
Coordination of EEG between speakers and listeners

Anna Kuhlen^{*†1,2}, Carsten Allefeld^{‡2}, and John-Dylan Haynes^{2,1}

¹Berlin School of Mind and Brain, Humboldt Universität zu Berlin, Berlin – Germany

²Bernstein Center for Computational Neuroscience, Charite Universitätsmedizin, Berlin – Germany

Abstract

When two people talk to each other they coordinate both their linguistic and nonlinguistic behavior. To capture the neural basis of social interaction processes, studies in social neuroscience have recently begun to extend their focus from the isolated individual to investigating two or more interacting individuals. In this study we uncover a coordination of neural activity between two individuals' ongoing EEG (electroencephalogram) – a person speaking and a person listening. The EEG of 12 speakers was recorded while narrating short stories. The EEG of another set of 12 participants was recorded while watching video recordings of these narrations. To ascertain that a neural coordination is indeed due to processing communicated information, audiovisual recordings of two speakers were superimposed on each other, and listeners were instructed to attend either to one or the other speaker. Using multivariate analyses of variance we found evidence that listeners show similar time-locked activity when attending to the same speaker. Furthermore, a canonical correlation approach revealed that listeners' EEG coordinates with speakers' EEG at a delay of about 13 seconds. This finding suggests that speakers and listeners coordinate their representations of larger semantic units. Going beyond previous studies, our study ascertains that the established neurophysiological marker of interpersonal coordination is not driven by individuals synchronously processing shared sensory input. Instead, our measure reflects an interpersonal coordination between two individuals that is based on the information one interlocutor conveys to the other.

*Speaker

†Corresponding author: anna.kuhlen@bccn-berlin.de

‡Corresponding author: carsten.allefeld@bccn-berlin.de