SEMINAR SERIES

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A Dynamical, Radically Embodied, and Ecological Theory of Rhythm Development

Featuring Dr. Edward Large

University of Conneticut

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Friday, April 22 | 12:00 - 1:15 pm | BRB 167

https://unomaha.zoom.us/s/92012305734

PRESENTATION ABSTRACT

Musical rhythm abilities-the perception of and coordinated action to the rhythmic structure of music-undergo remarkable change over human development. In the current paper, we introduce a theoretical framework for modeling the development of musical rhythm. The framework, based on Neural Resonance Theory (NRT), explains rhythm development in terms of resonance and attunement, which are formalized using a general theory that includes non-linear resonance and Hebbian plasticity. First, we review the developmental literature on musical rhythm, highlighting several developmental processes related to rhythm perception and action. Next, we offer an exposition of Neural Resonance Theory and argue that elements of the theory are consistent with dynamical, radically embodied (i.e., non-representational), and ecological approaches to cognition and development. We then discuss how dynamical models, implemented as self-organizing networks of neural oscillations with Hebbian plasticity, predict key features of music development. We conclude by illustrating how the notions of dynamical embodiment, resonance, and attunement provide a conceptual language for characterizing musical rhythm development, and, when formalized in physiologically informed dynamical models, provide a theoretical framework for generating testable empirical predictions about musical rhythm development, such as the kinds of native and non-native rhythmic structures infants and children can learn, steady-state evoked potentials to native and non-native musical rhythms, and the effects of short-term (e.g., infant bouncing, infant music classes), long-term (e.g., perceptual narrowing to musical rhythm), and very-long term (e.g., music enculturation, musical training) learning on music perception-action.

ABOUT DR. TIMMINS

Ed Large PhD directs the Music Dynamics Laboratory and the Theoretical Neuroscience Laboratory at the University of Connecticut, where he is professor in the departments of Psychological Sciences and Physics. He has spent the past 30 years studying how music entrains—or synchronizes—brain rhythms. His research is published in Journal of Neuroscience, Psychological Review, Physica D, Music Perception, and many others, and he has been granted several US and International patents. He has received recognition for his work, including a National Research Service Award, a National Science Foundation CAREER Award, and a Fulbright Chair in the Science and Technology of Music. He previously served as President of the Society for Music Perception and Cognition.

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