A 24/7 automated evidence accumulation task in mice to study deliberation biases

Deciding when enough information has been gathered is a critical component of adaptive decision-making. This capacity is dramatically altered in neuropsychiatric conditions: schizophrenia is associated with "jumping to conclusions" (JTC; premature, overconfident choices) while obsessive-compulsive disorder is linked to excessive information-gathering and indecisiveness (IND). Recent computational work suggests that these opposing biases may reflect altered weighting of incoming evidence during sequential integration. Critically, evidence integration signals in dorsomedial prefrontal cortex and striatum are thought to be dopaminergically modulated, yet causal evidence linking dopamine to these deliberation biases remains limited.

Here we present a new mouse behavioral paradigm designed to investigate the neural and dopaminergic mechanisms underlying the JTC/IND spectrum. Mice are trained on a visual evidence-accumulation task inspired by the virtual "Towers Task" (Pinto et al., 2018), adapted for use in the Training Village, an automated RFID-based 24/7 training platform enabling self-paced, high-throughput data collection. Stimulus sequences are constructed to decorrelate evidence amount, timing, and recency, allowing computational dissection of evidence integration biases. Task variants incorporating opt-out and early-response options will provide explicit behavioral readouts of JTC- and IND-like tendencies. In subsequent phases, fiber photometry and optogenetic manipulation of dopamine release in prefrontal cortex and ventral striatum will test model-derived predictions about dopaminergic contributions to deliberation biases across the JTC/IND spectrum.