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Data Article

Supplementary dataset of context-dependent conditioned responding to an alcohol-predictive cue in female and male rats

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ABSTRACT

This supplementary dataset is supportive of the research article entitled 'The role of context on responding to an alcohol-predictive cue in female and male rats' [1]. This article describes the raw data pertaining to the behaviour of male and female rats during intermittent to ethanol and Pavlovian conditioning training and testing procedures. Specifically, the dataset describes the alcohol consumption and ingested-dose of ethanol during home-cage ethanol exposure, as well as the conditioned responding during Pavlovian discrimination training, a test assessing the effect of context on responding to an alcohol-predict cue in the absence of alcohol, and a reinstatement test assessing the effect of context on conditioned responding to an extinguished alcohol-predictive cue.

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Specifications Table

Subject	Neuroscience: Behavioural
Specific subject area	Pavlovian conditioning in male and female rats
Type of data	Raw dataset
How the data were acquired	Data were acquired by intermittently exposing male and female rats to alcohol in the home-cage, after which they were trained and tested in a Pavlovian context discrimination task, using conditioning chambers (Med Associates, St. Albans, VT, USA). In conditioning chambers, alcohol was delivered into a fluid port (ENV-200R3AM) that contained a photobeam (ENV-205M). Transections of the beam were counted and recorded throughout the sessions using MED PC-IV software.
Data format	Raw
Description of data collection	The dataset was transformed from the input data, where the amount of alcohol consumption during intermittent access was recorded and presence or absence of a fluid-port entry during each time interval was noted for each session throughout the Pavlovian conditioning training and testing procedures for each rat. As in the associated research article, rats that made less than 10 CS port-entries averaged across the last two sessions during Pavlovian discrimination training were excluded from the statistical analysis (2 = males, 3 = females). Additionally, all the rats met the extinction criterion of less than 10 CS port-entries averaged across the last two extinction sessions.
Data source location	Concordia University Montreal, Quebec Canada 45.4948° N, 73.5779° W
Data accessibility	Mendeley Data 10.17632/hnzcr3w46f.1 https://data.mendeley.com/datasets/hnzcr3w46f/
Related research article	D. Segal, M. D. Valyear, N. Chaudhri. The role of context on responding to an alcohol-predictive cue in female and male rats.

Value of the Data

- The data provide an in-depth depiction of the conditioned responding of the male and female rats during each phase of the study, which can facilitate the readers' understanding of the complex behavioural paradigm.
- All researchers and readers who focus on sex differences in reward-related behaviours and the influence of physical contexts on these behaviours can benefit from these data.
- The data enriches the reader's knowledge about the sex differences in context-dependent conditioned responding.

1. Data Description

The provided data are supplementary to the associated article [1]. The dataset provides the weight (g), fluid consumption (g), and ingested dose of ethanol (g/kg/24 h) during the home-cage ethanol exposure where male and female rats had intermittent access to ethanol. Further, it provides the number of port-entries produced by male and female rats during the PreCS and CS time intervals as well as the ΔCS values for the testing procedures. The port-entries produced during the inter-stimulus interval were provided for the training phase. The accompanying data file containing the raw data is provided in the data repository [2].

2. Experimental Design, Materials, and Methods

The associated research article was designed to examine the effect of a physical context on conditioned responding for alcohol in male and female rats [1]. First, rats were acclimated to drinking alcohol. Alcohol was delivered via a 100 ml graduated cylinder with a rubber stopper containing a metal ball in the spout to reduce spillage. During each alcohol session (i.e., Mondays, Wednesdays, and Fridays), rats were weighed, then a graduated cylinder containing alcohol and a 500 ml bottle of water were weighed and placed onto the cage lids at the start of the 24 h period. On Tuesdays, Thursdays, and Saturdays, both bottles were removed and weighed, then a 100 ml graduated cylinder containing alcohol and the 500 ml bottle of water were placed onto the cage lids for 24 h. Cylinders and bottles were randomly placed on either the left or right side of the cage lid during each session. This procedure was repeated for 5 weeks until 15 alcohol sessions were completed. To control for spillage and evaporation, two control cages were set up on the highest and lowest shelves and were treated identically to the cages that contained rats. For each session, the average volume of fluid that was lost from the two control cages was subtracted from the volume of the fluid consumed by each rat. The ingested dose of ethanol was calculated for each rat by multiplying the grams of ethanol consumed, by the density of ethanol and then dividing by the weight (kg). For the first 6 alcohol sessions, rats were given access to 15% ethanol. Rats that consumed less than 1 g/kg of ethanol averaged across the 5^{th} and 6^{th} session were given access to 5% ethanol. Once rats consumed at least 1g/kg averaged across two consecutive sessions they were then given 10% ethanol. If rats consumed at least 1 g/kg averaged across two consecutive sessions, they were switched back to 15% ethanol. Rats remained on the ethanol concentration given on the 14th alcohol session for the remainder of the experiment.

