Music Perception and Pleasure: interactions between neocortical and striatal systems

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Abstract:
Music has existed in human societies since prehistory, perhaps in part because it allows expression and regulation of emotion, and evokes pleasure. In this lecture I present findings from cognitive neuroscience that bear on the question of how we get from perception of sound patterns to pleasurable responses. First I identify some of the auditory cortical circuits that are responsible for encoding and storage of tonal patterns; I will then discuss evidence that cortical loops between auditory and frontal cortices are important for maintaining musical information in working memory, and for the recognition of structural regularities in musical patterns which then lead to expectancies. I will then review evidence concerning the mesolimbic striatal system and its involvement in reward, motivation and pleasure in other domains. Recent data from our lab indicate that this dopaminergic system mediates pleasure associated with music; specifically, that reward value for music can be coded by activity levels in the nucleus accumbens, whose functional connectivity with auditory and frontal areas increases as a function of increasing musical reward. We propose that pleasure in music arises from interactions between cortical loops that enable predictions and expectancies to emerge from sound patterns, and subcortical systems responsible for reward and valuation.

Biographical Note:
Robert Zatorre is a cognitive neuroscientist at the Montreal Neurological Institute of McGill University. His research explores the functional and structural organization of the human brain, with special emphasis on two complex and characteristically human abilities: speech and music. He and his collaborators have published over 200 scientific papers on topics including structure and function of the human auditory cortex, pitch perception, auditory spatial processing, musical imagery, music and emotion, and brain plasticity in the blind and deaf. He holds a James McGill chair in Neuroscience since 2005. In 2006 he became the founding co-director of the international laboratory for Brain, Music, and Sound research (BRAMS). In 2011 he was awarded the IPSEN foundation prize in neuronal plasticity and in 2013 he won the Knowles prize in hearing research.