

wood rats learn to avoid very effectively, even though initial acquisition of the response is difficult because of the animal's unconditioned response to electric shock.

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## Pattern of daily water consumption in relation to intake of saccharin solution

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Twelve nondeprived rats were presented with a bottle (B2) containing .25% saccharin solution for 1 h each day in addition to the maintenance water bottle (B1). After 18 days (preshift), the contents of B2 were changed to plain tap water for 6 days (postshift). Intake from B1 in the 2 h preceding the time of B2 presentation increases during preshift while overnight intake decreased, suggesting the emergence of a B1 drinking schedule as intake from B2 increased. However, detailed aspects of the results were not consonant with this possibility. During postshift, intake from B1 returned to the initial preshift level while intake from B2 settled at a much higher level, suggesting the operation of secondary reinforcement.

If a bottle (B2) containing saccharin solution is presented for 1 h each day in addition to the maintenance water bottle (B1) in the home cage of nondeprived rats, the intake from B2 gradually increases to an asymptotic level (Di Lollo & Meyer, 1970). The daily growth of intake from B2 suggests the operation of a learning factor, but the nature of the habit is not immediately obvious. The gradualness of the daily increments could merely represent the development of an association between the sight of B2 and the taste of saccharin or could represent, as suggested by Di Lollo & Meyer (1970), the development of a daily drinking schedule set to maximize the volume of saccharin intake.

The detection of any such schedule would be aided by monitoring the level of water intake from B1, particularly during the daily period just preceding the time of presentation of B2.

In the study reported here, volume of water intake from B1 was measured during an 18-day preshift stage while saccharin

intake from B2 climbed to an asymptotic level, and during a 6-day postshift stage when the contents of B2 were changed to plain tap water, the same as B1.

#### METHOD

The Ss were 12 male albino rats from the colony maintained at the University of Western Australia. They were approximately 120 days old at the beginning of the experiment and were housed individually. All Ss were maintained on ad lib food and water throughout the experiment. All testing took place in the home cages.

The experiment was conducted in two stages: preshift (18 days), and postshift (6 days). In both stages a second bottle (B2) was presented in addition to the maintenance water bottle (B1) always present in the cage. All bottles were fitted with leakproof metal spouts manufactured by Atco Manufacturing Co., Napa, California. During preshift, B2 contained 0.25% (w/v) saccharin solution (sodium saccharin and plain tap water) while B1 contained just tap water. During postshift

both bottles contained plain tap water.

The quantity of fluid contained in each bottle was read with a resolution of 0.25 cc from a transparent graduated scale attached to each bottle. Readings from B1 were taken every day at 30-min intervals beginning 2 h before the presentation of B2 and ending 2 h after its withdrawal. With respect to B1, this procedure yielded four daily intake scores for the 2 h before the presentation of B2, two scores while B2 was available, and four scores for the 2-h period following the withdrawal of B2. In addition, an intake score was available for the 19-h period intervening between the last reading on a given day and the first reading on the next day. Daily readings from B2 were taken at the beginning, the middle, and the end of the 1-h period during which B2 was available. This procedure yielded two daily intake scores for B2.

#### RESULTS AND DISCUSSION

The principal aspects of the results are illustrated in Fig. 1. Missing from Fig. 1, because of widely different scale requirements, is a plot of the mean daily intake from B2 during preshift (the scores, in milliliters, from Day 1 to Day 18 were: 5.4, 8.9, 9.4, 10.0, 11.6, 11.8, 14.3, 15.9, 14.3, 15.6, 21.9, 20.5, 20.9, 21.4, 22.0, 20.6, 18.6, and 17.2). The abbreviations used in Fig. 1 are used in the remainder of this paper in referring to the daily measurement periods.

During preshift the mean *B1 overnight* intake decreased steadily from about 1.00 ml to about 0.75 ml/h,  $F(17,187) = 10.64$ ,  $p < .001$ . During the same period the mean *B1 before* intake increased from about 1.00 ml to almost 3.00 ml/h,  $F(17,187) = 6.69$ ,  $p < .001$ . In terms of total daily intake, the increment in *B1 before* matches almost exactly the decrement in *B1 overnight*. In fact, when plotted, the level of total 24-h intake from B1 remains practically unchanged throughout preshift.

