Positive Reward Bias on Human Reinforcement Learning under Increased Dopaminergic Neurotransmission

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Résumé

Learning action values is key to maximize their effective payoff in uncertain reward environments. But how does dopamine affect this reinforcement learning (RL) process in humans? To test the hypothesis that increases in sustained dopamine concentration levels trigger a positive reward bias on human RL, we administered dopamine precursor L-DOPA to healthy adult volunteers performing a restless two-armed bandit task during a double-blind randomized placebo-controlled study. We found that L-Dopa decreases switching between volatile choice options. Using computational modelling, we show that L-Dopa decreases the learning rate and precision of RL but does not affect the policy used to choose between options. These learning effects of L-DOPA are best explained by a positive reward bias on recurrent neural networks (RNNs) trained to perform the same task.

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