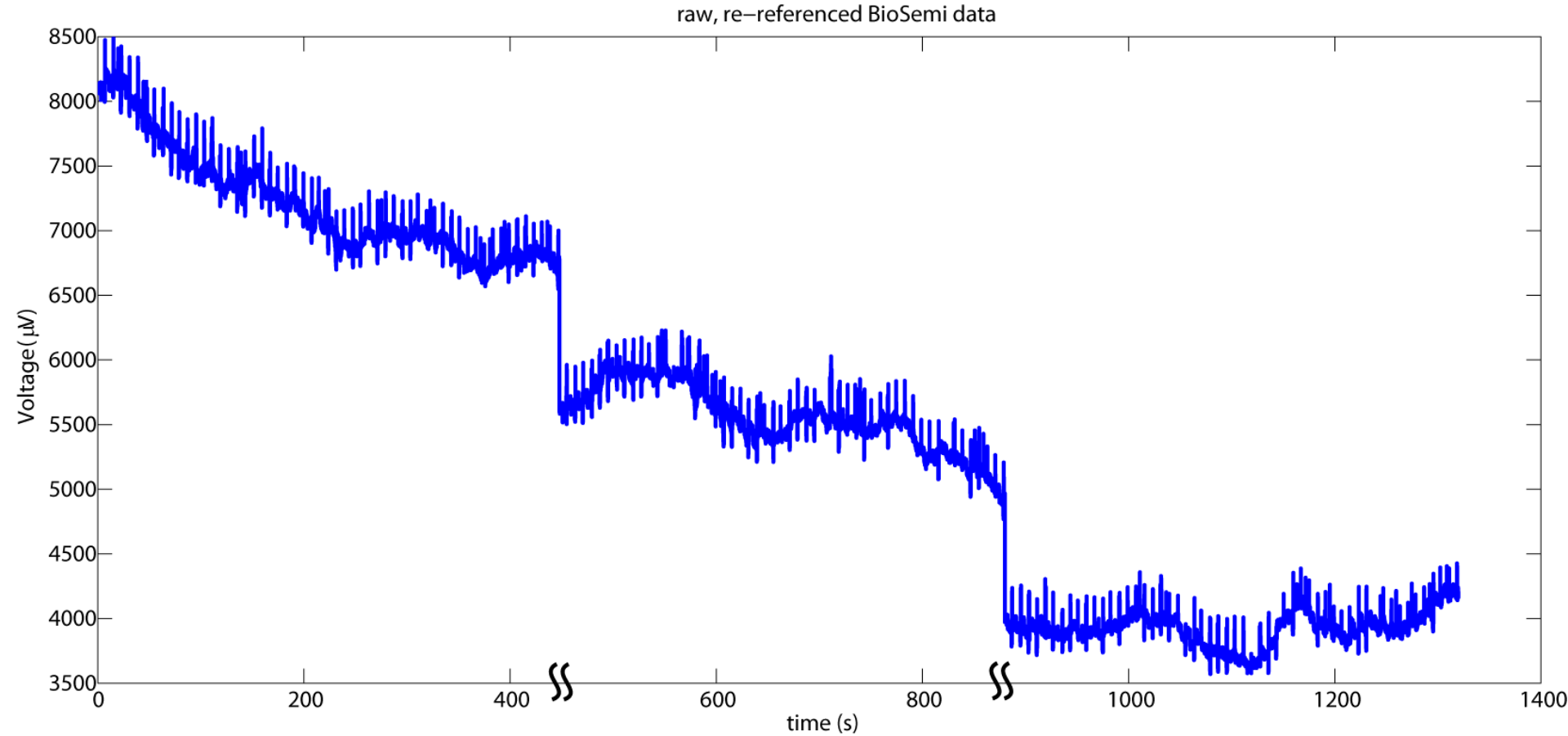
