NEURAL REINFORCEMENT ACROSS BRAIN REGIONS AND CELL-TYPES

Throughout learning, reinforcement of neural activity underlies the reinforcement of behavioral actions that lead to reward. The cortex and the striatum are critical to this process, but the nature of their involvement and the role of their diverse subpopulations of neurons remains unclear. Leveraging a neuroprosthetic task, we recorded neuronal activity both in cortex and the striatum as rodents learned to control specific neurons in the motor cortex. We found diverse reinforcement strength in different motor cortex populations and showed that striatal activity models cortical progress towards reward. Taken together, these results shed light on the cortex and the striatum’s role in neural reinforcement and thus in a fundamental mechanism by which the brain reuses and refines behavior.