

William Sedley:

Predictions and their precision in the causation and perpetuation of tinnitus

Aside from the undeniable fact that tinnitus and hearing damage are closely associated, little is known for certain about the neural processes that cause tinnitus. Decades of research have identified various abnormalities of brain structure, function and chemistry from brainstem to cortex in humans and animals with tinnitus, leading to a raft of theories about how tinnitus originates. However, most of these theories are mutually incompatible, and even together leave unsolved a number of paradoxes. In this talk I justify and explain a recent framework to bring together most of these contributory mechanisms and solve these paradoxes. The overarching framework is that of Predictive Coding, with the major determinant of tinnitus emergence being Sensory Precision. In this framework, ongoing alterations in brain activity reflect Prediction Errors, rather than any metric of tinnitus itself. Finally, I discuss future directions of research, including ongoing work to directly expose evidence of tinnitus predictions, and their precision, in the brain.