INTRODUCTION

Previous research has shown an increase in endorphin and dopamine (DA) functioning following chronic, intermittent sucrose consumption.

NALTREXONE

Naltrexone (NTX: an endorphin antagonist) typically cannot be discriminated from saline; however, we wondered if chronic sucrose consumption would allow NTX to serve as a discriminative stimulus.

Our previous research has shown that naltrexone can be established as a discriminative stimulus for rats given daily sucrose solutions and trained under a 3.2 mg/kg training dose (TD). Our current study attempts to establish naltrexone as a discriminative stimulus under a 0.32 mg/kg TD.

HALOPERIDOL

McElroy (1989) was able to train rats to discriminate haloperidol (HAL: a D_{2} antagonist; 0.05 mg/kg i.p.) in a mean of 45 training sessions. This discrimination was established without chronic sucrose consumption.

METHOD

Male Sprague Dawley rats were maintained on a 12hr light dark cycle, were given either 12hr sucrose/water access or 24hr water access.

At the beginning of the dark cycle, rats were given access to sucrose. After one hour, subjects were injected with either the training drug or saline and discrimination training began. After discrimination training, rats were returned to the home cage and had sucrose access for the remainder of the twelve hour access period. Subjects maintained under 24-hr water access were injected 1 hour after the dark cycle began.

Some rats were trained to discriminate between 0.32 mg/kg NTX and saline. S.c. injections were made 15 minutes before the training session began. Other rats were trained to discriminate between either 0.056 mg/kg or 0.018 mg/kg HAL and vehicle. Injections were made 30 minutes prior to the session.

Discrimination training consisted of left or right lever presses producing food pellets for the drug or saline, respectively. Following drug administration, left lever responses were reinforced. Right lever presses were punished with 8 seconds of darkness. Following saline or vehicle administration the response contingencies were reversed. Sessions continued until 10 sucrose pellets were delivered or 30 minutes elapsed.

Discrimination training continued until > 80% of the subject’s responses were correct for 8 of the previous 10 training days.

Once subjects acquired the discrimination, generalization testing began. A single dose of NTX or HAL, which differed from the training dose, was administered 15-60 minutes before the test session. The test consisted of a 30 minute response period where subjects could earn up to 10 reinforcers. Subjects were required to reach at least two consecutive training sessions (one of each, saline and drug) before the next test session.

RESULTS

NALTREXONE

- Subjects training under a dose of 0.32 mg/kg acquired the discrimination in a mean of 120 sessions. Previously, we found that subjects trained under larger doses (3.2 mg/kg, M = 83), (1.0 mg/kg, M = 75), acquire the discrimination in fewer sessions. We trained subjects to discriminate between 0.1 mg/kg and saline, but only 7 out of 21 subjects acquired the discrimination (M = 57 sessions) and training was terminated after 61 sessions (Figure A).

- Figure B depicts naltrexone generalization tests as a function of the training dose.

HALOPERIDOL

- Subjects with access to sucrose were able to acquire the discrimination in fewer sessions, whereas 24/hr water subjects either took longer to acquire the discrimination or failed to acquire (Figure C).

- Subjects acquired the discrimination in fewer sessions (M = 42) at a larger TD. TDs were decreased to 0.032 mg/kg and the discrimination took longer to acquire (M = 128) (Figure C).

- XY represents the number of subjects that acquired the discrimination (X) out of the total subjects training in condition (Y).

DID NOT ACHIEVE DISCRIMINATION

- Did not acquire

DISCUSSION

NALTREXONE

- Rate suppression is a decreased responding rate (lever presses/minute).

- Similar to O’Donnell’s (1989) findings, 0.056 mg/kg HAL showed rate suppression. The rate suppression may impact the discrimination acquisition, by decreasing the number of completed training sessions.

- To address this we first lowered the training dose to 0.032 mg/kg s.c. HAL, but, rate suppression persisted.

- PT was then increased from 30 minutes to 60 minutes. Training session rates increased significantly under 60 minute PT (M = 19.46) compared to the 30 minute PT (M = 5.07) (p < .019), but rate suppression still persisted slightly compared to the vehicle condition (M = 27.32) (p < .001) (Figure F).

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