

BRIEF COMMUNICATION

Effect of Body Weight on Ethanol-Induced Taste Aversion Learning

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CANNON, D. S. AND J. K. LEEKA. *Effect of body weight on ethanol-induced taste aversion learning*. PHARMACOL BIOCHEM BEHAV 37(2) 379-381, 1990.—Saccharin aversions were conditioned using ethanol (EtOH) in rats of different body weights. There was a nonuniform relation between EtOH dose (g/kg) and strength of conditioned taste aversion. Heavier rats learned stronger aversions at the same dose, and a weak dose (i.e., 1.0 g/kg) was effective only in heavier rats. It is suggested that rats be equated on body weight in studies of EtOH-induced taste aversion learning and in studies of EtOH preference.

Ethanol	Taste aversion learning	Rats	Body weight
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IT is well known that pairing ethanol (EtOH) with a palatable flavor results in taste aversion learning [e.g., (2)]. Typically, studies of EtOH-induced taste aversion control for body weight differences among subjects by using a uniform dose/body weight (g/kg) ratio for experimenter-administered doses, and self-administered doses are computed as g/kg. However, it has been shown that a constant g/kg dose produces lower blood EtOH levels in lighter rats (1). Further, a constant g/kg dose is reported to produce more ataxia in heavier rats (3). This paper examines the effect of body weight on EtOH-conditioned taste aversions.

EXPERIMENT 1

In the first experiment, EtOH-conditioned taste aversion learning was examined in two cohorts of Wistar-Kyoto (WKY) rats that differed in age and body weight. Because too high a dose could possibly mask effects due to body weight, a low EtOH dose (1 g/kg) was used.

METHOD

Subjects

Subjects were experimentally naive male WKY rats that were descended from the rats used in our previous studies (2). Subjects

included 11 rats approximately 190 days old and 10 rats approximately 100 days old. The younger cohort weighed significantly less (mean = 251.3 g, SD = 10.3) than the older cohort (mean = 309.0 g, SD = 23.3), $t(19) = 4.71$, $p < 0.001$.

Procedure

Animals were housed individually in 18 × 18 × 24 cm stainless steel cages in a room with a 12-hr light/dark cycle, and Teklad lab chow was available ad lib throughout the study.

Animals were adapted to a 20 min/day drinking schedule for 11 days prior to conditioning. Watering occurred daily at approximately 1400 hr throughout the study. Intakes were determined by weighing fluid bottles before and after each drinking period. At 1000 hr on the conditioning day, all rats were given a 0.1% (w/v) saccharin-water solution for 20 min. Immediately following the saccharin presentation, rats were injected IP with either a 1.0 g/kg dose of a 15% (v/v) EtOH-water solution or an equal volume of a 0.9% (w/v) saline-water solution (i.e., 0.0 g/kg EtOH), depending on random assignment (Ns = 5/group except the 1.0 g/kg group of the heavier cohort, N = 6). On a test trial two days following the conditioning trial, the saccharin solution was presented again for 20 min at 1000 hr.

RESULTS

The results of the saccharin test are shown in Fig. 1. A cohort

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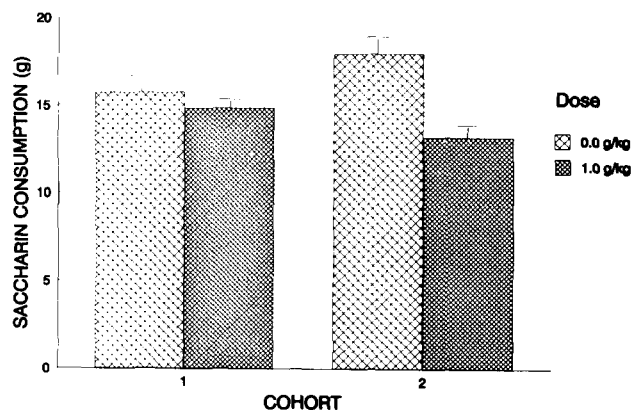


FIG. 1. Mean test trial saccharin consumption (g) by cohort and dose in Experiment 1. Cohort 1 weighed less than Cohort 2. The error bar is the standard error of the mean.

by dose analysis of variance (ANOVA) resulted in significant effects for dose and the interaction term, $F_{s(1,17)} \geq 7.0$, $p < 0.017$. There was a significant difference between doses for the heavier cohort only, $F(1,9) = 20.8$, $p < 0.001$. Further, the 1.0 g/kg group of the heavier cohort drank less than the 1.0 g/kg group of the lighter cohort, $F(1,9) = 5.12$, $p < 0.05$; but there was not a significant difference between cohorts in saccharin intake by the 0.0 g/kg groups.