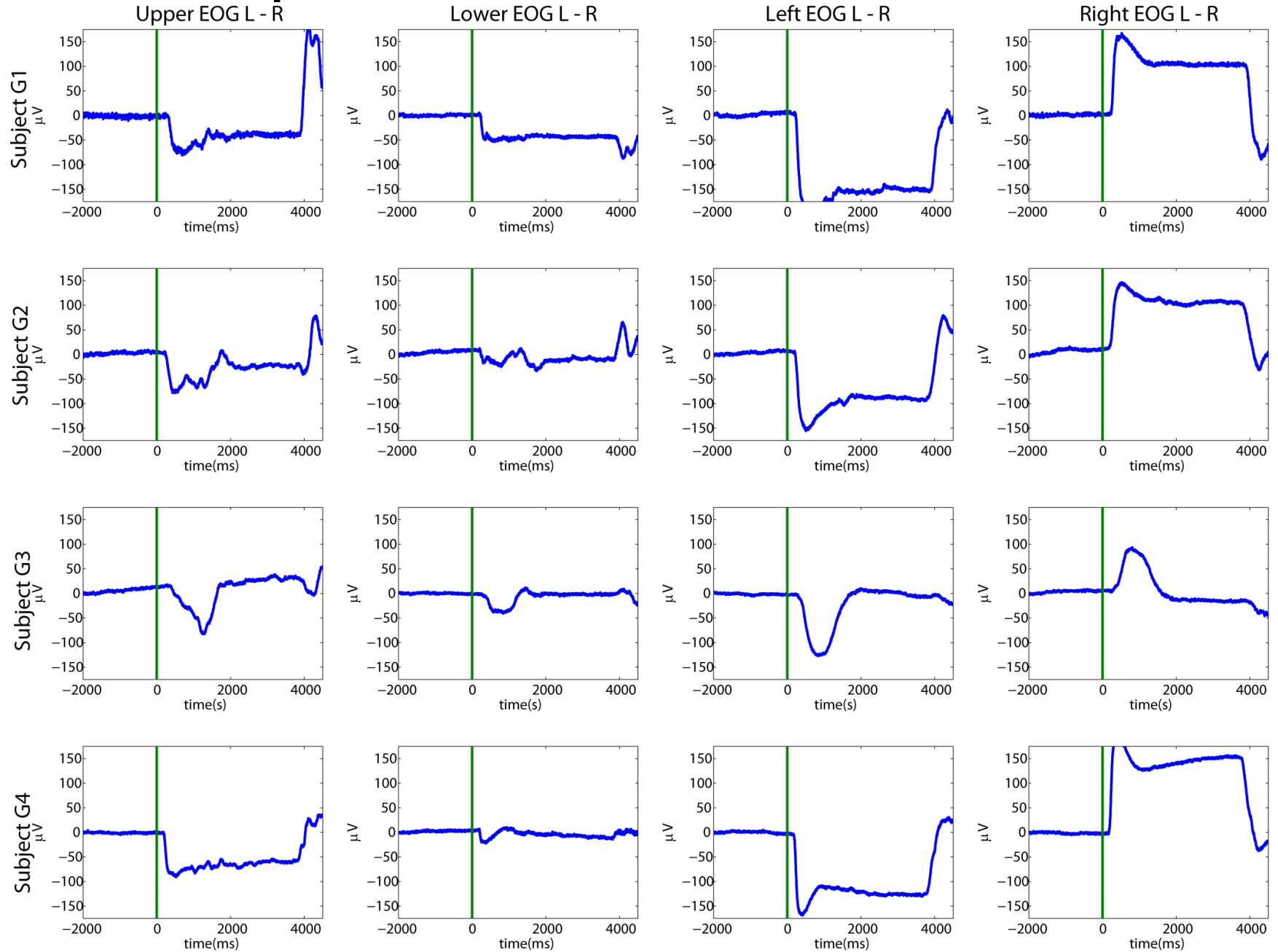


