University of Zurich[UZH]

Department of Economics – Neuroeconomics Seminar

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Affective learning and problematic reward-seeking behavior

A common symptom across many clinical conditions, such as drug addiction, is the willingness to go to extraordinary lengths to obtain an object of desire, even though, once obtained, the object is not experienced as pleasurable. What are the mechanisms that make the human brain vulnerable to situations where choice behavior is hijacked in the service of outcomes that are not valued by the individual? To address this question, we conducted a series of studies combining classical experimental paradigms of affective value learning (i.e., Pavlovian conditioning) with eye-tracking and functional imaging techniques. During Pavlovian conditioning, participants generated a set of conditioned responses to a conditioned stimulus that predicted the subsequent delivery of an affectively significant outcome, namely food. Our results suggest that Pavlovian conditioning involves at least two anatomically and computationally distinct learning signals: one that learns the value of the outcome and one that learns the sensory properties of the outcome. These neural learning signals generated multiple and parallel conditioned responses. Strikingly, these conditioned responses had different sensitivities to outcome devaluation: Pavlovian responses based on the representation of the outcome's value flexibly adapted to outcome devaluation, whereas Pavlovian responses based on the sensory properties' representation were resistant to outcome devaluation. These findings shed some light on the mechanisms underlying Pavlovian learning and provide new insights into the understanding of persistent reward-seeking behaviors when the reward is no longer valued by the individual.