

The EEG microstates approach in social, cognitive, and affective neuroscience

Dr. Bastian Schiller

Department of Psychology, Laboratory for Biological Psychology, Clinical Psychology and Psychotherapy (head: Prof. Dr. Markus Heinrichs, University of Freiburg)

E-mail: schiller@psychologie.uni-freiburg.de

Abstract

The EEG Microstate analysis approach has become increasingly popular in social, cognitive, and affective neuroscience. It deconstructs multichannel EEG into short periods of stable potential field maps lasting fractions of seconds, thereby identifying rapid fluctuations among large-scale resting brain networks. In my talk, I aim to illustrate the benefits of taking the microstates approach to analyze both resting EEG and ERP data. The first part will focus on studies analyzing the temporal dynamics of brain networks during rest. These studies aim to either explain individual differences in psychological traits (such as self-control or prosociality) or to explore the neurophysiological mechanisms of pharmacological actions (such as oxytocin or alcohol). The second part will focus on ERP microstate studies. These studies are conducted to reveal either quantitative or qualitative differences in neurophysiological processing across experimental conditions (such as stress vs. control). Overall, I hope to demonstrate that unleashing the full potential of this analysis approach deepens our knowledge of the spatio-temporal organization of brain networks associated with social, cognitive, and affective processing.

Brief CV



Bastian Schiller received his PhD in 2014 from the University of Basel, Switzerland (Supervisor: Prof. Daria Knoch). From 2014-2016 he completed a post-doctoral fellowship at the University of Freiburg, Germany (Laboratory for Biological Psychology, Clinical Psychology, and Psychotherapy, Department of Psychology, head: Prof. Markus Heinrichs), where he was appointed Assistant Professor in 2016 and since then has led the Social Interaction Group Laboratory and Laboratory for Psychophysiology. In 2021, Dr. Schiller finished his clinical training to become a licensed psychological therapist (behavioral therapy). His research focuses on revealing the psychobiological foundations of social interactions in healthy individuals, and in individuals with pathologies associated with social dysfunction. Since 2023, he is leading an independent working group on interacting in the digital space and exploring new ways of socially enriching these interactions (ERC starting grant “Social animals interacting in a digital world”). He has taken the microstates approach to analyze both resting EEG and ERP data, aiming to reveal the spatio-temporal dynamics of brain networks and associated mental processing.