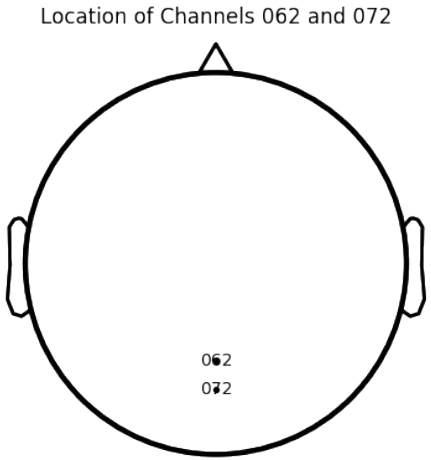
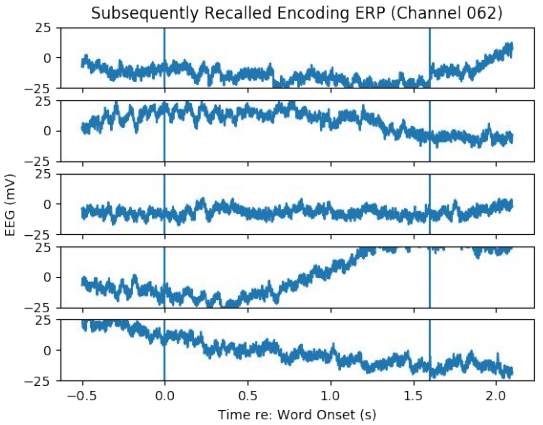
Psych 429: Homework 2

Jonathan Levine
09/24/17

Scalp EEG - LTPFR_2

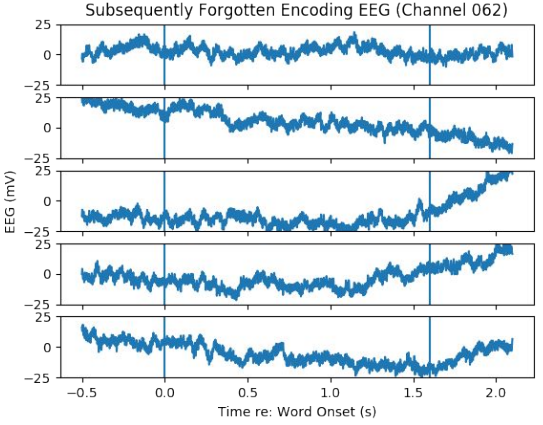


Means:	SDVs:	Kurtosis:
-13.65	7.42	0.47
7.34	9.10	-0.93
-6.90	4.10	-0.35
3.42	19.09	-1.48
-0.80	12.47	-0.64



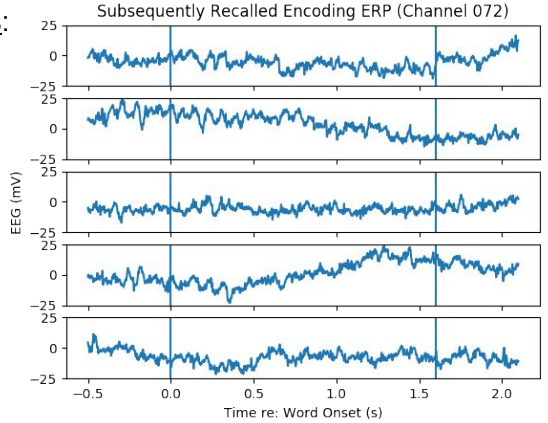
The word ERP is used here not in the sense of averaged out noise, but in the sense of evoked potentials to some event in time. The event is denoted at time 0, with the first vertical line, showing the onset of the presentation of the word. The second vertical line represents the word representation turning off. Thus the time in between the lines is the word presentation interval, and the memory storing process should be in that time frame

Means:	SDVs:	Kurtosis:
2.61	4.79	-0.19
4.61	10.33	-0.68
-11.25	11.03	2.36
-2.90	8.91	0.36
-5.57	8.67	-0.87

