University of Zurich[UZH]

Department of Economics – Neuroeconomics Seminar

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Modeling value effects on choice response times in reinforcement learning

Reinforcement learning is an interdisciplinary field that studies how individuals (i.e., humans, animals, or artificial agents) learn to minimize punishments and maximize rewards based on feedback. However, traditional cognitive models of reinforcement learning have exclusively focused on the across-trial temporal dynamics (i.e., how we update our expectations after receiving feedback) rather than on the within-trial temporal dynamics of decision making (i.e., how we select one option over another based on our expectations).

In previous work, we have shown how one can get more insight into decision processes underlying reinforcement learning by combining traditional reinforcement learning models that model across-trial dynamics, with sequential sampling models, that model within-trial dynamics. We also showed that differences in learning contexts affect not only choice probabilities but also response times, and how such effects can be explained by mapping different aspects of the learned values to different decision-making parameters in a sequential sampling model.

We found that both the magnitude (i.e., high vs. low) and the sign (i.e., positive vs. negative) of the feedback have a strong effect on the response times, but not on choice probabilities: participants tend to give faster responses in higher-value contexts compared to low-value contexts. In this talk, I will discuss previous and ongoing research on this topic and future avenues for this relative new field.