DISCUSSION

The heavier WKYs given EtOH developed an aversion relative to both weight-matched controls and lighter rats given EtOH. These results support the conclusion that there is a nonuniform relation between taste aversion learning and body weight if EtOH dose is standardized on the basis of g/kg.

EXPERIMENT 2

To ensure that the effects observed in Experiment 1 are not specific to WKY rats, Sprague-Dawley rats were used as subjects in Experiment 2. Further, two conditioning doses were used to compare dose-response curves.

METHOD

Subjects

Forty-eight (48) experimentally naive male Sprague-Dawley rats served as subjects. Half were about 60 days old, and the other half were about 120 days old. The younger cohort of rats, of course, weighed less (mean = 245.9 g, SD = 12.9) than the older rats (mean = 361.3 g, SD = 15.7), $F(1,46) = 774.8$, $p < 0.001$.

Procedure

In unspecified regards, the procedure was the same as in Experiment 1. Rats were habituated to the fluid deprivation schedule for 14 days prior to conditioning. On the conditioning day, rats within each cohort were randomly assigned to one of 3

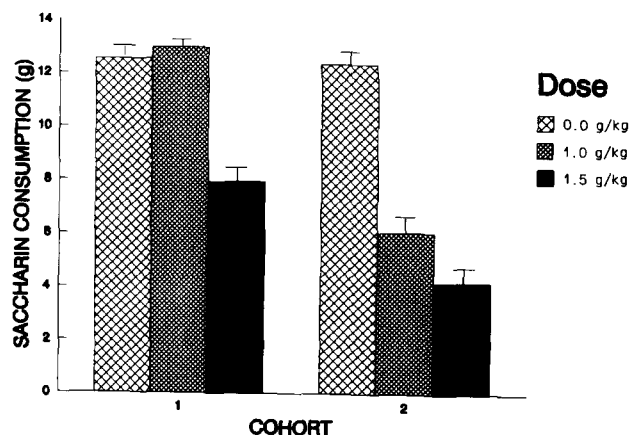


FIG. 2. Mean test trial saccharin consumption (g) by cohort and dose in Experiment 2. Cohort 1 weighed less than Cohort 2. The error bar is the standard error of the mean.

EtOH conditioning doses, viz., 0.0, 1.0, and 1.5 g/kg ($N_s = 8/\text{group}$).

RESULTS

Mean test trial saccharin intake by cohort and conditioning dose is shown in Fig. 2. A cohort by conditioning dose ANOVA was significant for cohort, dose, and their interaction, $F_{s(2,42)} \geq 7.35$, $p_s \leq 0.002$. Newman-Keuls post hoc analyses of consumption by the smaller rats indicate the 1.5 g/kg dose resulted in less saccharin intake than did either other dose, $p_s < 0.05$. There was no difference between the 0.0 and 1.0 g/kg doses. Among the larger rats, both the 1.0 and 1.5 g/kg doses resulted in less intake than did the 0.0 g/kg dose, $p_s < 0.05$; but the 1.0 and 1.5 g/kg doses did not differ from one another. Comparisons of saccharin intake by rats given the same conditioning dose indicated the heavier rats drank less than the lighter rats at both the 1.0 g/kg and 1.5 g/kg doses, $t_{s(14)} \geq 2.94$, $p_s < 0.05$. There was no difference between weight groups in consumption by 0.0 g/kg animals.

DISCUSSION

These results suggest that the smaller the rat, the larger the EtOH dose required to produce a taste aversion. Further, at least over the range of doses tested, a given dose results in stronger taste aversions in larger rats.

GENERAL DISCUSSION

The results of these studies suggest that body weight should be equated in studies of EtOH conditioning. Unless gender differences are of specific theoretical interest in a particular study, it is further suggested that all subjects be of the same sex because of sex differences in body weight.

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