Tkach, Colleen

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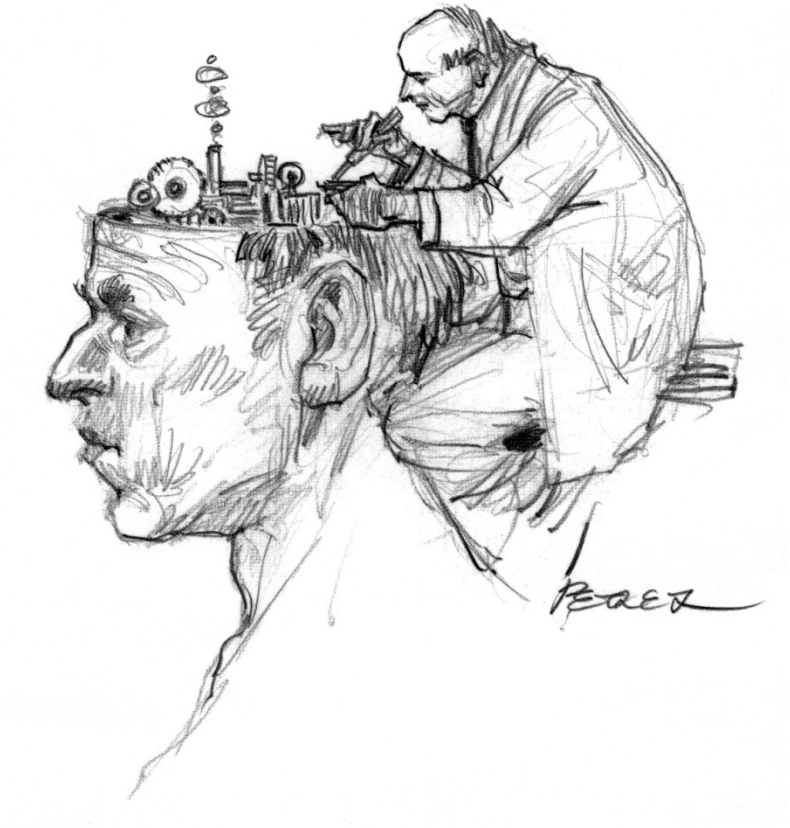
Subject: EM: Neuroscience Speaker Series: Prof. Jesse Rissman UCLA

Importance: High

From: Tom Borowski

NEUROSCIENCE SPEAKER SERIES



Prof. Jesse Rissman

Department of Psychology
University of California, Los Angeles

Learning in Context: Insights from Virtual Reality, Functional MRI, and Neural Network Models

Wednesday, October 29th

4:30 PM

Seaver Commons RM 102
Pomona College

Abstract: How do we learn in dynamic, context-rich environments, and what cognitive and neural mechanisms support this learning? This talk synthesizes findings from two distinct lines of research that highlight the powerful role of context in shaping memory. The first leverages immersive virtual reality (VR) environments to investigate how distinctive spatial contexts enhance long-term memory retention and minimize interference. Using fMRI to capture neural signatures of mental context reinstatement, we demonstrate how cortical reactivation of a learning context can bolster recall of information learned in that context. Additional work exploring the Method of Loci mnemonic technique, adapted for use in VR, showcases how spatial scaffolding supports the memorization of non-spatial information. The second line of research examines context-dependent statistical learning, assessing whether individuals can implicitly acquire multiple sets of temporal associations across shifting contexts. Behavioral results reveal for the first time that humans are capable of learning of context-dependent visual object sequences, even when context shifts are unsignaled. Neural network modeling shows context-gated mnemonic predictions can be achieved without any explicit coding of context, relying instead on emergent dynamics within its hidden layers. Representational similarity analysis of these hidden layer representations tracks the evolution of context sensitivity and its relation to task performance. Together, these studies shed light on how spatial and temporal contexts profoundly shape our ability to acquire, retain, and retrieve information to support memory-guided behavior.