: $F(454) = 20.99$, $p < 0.001$). For each subject a main effect of electrode was significant (S1: $F(1,698) = 45.99$, $p < 0.001$; S2: $F(598) = 32.27$, $p < 0.001$; S3: $F(454) = 61.61$, $p < 0.001$). A breakdown of the interaction revealed a significant difference between electrodes in the word condition (S1: $t(298) = -2.46$, $p < 0.05$; S2: $t(198) = 4.97$, $p < 0.001$; S3: $t(228) = -4.03$, $p < 0.001$) and in the phoneme condition (S1: $t(400) = -8.00$, $p < 0.001$; S2: $t(400) = -13.08$, $p < 0.001$; S3: $t(226) = -6.77$, $p < 0.001$). A significant difference between conditions was found within electrode A (S1: $t(349) = -6.22$, $p < 0.001$; S2: $t(299) = -14.12$, $p < 0.001$; S3: $t(227) = -4.70$, $p < 0.001$). Subjects S1 and S3 did not show a significant difference between conditions in electrode B while subject S2 did show a significant difference (S1: $t(349) = -1.35$, $p = 0.18$; S2: $t(299) = 3.58$, $p < 0.001$; S3: $t(227) = -1.31$, $p = 0.19$).



Supplemental Figure 3.

Average spectral γ_{High} estimates for each electrode locked to hearing (red) and speaking (blue) phonemes across a 64 contact 8x8 electrode grid in subject S4 (identical grid orientation depicted in Figure 3). Stars mark electrodes with a significant difference between hearing and speaking conditions (Wilcoxon rank-sum, $p < 0.001$). Blue box marks an area of approximately 1 cm² of cortex; blue arrowhead marks an electrode exhibiting self-speech specificity. Electrodes with no contact or abnormal signal are not shown.





Supplemental Figure 4.
Intraoperative images with (left) and without (middle) the electrode array in subject S1 alongside the reconstructed MRI and corresponding grid orientation (right).

Subject	Passive Listening	Active Repetition	Age	Sex	Procedure
S1	Phoneme ¹ Word		46	M	Temporal lobectomy
S2	Phoneme ¹	Phoneme ² Word	53	M	Parietal lesionectomy
S3		Phoneme ² Word	33	F	Temporal lobectomy
S4		Phoneme ²	51	M	Frontal lesionectomy

Supplemental Table 1.

Breakdown of stimuli and tasks performed by each subject including Age, Sex and intraoperative procedure performed. Superscripts refer to the two types of phoneme stimuli described in the Methods section.