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Single action sequence reinforcement

Jonathan Tang[1,2,3]

[1]Department of Neuroscience, Zuckerman Mind Brain Behavior Institute, Columbia University, New York, NY 10027, USA;
[2]Seattle Children's Research Institute, Center for Integrative Brain Research, Seattle, WA, USA;
[3]University of Washington School of Medicine, Department of Pediatrics, Seattle, WA, USA

c.weber-schmidt
Allen Institute, ASAPCRN

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 x 400 mm white matte acrylic walls and a 410 x 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.

Protocol status: Working
We use this protocol and it's working

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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 initated 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.

Session 4

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.

Contingency Degradation Protocol

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.

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.