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Single action sequence reinforcement

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We use this protocol and it's working

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Abstract

Single action sequence reinforcement protocol for mouse studies from Tang et al 2023.

Guidelines

Individual mice were subjected to a single session of protocol each day, with sessions following each other on consecutive days.

Materials

The white open field box is made of 410 × 400 mm white matte acrylic walls and a 410 × 400 mm white matte acrylic base. **Note:** A white open field was used instead of a grey open field to minimize habituation effects, which would lead to reduced initial spontaneous behavior during closed loop protocol.



Session 1 + Baseline

- 1 Mice were placed in a white open field box for closed loop reinforcement protocol. To acquire baseline behavior, individual mice were allowed to behave freely inside the box for 30 minutes on the first action A reinforcement session.
- 2 After initial behavior acquisition, closed loop reinforcement was initiated by blue laser stimulation of VTA DA neurons were made available for 60 minutes.

Sessions 2 & 3

- 3 90 minutes of closed loop reinforcement were made available for individual mice during sessions.
- 4 An extinction protocol was carried out comprising of 20-minute maintenance of reinforced behavior with laser availability, followed by 60 minutes of extinction of reinforced behavior without laser availability, followed by 20-minute re-acquisition of reinforced behavior with laser availability.

STEP CASE

Selection for Action B 1 step

To select for action B, a repeat of the protocol described above for action A was performed starting on the day following extinction protocol of action A.

Contingency Degradation Protocol

- 5 Upon completion of the reinforcement and extinction protocols for action B, a contingency degradation protocol was performed comprising of 20-minute maintenance of action B with laser availability, followed by 60 minutes of contingency degradation of reinforced behavior by triggering laser randomly, followed by 40-minute re-acquisition of reinforced behavior with laser availability for action B performance.