# Experiment 3: Data Processing

- Raw BioSemi data channels have large offsets which drift over time
- High-pass filtering can remove this
- High-pass filtering is also useful for improving Infomax ICA decompositions



# Experiment 3: Raw L-R ERPs



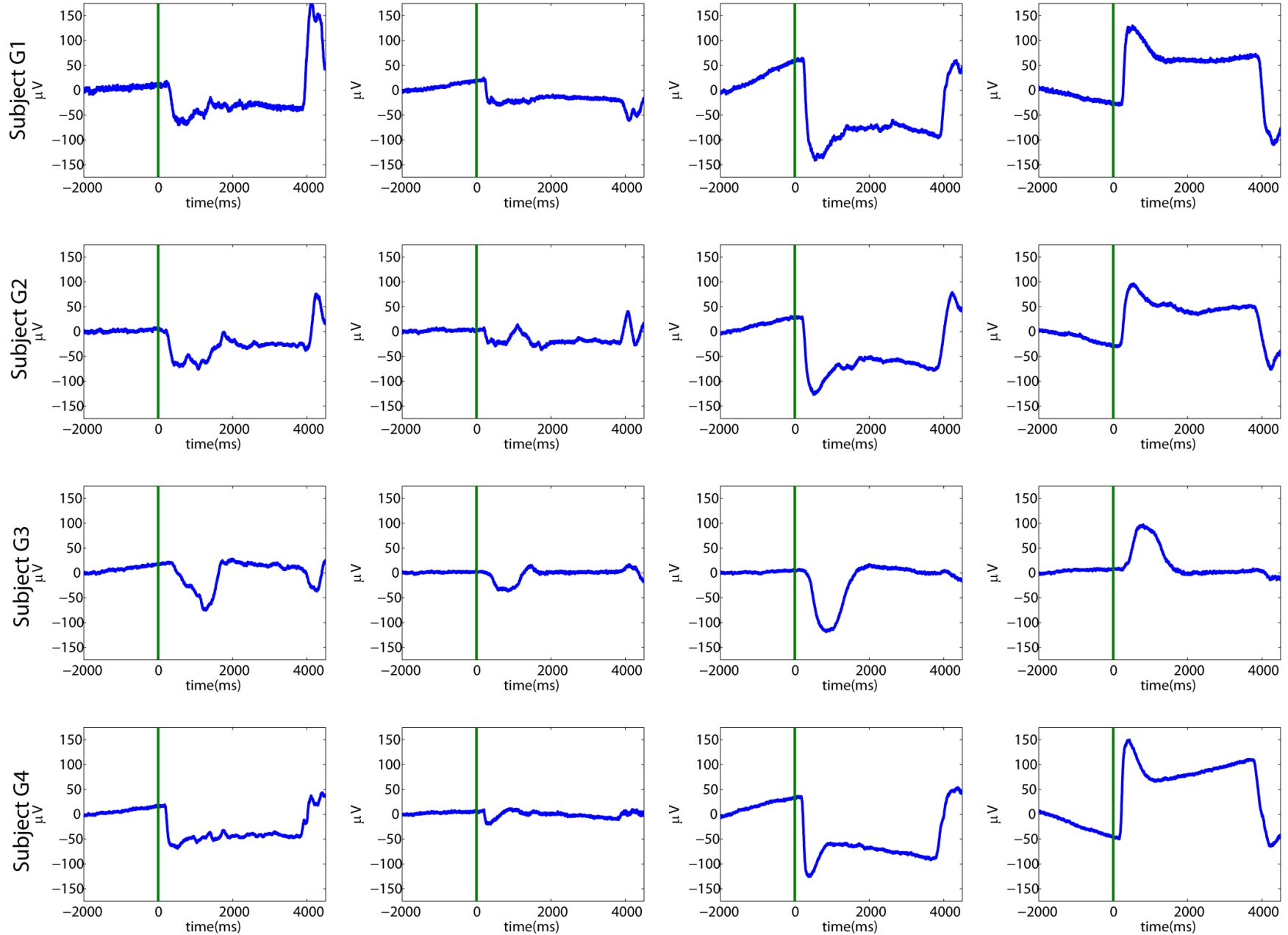
# Experiment 3: HPF 0.1 Hz L-R ERPs

Upper EOG L - R

