



From Neuroscience to the Classroom

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Using the Brain when Learning: How Neuroscience Can Improve Cognitive Learning

Abstract:

The field of neuroscience enriched our understanding of cognitive learning in typically developing individuals and in those who suffer from neurodevelopmental disorders, as well as improve our prediction of learning outcomes. However, neuroscientific findings open new opportunities to improve learning by modulating human biology. One of the most promising methods is transcranial electrical stimulation (tES). tES allows to deliver a low and painless current non-invasively through the individual's scalp. The current penetrates the skull and affects brain regions underneath the electrodes and connected brain regions. Basic research has shown the capability of tES to influence changes in the brain that occurred during learning. I will focus on research coming from my lab showing the combination between cognitive training and a recently introduced stimulation method when the current is varied randomly, and appears as if its main effects on cortical functioning are excitatory. I will present results that combine tES with cognitive training of arithmetic and executive functions and will discuss some of the potential mechanisms, and future directions.

About:

Roi Cohen Kadosh is a Professor of Cognitive Neuroscience at the University of Oxford. His main research focuses on the psychological and biological factors that shape learning and cognitive achievements with focus on mathematical cognition and executive functions. Depending on the research question, the techniques used can vary from cognitive assessment, mental chronometry, and diffusion models to neuroimaging methods that allow to examine neurochemicals and brain structures and functions. In addition, he pioneers the use of brain stimulation to modulate neuroplasticity during cognitive training to improve learning and cognitive achievement.