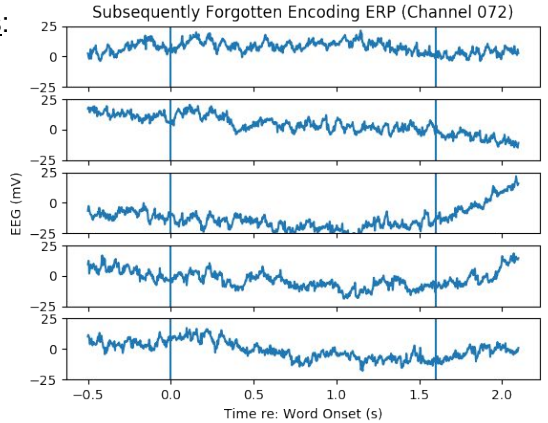


Due to the noisiness of individual trial EEG traces, it is impossible to distinguish betweens evoked potentials for recalled or not recalled events. Similarly, the statistics associated with this condition are not different enough due to the noisiness of the signal.

Means:	SDVs:	Kurtosis:
-5.10	5.62	0.23
3.55	8.94	-1.15
-5.56	3.40	0.26
1.51	9.08	-0.71
-7.42	5.02	0.24

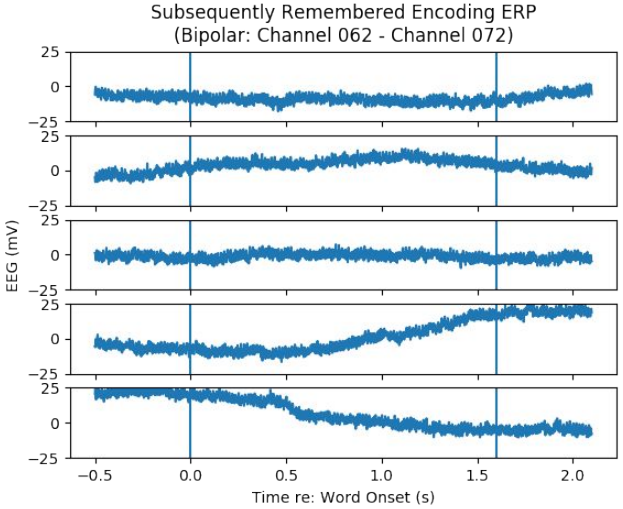


Means:	SDVs:	Kurtosis:
7.48	4.70	-0.50
4.05	7.58	-0.66
-12.71	8.82	1.62
-2.77	6.97	-0.13
-0.93	7.09	-0.70

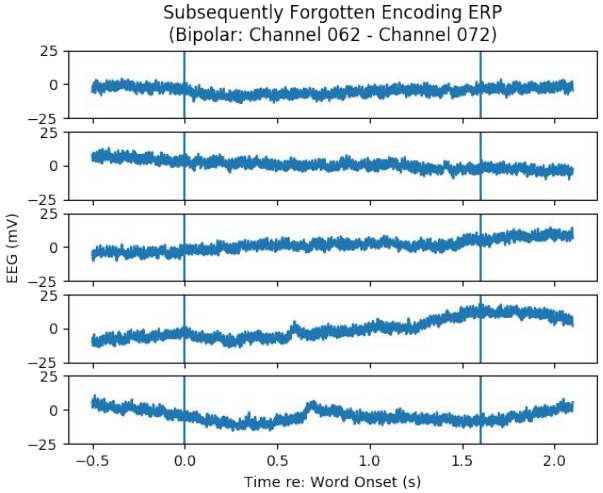


Bipolar Referencing

Means:	SDVs:	Kurtosis:
-8.55	3.43	-0.36
3.78	4.77	-0.43
-1.34	2.96	-0.59
1.91	11.47	-1.21
6.62	11.26	-1.43



Means:	SDVs:	Kurtosis:
-4.87	3.48	-0.56
0.55	3.99	-0.32
1.46	4.67	-0.39
-0.13	7.76	-0.95
-4.65	4.79	-0.48