During the last week of Home-cage Ethanol Exposure, rats were habituated to the experimental rooms and conditioning chambers that were used during Pavlovian Discrimination Training. Habituation sessions were conducted during the days that rats only received water (i.e., Thursday, Saturday, and Sunday). On the first session, rats were brought into the experimental rooms in their cages, weighed, and left in their cages for 20 min. On the second and third sessions rats were habituated to the conditioning chambers in one of the contexts. Context A consisted of black walls, a lemon odour, and smooth plexiglass floors, and context B consisted of clear walls, an almond odour, and a grid metal floor. During these sessions rats were weighed and placed into the chambers, after 1 min the house light turned on and stayed on for 20 min.

During Pavlovian Discrimination Training, rats were trained to associate a context in which a distinct sound (CS) was paired with alcohol delivery (i.e., alcohol context). On alternating sessions, rats were exposed to a second context in which a different distinct sound (neutral stimulus) was presented, and alcohol was not delivered (i.e., neutral context). The auditory stimuli consisted of either a 10 s continuous white noise ($\sim$8 dB above background; ENV-225SM) or clicker (5 Hz, $\sim$8 dB above background; ENV-135M). Rats were counterbalanced across the contexts and stimuli based on ethanol consumption averaged across the last two alcohol sessions of Home-cage Ethanol Exposure. Training consisted of 12 sessions in each context. Each training session (73.5 min duration) began with a 2 min delay after which the house-light turned on for the remainder of the session, then the first inter-trial interval (ITI) began. Each session contained 15 trials of an auditory stimulus that occurred on a variable-time 240 s schedule (i.e., ITI of 120, 240, or 360 s). In the alcohol context, every CS was paired with 0.2 ml of ethanol that was dispensed over the last 6 s of the CS into a fluid port (ENV-200R3AM) for consumption via a syringe and syringe pump (PHM-100, 3.33 rpm). Transection of the photobeam within the fluid port was recorded as a port entry (ENV-205M) on a PC computer using MED-PC-IV software. In the neutral context, the neutral stimulus was presented without alcohol delivery. Rats that made less than 15 port entries during the CS averaged across the 5th and 6th sessions were given 2% sucrose and ethanol solution until they reached at least 15 port entries during the CS averaged across two consecutive sessions, and then were switched back to the ethanol solution without sucrose for the remainder of the experiment. Rats ($n = 5$) that did not complete at least 10 port

entries during the CS averaged across the last two training sessions in the alcohol context were excluded from the final dataset.

Following training, responding to the CS was tested in both the alcohol and neutral contexts without the delivery of alcohol. Two test sessions were conducted, in which rats were placed into their alcohol or neutral contexts, in which the CS was presented as in training, but alcohol was not delivered. Next, 8 repeated test sessions (i.e., 4 in each context) were used to extinguish the CS-alcohol association. Lastly, the reinstatement of responding to the CS was tested in both the alcohol and neutral contexts following an oral alcohol prime. The alcohol-primed reinstatement test consisted of one session using a counterbalanced between-subjects design, in which 0.2 ml of ethanol was delivered over 6s into the fluid port 30 s after the start of the session. Then, 0.2 ml of ethanol was delivered during the first CS presentation, after which no ethanol was delivered for the remainder of the session.

PreCS port-entries were the summed port-entries during the 10 s before each CS interval. ΔCS port-entries were calculated by subtracting PreCS port entries from CS port-entries. ITI port-entries were the summed port-entries that occurred between each CS interval excluding the 10 s before and following the CS. The total latency is the summed time in seconds that elapsed during each CS presentation before the first port entry occurred and the total duration is the summed time in seconds that elapsed during port entries, initiated during all CS presentations. Using the interquartile range method [3], three data points were identified as outliers and corrected by replacement with the median of the trial: The duration of CS port entries of rat #24 on session 7 during Pavlovian Discrimination Training in the neutral context, and the duration and number of CS port entries of rat #14 on session 4 of extinction in the alcohol context.

Ethics Statements

All experimental procedures were approved by the Animal Research Ethics Committee at Concordia University, complied with regulations provided by the Canadian Council on Animal Care, and were performed in accordance with relevant guidelines and regulations.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT Author Statement

Diana Segal: Writing – original draft, Writing – review & editing, Conceptualization, Visualization, Methodology, Investigation, Formal analysis; **Milan D Valyear:** Writing – review & editing, Conceptualization, Methodology, Formal analysis; **Nadia Chaudhri:** Methodology, Supervision, Project administration, Resources, Funding acquisition.

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References

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