Center for Applied Neuroscience

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9th Annual Scientific Conference
ADVANCES IN RESEARCH METHODOLOGIES IN NEUROSCIENCE

Dr. Valéria Csépe

Title:
Methods in Cognitive Neuroscience: How to deal with critical questions about the developing brain?

Abstract:
Cognitive neuroscience is an interdisciplinary field of research with an exceptional potential to answer critical questions about the neural substrates of human behavior across the cognitive, affective, and social domains. This research field has a promising and challenging area called developmental cognitive neuroscience. Here the growing number of methods provide a special insight into several processes by using different measures either causal or correlative in nature. By studying the child brain under maturation (biological constrain) and development (impact of the social environment) we may better understand trajectories and mechanisms of the typical and atypical development. Moreover, we may or should aim at translating this knowledge to the prevention and treatment of neurodevelopmental disorders and emerging psychopathologies. However, in order to reach our goals, we have to be aware, how central this methodological issue is to our endeavor. The presentation will highlight all the techniques employed to examine the brain across development, including electrophysiology, structural, functional, and diffusion magnetic resonance imaging (s-, f-, -d MRI), as well as the functional near infrared spectroscopy (NIRS). The presentation will address the strengths and limitations of each method and emphasize how important is to develop guidelines for data acquisition, experimental design, data analysis and a development focused interpretation

Valéria Csépe, Ph.D. is research Professor at the Research Centre of Natural Sciences (RCNS) of the Hungarian Academy of Sciences (HAS), Professor of Cognitive Psychology and Neuroscience (Technical University of Budapest, University of Pannonia), and member of the Hungarian Academy of Sciences and the Academia Europaea. Her research focuses on the behavioral and brain correlates of typical and atypical cognitive development from infancy to adulthood. The research group of Neurocognitive Development founded by her at the Brain Imaging Centre of RCNS HAS, investigates brain correlates related to the development of spoken and sign language, reading acquisition and disorders, spatial navigation, music as well as executive functions and probabilistic learning with various brain and behavior methods. She served as deputy secretary General of the Hungarian Academy of Sciences, elected for two terms (2008–2014), being the first female in such a high position there. Between 2012 and 2018 she worked for the strategic committee of the International Council of Science (ICSU) as elected member and took part in the preparatory works of the International Science Council (merger of ICSU and ISSC). She is president, appointed in 2016 and 2018, of the Hungarian High Education Accreditation Committee. As of 2017 she is principal investigator of the national curriculum redesign and implementation EU project in Hungary, member of the Education 2030 focus group as well as invited expert of The Research Precariat Scoping Group of the OECD.

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