Spatio-temporal Correlates of Picture Naming: An MEG Study

Abstract

Current neurological models of speech production are the product of merging the information gleaned from chronometric, ERP, and fMRI data in an effort to extrapolate the flow of activation through time between regions of the brain thought to support language processing. When merging such disparate information, however, one necessarily makes assumptions that are not directly backed-up by empirical data, thus potentially invalidating the models that are based on them.

In the present study, we endeavoured to directly determine the flow of activation in 278 regions distributed across the entire brain in one single experiment. We recorded magneto-encephalographic (MEG) data from 15 healthy participants from the population at large while they were performing an unconstrained picture naming task. Beamformer time courses of activation were derived and analyzed using bagging with conditional inference regression trees. The functional interpretation of each of the clusters of regions obtained from this analysis will be characterized.

The resulting empirical model will be compared against prominent models of speech production. This study will provide valuable insight into the spatio-temporal dynamics of activity underlying speech production.