Self-punitive behavior: One way to stop it[1]

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After rats had demonstrated reliable self-punitive behavior the introduction of an 18-min interval between massed trials resulted in rapid extinction of the response. Another punished group which was not delayed continued to perform the response which resulted in punishment, while a nonpunished group showed significantly less resistance to extinction and stopped responding in very few trials. The 18-min interval was assumed to have reduced drive level by lowering residual emotionality. These results are consistent with the Mowrer-Brown theoretical explanation of self-punitive behavior.

Programmatic research on self-punitive, or vicious-circle, behavior has pivoted around the search for optimal conditions for production of the phenomenon and tests of different theoretical explanations (Brown, Martin, & Morrow, 1964; Martin & Melvin, 1964; Melvin & Martin, 1966). (For a review of the literature, see Brown, in press.)

The Mowrer-Brown theoretical explanation of the phenomenon has received the greatest amount of support. Within the framework of this explanation a S encounters punishment because a high level of drive energizes the response of running; the punishment encountered maintains the drive level; and the response of running is reinforced when the S escapes the punishment. Fear, conditioned to the cues of the apparatus during acquisition of the instrumental response and maintained by the punishment, is one contributor to the drive level. The punishment also contributes to the level of drive. The aftereffects of the punishment, residual emotionality (re), are assumed to provide a temporal source of drive.

In the present study we attempted to stop self-punitive behavior after it was manifested. In an attempt to reduce drive level, residual emotionality was lowered (see Siegel & Siegel, 1951). Since the aftereffects of a noxious stimulus are temporal, the method involved simply the insertion of a delay period during the punishment phase at a point (after 20 trials) which had been shown to be sufficient to insure the production of the phenomenon. The choice of the amount of delay sufficient to allow dissipation of residual emotionality was based on data from an earlier study by Melvin, Martin, & Parsons (1965) in which an 18-min delay had been found effective in reducing the resistance to extinction of a runway shock-escape response.

SUBJECTS

The 44 Ss were naive, male Sprague-Dawley rats, weighing between 120 and 150 g, obtained from Dublin Laboratories. The Ss were housed in individual cages and fed 12-14 g of lab chow per day, with water available ad lib.

APPARATUS

The apparatus was a straight runway, divided into a start box (12 x 12 x 8 in.), alley (72 x 12 x 8 in.), and goal box (12 x 12 x 12 in.) by two guillotine doors. The start box and alley were painted off-white and had a grid-rod floor (¼-in. rods, ½ in. apart) through which constant current shock could be delivered from a Foringer shock source. The tops of the start box and alley were hinged, transparent Plexiglas. The goal box had a wooden floor and top, and was painted flat black. The goal box was dimly illuminated by two 26 V, red light bulbs. A 2 x 8-in. one-way mirror in the top of the goal box enabled the E to observe the S.

Photocells, located 6 in. from the ends of the alley, and associated switches and electronic equipment were used to measure start and alley times to the nearest .01 sec. Start time was measured as the time elapsing between opening of the start box door and interruption of the first photobeam. Alley time was the amount of time from interruption of the first photobeam to interruption of the second.

PROCEDURE

Acquisition

All Ss were given 32 shock-escape (1 mA) training trials after four shaping trials. During escape training both start and alley time were measured. The intertrial interval was approximately 30 sec.

Punishment-Extinction

Immediately after escape training S was designated to receive one of four conditions, on a random basis: Punishment with No-Delay, (VC-No-Delay), Punishment with Delay (VC-Delay), Regular Extinction with No-Delay (RE-No-Delay), or Regular Extinction with Delay (RE-Delay). Under a Punishment condition if S left the start box he encountered 18 in. of electrified grid in the alley just in front of the start box. Shock was not present in the start box or any other part of the apparatus. If the S was in a Regular Extinction condition no shock was delivered in any portion of the apparatus. A Delay condition meant that after the 20th trial S was taken back to his home cage and kept there for 18 min. During the 18 min E remained outside the colony room to prevent distracting events which might possibly frighten the Ss in the colony. At the end of 18 min E took S back into the laboratory and resumed the extinction procedure. All Ss were given 100 extinction trials unless they met a criterion of extinction (failure to enter the goal box within 60 sec). If S met the extinction criterion he was given no more trials and arbitrary scores of 60 sec were entered for his remaining trials. The number of Ss per group were: VC-Delay, 10; VC-No-Delay, 9; RE-No-Delay, 10; RE-Delay, 15.

Resistance to extinction was so rapid for nonpunished Ss that the designation "RE-Delay" became meaningless, because a delay interval could not be given to a S on his 20th trial if he quit running on the eighth trial. Only three Ss of the 15 in the group ran to the 20th trial. The data reported here are from the other three groups. To assess the effect of a delay on nonpunished extinction performance the interval will have to be inserted earlier in extinction.