Clearly, the regular availability of B2 during preshift brought about a rearrangement in the daily pattern of drinking from B1, with maximum B1 intake occurring in the 2-h period just preceding the time of B2 presentation. This pattern of B1 intake has all the appearances of a drinking schedule culminating at the time of B2 presentation. Indeed, there is a compelling impression of the development during preshift of an FI 24-h schedule from *B1 overnight* through *B1 before* to B2. However, this possibility is disconfirmed by the half-hourly distribution of B1 intake in the 2-h period preceding saccharin availability. Over the last 5 days of preshift, mean *B1 before* intake was high during the first ½-h period

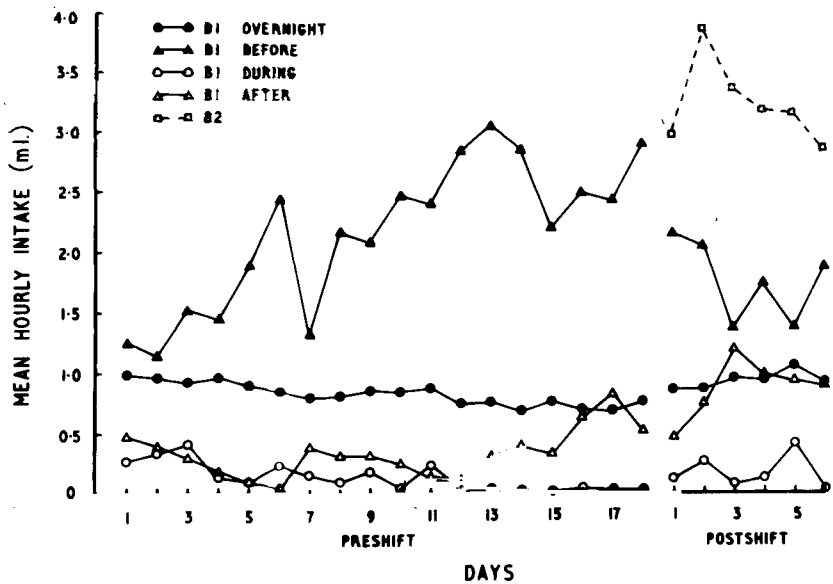


Fig. 1. Mean hourly intake from B1 and B2 on each day for the following periods: 2 h before the presentation of B2 (*B1 before*), 1 h while B2 was available (*B1 during*, and B2), 2 h after the withdrawal of B2 (*B1 after*), and 19 h intervening between experimental periods (*B1 overnight*).

(1.42 cc), decreased during the next two ½-h periods (1.19 and 0.91 cc, respectively), and increased sharply during the final ½-h period (1.63 cc). On the basis of these results, it seems more likely that the level of *B1 before* intake came under

the control of stimuli—such as laboratory noises and other events—occurring regularly at the time of experimentation throughout preshift.

During postshift the *B1 overnight* intake returned to the initial hourly level of

approximately 1 cc; the *B1 after* intake, which had been understandably depressed throughout preshift, also climbed to approximately 1 cc; and the *B1 before* intake declined toward the same level (Fig. 1). Clearly, the changes in the daily pattern of B1 intake induced during preshift were almost entirely cancelled during postshift when B2 no longer contained saccharin solution.

Intake from B2 dropped dramatically on the first day of postshift but remained consistently above each of the mean hourly intake estimates for B1 (Fig. 1). This pattern of results was obtained in each of the 12 Ss. The preference exhibited for B2 over B1 during postshift is not consistent with the notion that contrast effects may occur in this type of situation (Gandelman & Trowill, 1969). On the contrary, the sustained preference suggests the possibility that B2 had acquired durable secondary reinforcing properties.

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#### ERRATUM

LEE, CHING-TSE, & WONG, P. T. P.

Temperature effect and strain differences in the nest-building behavior of inbred mice. *Psychonomic Science*, 1970, 20 (1), 9-10. In Fig. 1, the strain name on the graph should be changed from C57BL/6J to C57BL/10J.