Self-punitive locomotor behavior in the Mongolian gerbil

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This study was primarily a test of the generality of a behavioral phenomenon across species. Several investigations have shown that rats when punished for an aversively motivated response will maintain that response rather than abandon it. Similar treatments revealed that the Mongolian gerbil also showed such self-punitive behavior. Special characteristics of the gerbil were noted.

Punishment of an ongoing aversively motivated response may maintain, or even facilitate, performance (e.g., Brown, 1964; Melvin & Martin, 1966). A number of investigators have studied this “vicious-circle” phenomenon through the analysis of locomotor behavior in the rat (see Brown, 1969). In fact, rats of various strains have been used in such studies. Recently, however, the generality of behavioral principles derived by use of laboratory rats has been severely questioned (Lockard, 1968). While one may not agree with many of Lockard’s contentions, his article does emphasize the need for more studies that examine the generality of phenomena across species. In the present study treatment conditions of punishment-after-escape training were instituted during extinction of a runway response in an attempt to ascertain whether the gerbil species of the order Rodentia demonstrate “vicious-circle” behavior.

Gerbils differ from rats (especially laboratory rats) in many respects, e.g., their ecological niche, water intake, resistance to heat, type of habitat, and the discovery that a behavioral phenomenon found in rats is also shown by the gerbil would broaden the generality of that phenomenon significantly.

SUBJECTS AND APPARATUS

The Ss, 14 naïve male gerbils (Meriones unguiculatus) of the Tumblebrook strain, were 13-14 weeks old. All Ss were deprived of food for 23 h before training.

The apparatus was a straight runway, 82 in. long and 12 in. high. A guillotine door, 12 in. from one end, divided the runway into a startbox and an alley 70 in. in length. At the other end of the runway, a second guillotine door separated the goalbox from the alley. The goalbox was 12 x 18 x 13.5 in., painted black, and had a wooden floor and lid. In contrast, the startbox and alley were white, had floors consisting of ¾-in.-diam grid rods spaced ¾ in. apart, and had lids of Plexiglas.

Raising the doors turned on the shock and an electronic clock; this clock stopped and a second clock started when S interrupted a photobeam 7 in. outside the startbox. The second clock stopped when S broke a photobeam at the entrance of the goalbox, thus measuring alley time to the nearest .01 sec.

PROCEDURE

Shock-escape training consisted of eight shaping trials followed by 35 acquisition trials. During shaping S was placed onto the grid at successive distances of 1.5, 3.0, 4.5, and 6 ft from the goalbox. Each gerbil was given two trials for each distance. Between each trial S remained in the goalbox for approximately 30 sec. The intensity of the scrambled shock was 1.0 mA.

During acquisition S was placed in the startbox. The doors were then raised, turning on a 1.0-mA shock. When S entered the goalbox, the doors were lowered to prevent retracing, and S remained there for about 20 sec. The intertrial interval was approximately 30 sec.
RESULTS

The mean number of trials to extinction was 49.7 for Group P and 22.1 for Group NP. This large mean difference, however, only approached statistical significance (t = 1.81; .05 < p < .01). Similarly, the median number of trials to extinction was 36 for Group P and only 17 for Group NP, but a Mann-Whitney U test was nonsignificant (U = 12, P = .13). Two punished gerbils (Group P) were the only Ss that ran the limit of 100 trials.

Figure 1 shows the mean alley speed for each group over six blocks of five extinction trials. Clearly, the punished S ran faster than Ss given regular extinction (Group NP). Analysis of variance of these data revealed that the effect of extinction treatments was significant (F = 6.27; df = 1/12; p < .05). The effects of trials and the Trials by Punishment interaction were nonsignificant. Group P also exhibited higher speeds than Group NP during the initial phase of extinction, when most Ss were still running. A test of the mean difference between groups (raw scores were medians of alley speed for Trials 1-10) was significant (t = 7.85, p < .01).

In Group NP, the median speed of six Ss for Block 1 was greater than that on Block 10. This extinction effect was revealed to be significant by a Wilcoxon matched-pair signed-ranks test (t = 0; p < .05). An equivalent test for Group P was not significant, indicating that the response strength of the punished Ss was maintained by the punishment.

DISCUSSION

These data indicate that the vicious-circle phenomenon is not limited to the domestic rat. Self-punitive behavior in the rat: Facilitative effects of punishment on resistance to extinction. Journal of Comparative & Physiological Psychology, 1964, 57, 127-133.

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NOTE

1. All statistical tests are two-tailed.