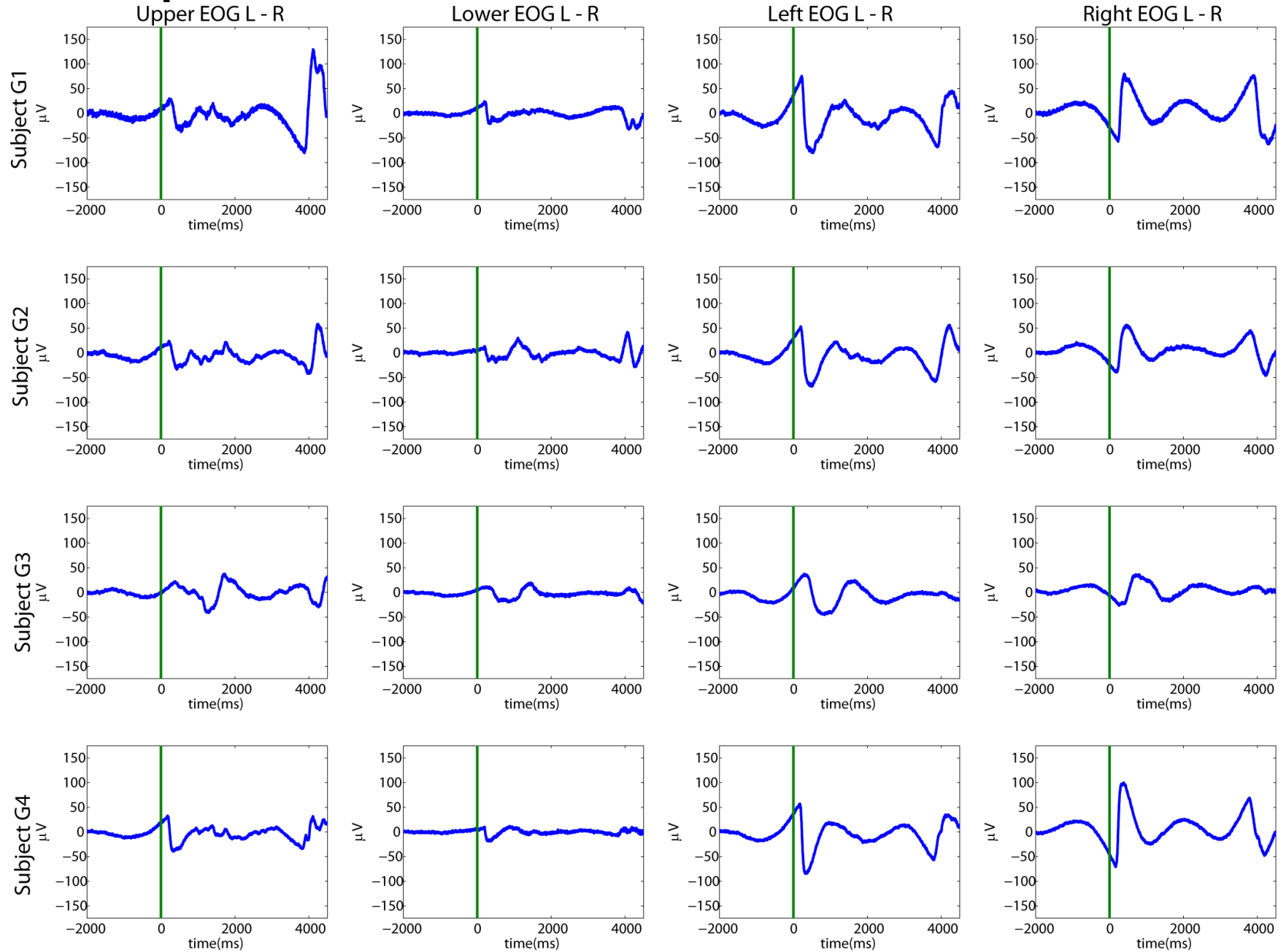
Lower EOG L - R

Left EOG L - R

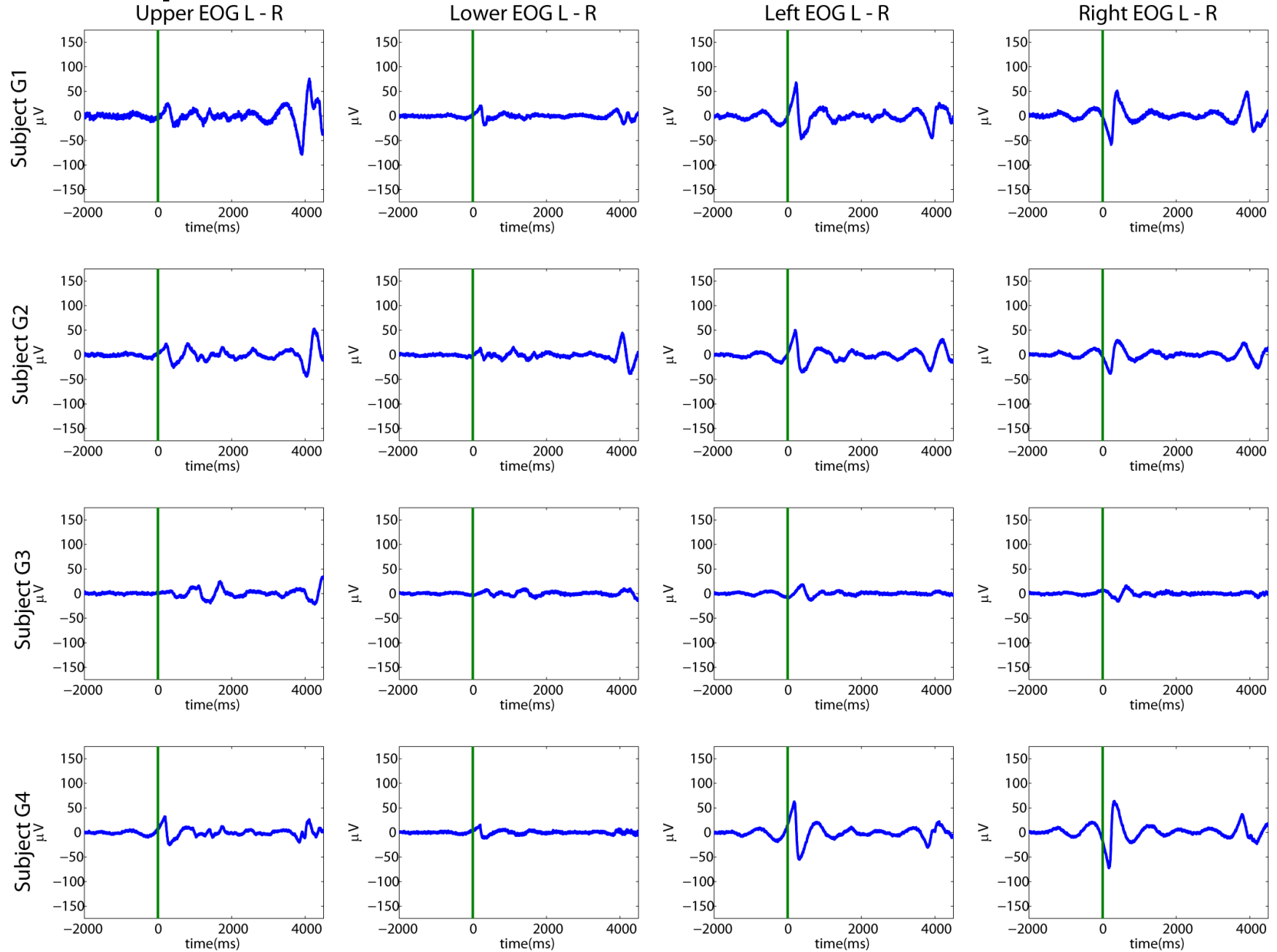
Right EOG L - R



# Experiment 3: HPF 0.5 Hz L-R ERPs



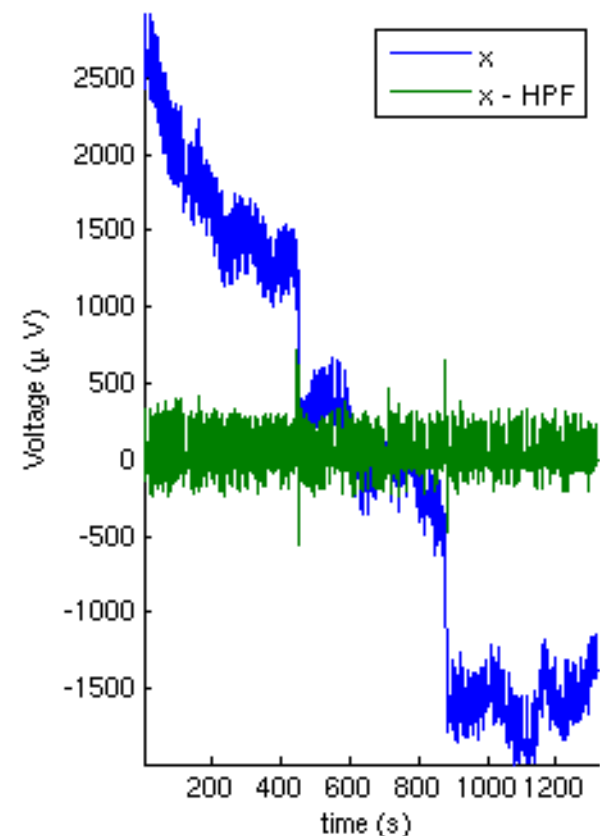
