Occurrence of the partial reinforcement extinction effect after only one NRNR sequence of trials¹

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Evidence is presented which demonstrates that the partial reinforcement extinction effect occurs reliably after only one NRNR sequence of trials which is preceded by a series of continuously rewarded trials.

Surridge, Rashotte, & Amsel (1967) report an experiment in which they failed to observe the partial reinforcement extinction effect (PREE) after only one NRNR sequence of trials which was preceded by a series of continuously rewarded trials.

Since no extant theory leads to the prediction of a strong PREE after only two NR transitions, certainly the most optimal conditions should be arranged to detect its occurrence. Assume, for example, that the PREE is due to the conditioning of nonreward produced stimuli (S^N) to the instrumental response (Capaldi, 1966a). If S^N attenuates over time as suggested by Bowen & Strickert (1966), then distributed training should weaken usual extinction effects. It is also a well confirmed finding that long nonrewarded confinement durations during extinction generate slower running than short confinements (e.g., Capaldi, 1966b). Subtle extinction effects may well be destroyed by such procedures.

Since Surridge et al used a 25-30 min intertrial interval (ITI) and a 90 sec extinction confinement, and since the reliable occurrence of the PREE after only a few partial reinforcement training trials would have considerable theoretical significance, E felt that a similar study using massed trials and a short extinction confinement should be done before accepting the null hypothesis.

Method

The Ss were 25 naive Wistar strain albino rats about 90 days old at the beginning of training. Three Ss were eliminated (two for whirling disease, one for viciousness), leaving 22 which participated in the experiment. The apparatus was a standard Model 380 Hunter small animal runway. The alley was 33.5 in. in overall length and running times over the middle 18 in. were measured.

The Ss were maintained on a 23 h food deprivation schedule for 14 days. For the first 10 days, Ss were handled and tamed. There was no feeding during handling. On Days 11 and 12, Ss were allowed to explore the apparatus in groups of four for 15 min each. On Days 13 and 14, each S was placed directly into the goalbox and allowed to eat three 97 mg Noyes pellets.

Day 1 of acquisition began on the fifteenth day.

All Ss received four acquisition trials per day for

nine days. Group C received continuous reward throughout acquisition training. Group P received continuous reward through Day 8, and then two rewards and two nonrewards in an NRNR sequence on Day 9. The reward was three 97 mg Noyes pellets. Nonreward was 15 sec confinement in the unbaited goalbox. All Ss received 13 nonrewarded trials on Day 10. Only the last 12 were classed as extinction trials. All ITIs within days were 15 sec.

Results and Discussion

The time data were converted to logarithms. Figure 1 presents terminal acquisition levels (means for Day 9) and extinction curves. The mean log running times for Days 9 and 10 were, respectively, for Group C, .20 and .52, and for Group P .22 and .43. Analysis of variance of these data yielded a significant days effect ($F=131$, $df=1/20$, $p<.001$) and a significant days by groups interaction ($F=5.73$, $df=1/20$, $p<.05$). Orthogonal comparisons revealed that the groups did not differ on Day 9 ($F=.42$, $df=1/20$), but that Group P ran significantly faster than Group C on Day 10 ($F=7.51$, $df=1/20$, $p<.02$); i.e., the PREE obtained.

The present results, then, support the aftereffects hypothesis (Capaldi, 1966a) and tend to confirm McCain's (1966) finding that the PREE occurs reliably following a small number of NR transitions. The results appear to be damaging to the frustration hypothesis (Amsel, 1962) which would seem to require more partially rewarded training trials than were given in the present study in order to account for the PREE.

Fig. 1. Terminal acquisition running times and extinction curves.

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Note

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