INSTITUT PARIS DESCARTES NEUROSCIENCES COGNITION

FÉDÉRATION DE RECHERCHE EN NEUROSCIENCES

Neuroscience Seminar Series

Friday, November 30th, 2018 at 11:30

Salle des Conférences (R229)

Centre Universitaire des Saints-Pères

45 rue des Saints-Pères, 75006 Paris

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Speech processing with (and without) cortical oscillations

Perception of connected speech relies on accurate syllabic segmentation and phonemic encoding. These processes are essential because they determine the building blocks that we can manipulate mentally to understand and produce speech. Segmentation and encoding might be underpinned by specific interactions between the acoustic rhythms of speech and coupled neural oscillations in the theta and low-gamma band. To address how neural oscillations interact with speech and intervene in phonological processing, we developed neurocomputational models involving theta and gamma oscillations. By comparing models with and without oscillations, we establish that recognition performance are generally better with oscillations. Based on these models we hypothesized that if low-gamma oscillations are disrupted or shifted in frequency speech perception would still be possible, but phonemic units within syllables would have an abnormal format, potentially causing difficulties to map idiosyncratic phonemic representations with universal ones, as those we are taught to become aware of when learning to read. A disruption of the auditory gamma oscillation could hence account for some aspects of the phonological deficit in dyslexia. Using MEG, and EEG combined with fMRI, and neurostimulation, we found that dyslexia is associated with a specific deficit in low-gamma activity in auditory cortex, and that this deficit alone accounts for several facets of the disorder. Recently, we further found that boosting 30Hz neural activity in left auditory cortex using transcranial alternative current stimulation selectively improves phonological performance and reading efficiency. Altogether these results attempt to establish a causal role of oscillatory processes in speech perception.

Those interested in meeting with the speaker please contact

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