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Predictive listening in normal and phantom perception

Our brains are exquisitely specialized in extracting statistical regularities from incoming sensory input(s) in order to predict future events. Especially in the visual system it has been shown that this process involves an anticipatory engagement of sensory "templates" of the predicted events. Such purely top-down driven and anticipatory (predicted-)feature-specific activation has not been convincingly established in the auditory system. In the first part of my talk I will introduce a recent paradigm and analysis approach developed by our group, to eavesdrop these processes. Concretely I will show for a group of normal hearing individuals that an increasing regularity of a tone sequence boosts tonotopic specific activity prior to an anticipated sound and during (rare) omissions. Based on our current reasoning that formation and exploitation of predictive processes in listening shows considerable interindividual variability, I will introduce a framework by which increased reliance (or "precision" in predictive coding terms) on predictions may constitute a predisposition for the development of tinnitus. The presentation will be completed by presenting some supportive data for this hypothesis.