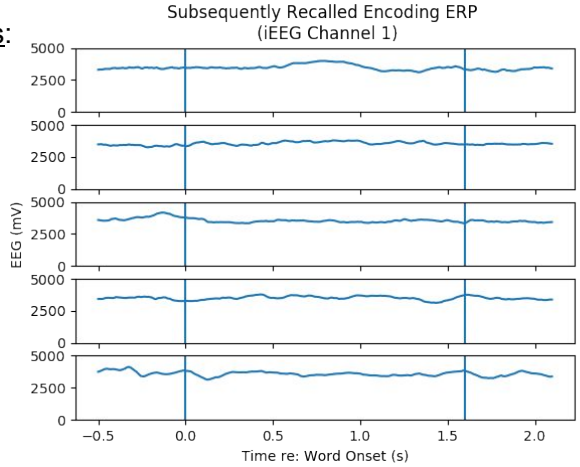
The Bipolar referencing seems to produce less noise than the average referencing scheme. This might be due to noise correlations due to the proximity of the electrodes. Since the noise is similar for the two signals, a lot of it is canceled out when you subtract one from the other.

Intracranial EEG - RAMFR_1

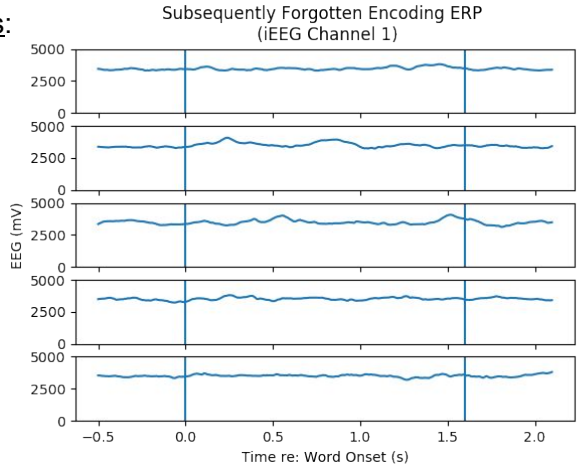
The intracranial EEG (iEEG) is a lot higher amplitude than the scalp EEG. This is because the iEEG signal is a lot closer to the source of the electrical signal (proportional to inverse square of distance).

Still, these samples are not enough to distinguish between recalled and not recalled events. We might need to average many trials together before seeing a true ERP.

Means:	SDVs:	Kurtosis:
3464	202.8	0.60
3542	125.7	-0.69
3545	168.3	2.84
3505	141.0	-0.11
3593	181.3	0.01



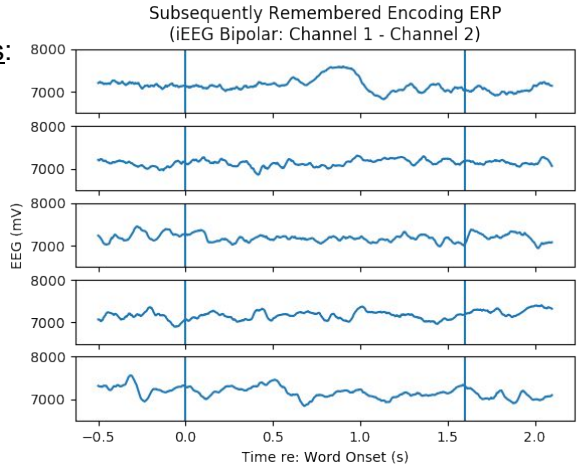
Means:	SDVs:	Kurtosis:
3461	109.5	1.16
3489	182.1	0.75
3491	182.6	0.95
3519	104.7	0.30
3508	92.4	0.81



Bipolar Reference

Left Cerebrum
Temporal Lobe
Middle Temporal Gyrus
Gray Matter
Brodmann area 21

Means:	SDVs:	Kurtosis:
7156	132.2	-0.01
7040	106.7	0.50
7148	157.7	-0.22
7159	137.6	0.35
7177	91.3	-0.42



Using the bipolar reference, we get a lot more signal than when we used the average reference. This different between average and bipolar referencing is a lot more significant for the iEEG than the scalp EEG. Still however, we cannot truly distinguish between the recalled and forgotten evoked potentials with individual trial traces.

Means:	SDVs:	Kurtosis:
7144	150.2	1.68
7135	75.72	0.33
7182	92.92	-0.12
7175	101.1	-0.27
7166	132.0	-0.16