Language and neurodevelopment symposium

Habilitation thesis defense by Clément François (LPL-AMU)

Friday October 11th, 2024

Schedule

9h30-10h30 Jutta Müller (Wien Univ)	Coffee break	**10h45-11h45** Ruth De Diego Balaguer (Barcelona Univ)	Coffee break	**12h-13h** Sam Wass (East London Univ)	Lunch	**15h** HDR

List of abstracts

1. **Prof. Jutta Müller (Wien University).**

Auditory rule learning across early childhood: Does speech matter?

Behavioral and neurophysiological studies provide ample evidence for the learning of various types of statistical regularities that may be important for language acquisition across early infancy. In line with this research, I will present evidence that statistical learning of non-adjacent dependencies between simple tones is not unique to humans, present potentially from birth, and can be modeled by an unsupervised neural network with high biological plausibility. Yet, some studies indicate that learning of regularities in speech vs. non-speech stimuli may not follow the same developmental pathways. In our own research, we found clear indication of learning of a complex tone grammar in 3-year-olds and a pattern of decreasing sensitivity to a similar speech-based grammar from 2 years to 4 years of age. I will discuss potential reasons explaining why, across developmental time, learning of rules that may be important for language paradoxically seems to be easier in non-speech than in speech stimuli.

2. Prof. Ruth de Diego Balaguer (Barcelona University).

In the right place at the right time: temporal expectations modulate language learning

Temporal expectations improve our perception and guide most of our behaviors. Language is predominantly conveyed through speech which is inherently a temporal stimulation. However, and despite the ubiquitous relevance of correctly orienting attention in time, we know little about how this ability influences language learning. In this talk, I will review developmental data and neuroimaging evidence in adults indicating how the ability to know what to expect at the correct time is a core component of language learning. In particular, I will illustrate how different aspects of temporal orienting have a determinant role on word segmentation and rule learning. The left frontoparietal system involved in temporal orienting has a clear anatomical overlap with the language network. Is this a pure coincidence? I will argue that it is not, and the intimate relation with temporal orienting abilities is essential to understand language learning.

3. **Prof. Sam Wass (East-London University).**

Hyperscanning and natural conversation in infant-caregiver interactions.

What does it mean to be 'in sync' with someone? Is synchrony (defined as 'when x is high, y is high') downstream of contingency (defined as 'changes in x forwards-predict changes in y')? Or are there causes of synchrony that are independent of contingency? And what can we learn about these questions by studying how synchrony emerges over development?

4. **Dr. Clément François (Aix-Marseille University).**

Towards an integrated neurodevelopmental model of language acquisition

During the first year of life, human infants become progressively attuned to the phonological properties of their native language. The early specialization observed for phonemes is in line with the idea that experience with the environment shapes the language system to optimize the integration of the most relevant information during critical periods of brain plasticity. In this talk, I will provide an overview of my previous work and propose an experimental framework that aims to specify the contribution of pre-programmed as opposed to experience-dependent factors on the development of speech sounds encoding and on the emergence of lexical memory traces in human infants.