**2.5 Mio Euro ERC Advanced Grant awarded to Prof. Pulvermüller for investigating the material basis of human cognition and language**

Recent breakthroughs in comparative neurobiological research highlight specific features of the connectivity structure of the human brain, which open new perspectives on understanding the neural mechanisms of human-specific higher cognition and language. In delineating the material basis of human cognition and language, neurobiologically founded modelling appears as the method of choice, as it allows not only for ‘external fitting’ of models to key experimental data, but, in addition, for ‘internal’ or ‘material fitting’ of the model components to the structure of brains, cortical areas and neuronal circuits.

This novel research pathway offers biologically well-founded and computationally precise perspectives on addressing exciting hitherto unanswered fundamental questions, such as the following: How can humans build vocabularies of tens and hundreds of thousands of words, whereas our closest evolutionary relatives typically use below 100? How is semantic meaning implemented for gestures and words, and, more specifically, for referential and categorical terms? How can grounding and interpretability of abstract symbols be anchored biologically? Which features of connectivity between nerve cells are crucial for the formation of discrete representations and categorical combination? Would modelling of cognitive functions using brain-constrained networks allow for better predictions on brain activity indexing the processing of signs and their meaning?

The project “MatCo” led by Prof Pulvermüller at the Freie Universität Berlin will use novel insights from human neurobiology translated into mathematically exact computational models to find new answers to long-standing questions in cognitive science, linguistics and philosophy. Models replicating structural differences between human and non-human primate brains will help delineate mechanisms underlying specifically human cognitive capacities. Key experiments will validate critical model predictions and new neurophysiological data will be applied to further improve the biologically-constrained networks.

MatCo will be funded with 2.5 Mio Euro by the European Research Council, ERC. Prof. Pulvermüller is teaching Linguistics and Neuroscince of Language at the Department of Philosophy of the Freie Universität Berlin and the Berlin School of Mind and Brain. He had been taking PhDs in Linguistics and Psychology at the Universities of Tübingen and Konstanz before joining the Medical Research Council’s Cognition and Brain Sciences Unit at Cambridge University as a Programme Leader in the Neuroscience of Language. In 2011, he moved to the Freie Universität to support the Cluster of Excellence “Languages of Emotions”. He is a PI at the Einstein Center of Neuroscience Berlin and at the Humboldt University’s Excellence Cluster “Matters of Activity”, which also focuses on deciphering the material basis of cognition. Pulvermüller’s MatCo project will start later in 2020 and run for 5 years.

**Hintergrundinformation:**

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