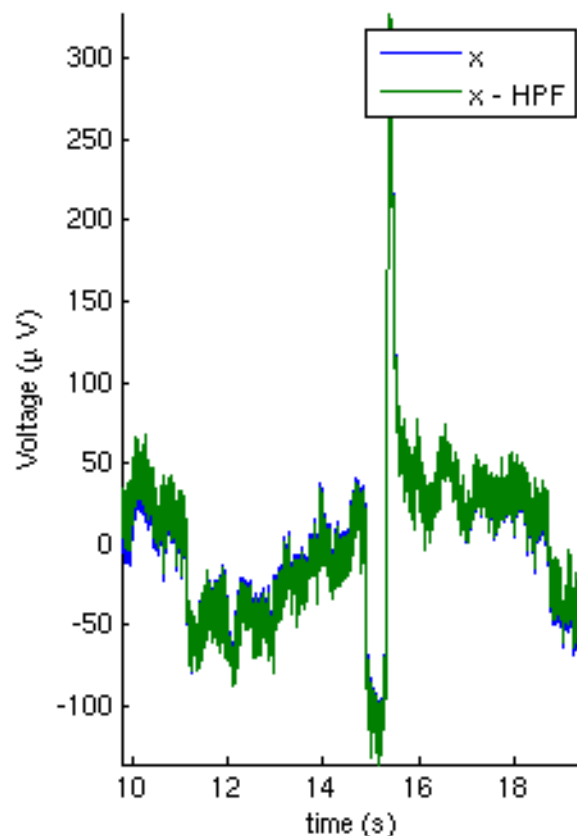
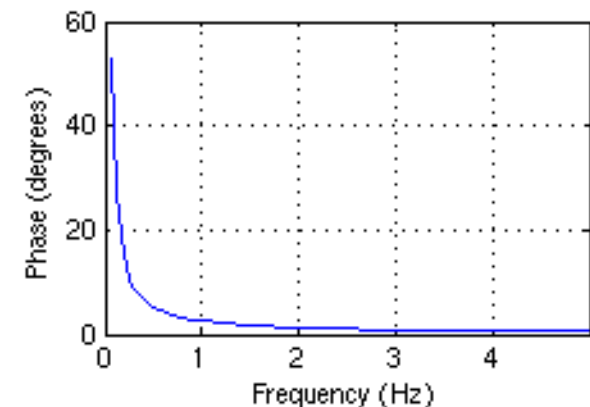
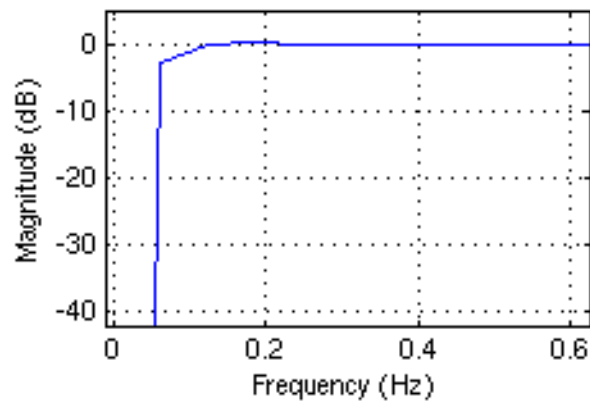
# Experiment 3: HPF 1.0 Hz L-R ERPs



