

Investigating the predictive brain with natural speech and music

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The human brain rapidly learns regularities of our sensory environment, helping us to predict and prepare ourselves for future actions. Prediction mechanisms have an even more fundamental role, as they have been shown to shape perception itself. Theories such as predictive coding have been proposed to explain how predictions contribute to the way we make sense of the world. While the impact of prediction on perception has been observed in a myriad of scenarios, the underlying neural mechanisms remain under intense debate. One challenge is that most investigations have been carried out with simple sensory stimuli and it remains unclear how those findings apply to more complex and realistic scenarios. In this talk, I will discuss the impact of prediction mechanisms on the perception of natural speech and music. In the first part, I will talk about speech perception and present results from EEG (and MEG) experiments indicating that our brain performs predictions at multiple linguistic levels simultaneously. The framework I will describe provides us with a new platform to investigate speech perception in various cohorts of participants, such as second-language learners. In the second part of the talk I will discuss the role of predictions in music perception, based on recent EEG and ECoG evidence on music listening and imagery tasks. Based on that work, I will argue that sensory predictions are ubiquitous in music perception and are related to mechanisms such as auditory imagery.