Contribution ID: **23** Type: **Talk**

Humans parsimoniously represent auditory sequences by pruning and completing the underlying network structure

Tuesday, July 19, 2022 4:20 PM (20 minutes)

Successive auditory inputs are rarely independent, their relationships ranging from local transitions between elements to hierarchical and nested representations. In many situations, humans retrieve these dependencies even from limited datasets. However, this learning at multiple scale levels is poorly understood. Here We used the formalism proposed by network science to study the behavioral and MEG representations of local and higher order structures in the brain, and their interaction, in auditory sequences. We show that human adults exhibited biases in their perception of local transitions between elements, which made them sensitive to high-order structures such as network communities. This behavior is consistent with the creation of a parsimonious simplified model from the evidence they receive, achieved by pruning and completing relationships between network elements. This observation suggests that the brain does not rely on exact memories but compressed representations of the world. Moreover, this bias can be analytically modeled by a memory/efficiency trade-off. This model correctly account for previous findings, including local transition probabilities as well as high order network structures, unifying statistical learning across scales. We finally propose putative brain implementations of such bias.

Primary author: BENJAMIN, Lucas

Co-authors: Dr FLO, Ana; Dr AL ROUMI, Fosca; Prof. DEHAENE, Ghislaine

Presenter: BENJAMIN, Lucas

Session Classification: Processing of Sequences

Track Classification: Predictive Processes and Statistical Learning