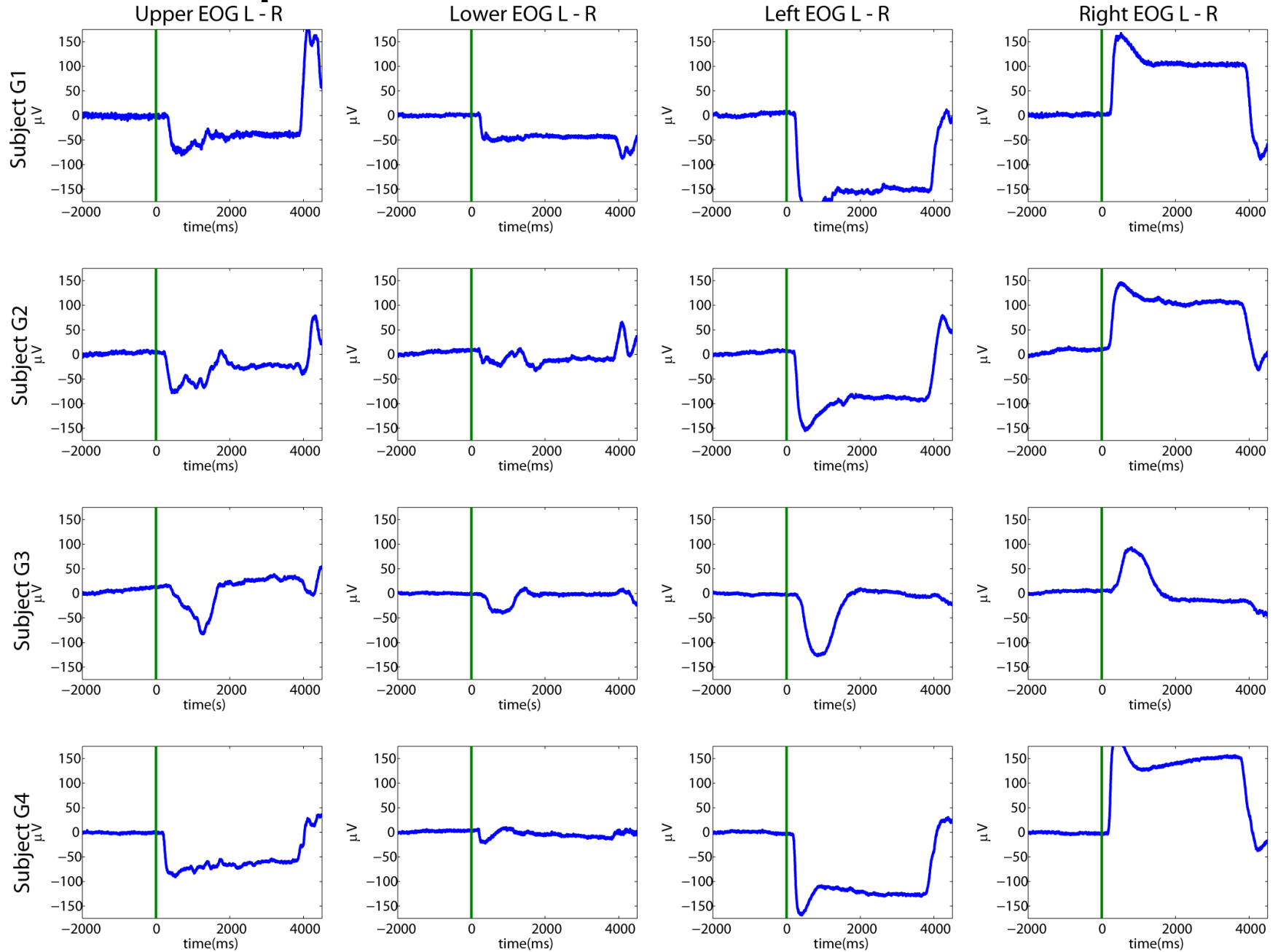
# Experiment 3: HPF Filter Design

- High-Pass filtering temporally distorts the EEG signal
- Gradual transitions from stop-band to pass-band reduces ringing
- Lower cutoff frequency reduces distortion
- Causal filters prevent distortion at previous timesteps
- Recommended filter: causal half-Gaussian FIR filter (Luck, 2005)

high-pass,  $\sigma = 2048$ , len = 4096



# Experiment 3: Raw L-R ERPs



# Half-Gaussian Causal HPF L-R ERPs

