Learning self-punitive running¹

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Rats were either punished or not punished near the goal box on the day following runway escape training. Running speed increased for punished animals and decreased for nonpunished controls. It is suggested that self-punitive running is learned during extinction-with-punishment.

Escape-trained rats exposed to shock interposed between start box and goal box in a runway persist in running through the shock zone although the start box and part of the alley before the shock zone are never electrified after the original escape training. If self-punitive running is motivated by fear conditioned during escape training and reinforced by fear reduction during punishment testing, it should be possible to obtain a learning curve in the first few trials of this extinction-with-punishment paradigm. To detect such learning it may be necessary to limit the amount of escape training prior to testing so that initial running, based on retention of escape training, is slow enough that an improvement in the early extinction trials can be observed. In this experiment rats were given just enough escape training one day to insure running from start box to goal box on the first trial the next day.

Method

The apparatus was the masochism alley described by Brown, Martin, & Morrow (1964). It consists of a duplex start box, a 6-ft alley, and a large goal box. Start box and alley are painted gray; the goal box is black. The experiment was run in two replications which differed only with respect to the use of an intermittent buzzer beginning 7 sec before the floor of the upper level of the start box dropped depositing the rat on the grid floor in the lower half of the start box. This variable had no effect on escape performance, so the two replications were combined.

The Ss were handled for two days. On the third day the escape response was shaped by: (1) two trials with start box connected directly to goal box; (2) three trials with 2-ft segment between start and goal boxes; (3) three trials with 4-ft segment; (4) two trials with the full alley. Shock was 45 V for the first five trials and 50 V for the last five trials. Two Ss were discarded for difficulty in handling and one for experimental error during shaping prior to assignment of Ss to groups. The surviving Ss were 22 female hooded rats 81-85 days old when shaped. They were roughly matched in pairs on the basis of speed in running the first 4 ft of the alley on the last shaping trial, then one of each pair was randomly assigned to each group. On the next day, the control

group received 10 simple extinction trials in which no shock was given. The experimental Ss were given 10 trials in which a 55-V ac shock (through 10 K resistance) was present in the last 2 ft of the alley adjacent to the goal box. Because the animals were run in large squads the intertrial interval was variable although always at least 5 min.

Data were discarded for two control animals. One was shocked through error. The other S extinguished on the first test trial. If this animal had been assigned to the experimental group she would not have progressed far enough in the alley to receive the experimental treatment. Extinguishing on the first trial is more a retention failure than an effect of the control (nonpunished) procedure. However, Ss failing to enter the goal box within 60 sec on subsequent test trials were regarded as extinguished and a speed score of 0.1 ft/sec assigned on their remaining scheduled trials.

Results and Discussion

Speed curves based on the first 4 ft of the alley, shock-free for both groups on all test trials, are shown in Fig. 1. The mean speed on the first trial was almost exactly the same for the two groups. That it was a little more than 3 ft/sec indicates satisfactory retention from previous day of escape training. After rising slightly on the second trial, the curve for the nonpunished controls dropped to less than 2 ft/sec. Three of the nine animals extinguished. By contrast, the curve for the experi-

Fig. 1. Mean running speed in the shock-free portion of the alley during extinction for punished and nonpunished rats.

mental Ss rose to about 5 ft/sec. None of the punished animals extinguished. The difference between mean speeds on Trial 10 was reliable, $t=3.65$, $df=18$, $p<.01$.

These data indicate that the experimental animals learn to run faster in the shock-free portion of the runway. Speed in the 2-ft shock segment also increased over trials. Thus, the experimental Ss improved their running speed in both portions of the runway. One might argue that the animal runs faster before the shock to build up speed to traverse the shock zone with minimum delay. A second possibility is that the shock serves to condition fear which then functions as an acquired drive motivating faster running. These possibilities are not mutually exclusive.

Speculatively, these data suggest that self-punitive

behavior is learned during extinction. Failures to obtain self-punitive behavior (e.g., Seward, King, Chow, & Shiflett, 1965) may be due to procedures which attenuate the necessary conditions for such learning, whatever these may be.

References

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Note

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