RESULTS

Mean number of responses to extinction for each group is shown in Fig. 1. It may be seen that the VC-No Delay group was most resistant to extinction, followed by the VC-Delay group

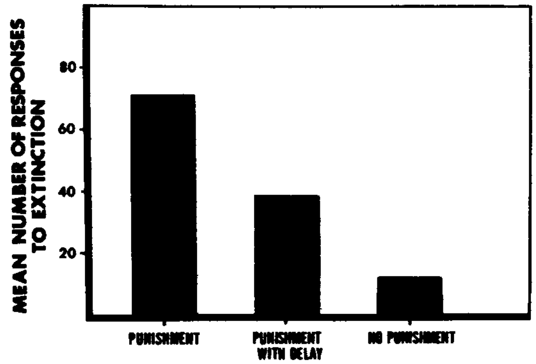

Fig. 1

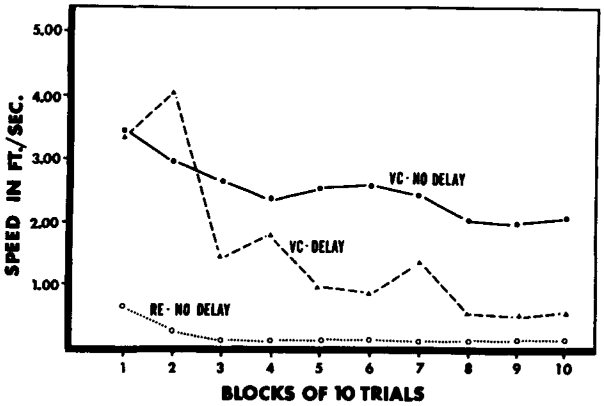

Fig. 2

and the RE-No Delay group. It should be noted that the effects of the delay on the punished group are represented by the number of responses above 20 since the delay was inserted after they completed 20 trials. The differences between groups were shown to be statistically significant ($F = 41.35$, $df = 2/28$, $p < .001$). The difference between the two punished groups was also statistically significant ($t = 3.48$, $df = 28$, $p < .01$), as was the difference between either punished group compared with the nonpunished group (VC-Delay $t = 3.87$, $df = 28$, $p < .01$; VC-No Delay $t = 7.35$, $df = 28$, $p < .01$).

Mean alley speed in ft/sec for all three groups across 10 blocks of 10 extinction trials each is shown in Fig. 2. It may be seen that both punished groups initially ran faster than the nonpunished group, and that the speed of the VC-Delay group decreased markedly after the delay (the second block of 10 trials). Analysis of variance of these data showed a significant Punishment effect ($F = 8.71$, $df = 2/26$, $p < .005$). Trials ($F = 24.08$, $df = 9/234$, $p < .001$), and Trials by Punishment effect ($F = 10.46$, $df = 18/234$, $p < .001$). The difference between the VS-Delay and VC-No Delay groups after the second block of 10 trials was statistically significant ($t = 405.1$, $df = 234$, $p < .001$).

The same relationships among the groups were also obtained with the start-speed measures, and these differences were also found to be statistically significant.

DISCUSSION

Once again, punishment of an instrumental, aversively-motivated response produced increased resistance to extinction, supporting the results obtained in other, similar studies (Brown, in press).

The effect of the interposed-delay interval of 18 min was a drastic reduction in resistance to extinction of Ss that had already indicated that they were trapped in the vicious circle of self-punishment. This effect provides further support for the contention that drive level is important in maintaining self-punitive behavior and that residual emotionality can be an important source of drive, especially under massed trial conditions. The above interpretation is consistent with the Mowrer-Brown theoretical explanation of self-punitive behavior, and thus provides further support for it.

It should be noted that these data might also fit an associative explanation. Interposing a longer-than-usual intertrial interval could significantly weaken the power of the stimulus complex by removing such aftereffect stimuli from the stimulus complex. One type of study which would support the motivational explanation, as opposed to the associative one, would be one in which some irrelevant source of drive (such as extreme temperature deviation) was introduced during the delay period. Such a manipulation should result in continued self-punitive behavior while Ss that did not receive such stimulation should show decreased resistance to extinction.

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NOTES

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Editorial Note

Beginning with this issue, two related changes in the production of this journal are being made. Articles averaging one and one-half pages are being combined so that they take up a total of three pages rather than four. This reduces the physical size of the journal and cuts printing costs considerably without affecting the content or length of articles.

The frequency of publication is also being changed from three times a month to twice a month. This is possible because of reduction in the number of pages and of other changes in printing facilities and still further reduces costs of printing and mailing the journal.

The slight inconvenience to readers of these two changes, we believe, is more than offset by the gain in efficiency.

Henceforth a volume will consist of six issues published each quarter. The size of the volumes will vary somewhat because of seasonal variation in the receipt of manuscripts, but the total number of articles published in a year will remain the same.

Editor