Department of Economics – Neuroeconomics Seminar

November 23, 2023 17:00 - 18:00

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Reinforcement learning dynamics and working memory: correlation or causation?

In order to take adequate decisions, we need to be able to adapt to our ever-changing environment. Through repeated reinforcement of our decisions, we learn to take the right decision in a given context, also when contexts change. However, the process of instrumental learning is not always straightforward and may rely on working memory to keep track of multiple reinforcement histories. We are interested in the dynamics of reinforcement learning in a changing environment and in how those dynamics are shaped by working memory. In this talk, I will discuss a series of experiments addressing that question. First, we used computational modelling to show that dynamic changes in people's learning rates around outcome reversals were more pronounced with higher working memory capacity, whereas average learning rate was lower. This was accompanied by better performance and a stronger representation of learning rates and reward prediction errors in cortical activity as measured with EEG. We then manipulated working memory load in an online experiment to investigate whether the observed correlations with working memory capacity imply causation. Working memory load indeed affected learning dynamics, with more pronounced changes in learning rates around reversals, as well as higher average learning rate with higher working memory load. Higher load also negatively contributed to performance. The results of these studies show a complex relationship between working memory and reinforcement dynamics in an ever-changing environment

Zoom Link:

https://uzh.zoom.us/j/66083933314?pwd=SnpXTCswQ05DSGtCTTc3OTRTMVBRdz09
Meeting ID: 660 8393 3314