

From Concrete Examples to Abstract Relations: A model-based neuroscience approach to how people learn new categories

Gareth Roberts

School of Psychology, University of Sydney

Micah Goldwater

School of Psychology, University of Sydney

Evan Livesey

School of Psychology, University of Sydney

Josue Giron

School of Psychology, University of Sydney

Tyler Davis

Department of Psychological Sciences, Texas Tech University

Abstract: The ability to form relational categories for objects that share few features in common is a hallmark of human cognition. However until recently, neuroimaging research largely focused solely on how people acquire categories defined by features. In the current electroencephalography (EEG) study, we examine how relational and feature-based category learning compare in well-matched learning tasks. Building on a previous functional magnetic resonance imaging study by our laboratory, we capitalise on the rich temporal information offered by EEG. Focusing on the neural dynamics of how people learn category memberships over individual trials in an experimental task, we investigate how these single trial dynamics modulate computational estimates from decision-making modelling frameworks. Specifically, by sorting participants' individual trials by their position in the experimental sequence we observe striking relationships between EEG dynamics (e.g., frontal theta oscillations and P300 component) and feature-based and relational categorisation behaviour.