Resistance to extinction after continuous and partial reinforcement in basenji puppies[1]

W. EDWARD BACON AND WALTER C. STANLEY
NATIONAL INSTITUTE OF MENTAL HEALTH

Eighteen basenji puppies each received 3 pretraining, 36 training, and 30 extinction trials, 1 trial per day, in a right-turn alleyway. Nine Ss had a 100% reinforcement schedule during pretraining and training, 9 had 100% during pretraining and 50% during training. The reinforcer was 1 min. of exposure to a passive person. A statistically significant decrement in start, running, and goal speed occurred during extinction, as expected. But, unexpectedly, resistance to extinction was unaffected by schedule of reinforcement.

Previous findings have indicated that a passive person functions as a positive reinforcer in the young dog. Basenji puppies exhibited orderly increases in running speed when contact with a passive person was contingent upon running to the person (Stanley & Elliot, 1962). Shetland sheep dogs achieved higher terminal running speeds with a passive person reinforcer under a high deprivation condition than under a low deprivation condition (Bacon & Stanley, 1963). Presence, absence, and reintroduction of a passive person produced, respectively, the acquisition, extinction, and reacquisition of a running response in Shetland sheep dogs (Stanley, Morris, & Trattner, 1965) and isolated beagles (Stanley, 1965). Thus, the passive person reinforcer affects canine behavior in ways consistent with the control exerted by, e.g., a food reinforcer in rats.

The purpose of this study was to extend our knowledge concerning the passive person reinforcer. First, basenji puppies were used as Ss because this breed had not been previously studied during extinction after training with a passive person reinforcer. Second, half the Ss were trained with an intermittent or partial reinforcement schedule. Partial reinforcement schedules usually produce greater resistance to extinction than 100% schedules. This phenomenon, generally termed the partial reinforcement effect (PRE), has been demonstrated in a variety of species, both vertebrate (Lewis, 1960) and invertebrate (Wyers, Peeke, & Herz, 1964), and with various reinforcers both consumable and nonconsumable (Lewis, 1960).

Method

The Ss were nine male and nine female purebred basenjis from stock of The Jackson Laboratory and were 52 days of age at the start of the experiment. They had been weaned between 31-35 days of age, and were housed six pups per large indoor pen. Feeding came 4 hr. before and 2 hr. after each daily experimental session. Caretaking was done by personnel other than E.

The apparatus was a right-turn L-alleyway, open at the top. The long arm of the L was 212 in. long. Attached to it was a short arm, 60 in. long. The floor was gray plywood, 24 in. wide, and the walls were framed white cloth 32 in. high. Attached to the other end of the long arm was an enclosed gray start box, 32 in. long, 24 in. wide, and 22 in. high, the floor of which was sufficiently depressible by S's weight to operate a switch. The start box door was hinged at the top and opened out into the alleyway. A gray wooden guillotine door was located 146 in. from the start box door and prevented S from leaving the end of the long arm which together with the short arm served as the goal box.

Three automatically controlled 0.1 sec. Standard Electric timers provided three measures of Ss' performance, defined by the location of controlling switches in the apparatus. Starting time was the time between E's opening the start box door and S's entry into the alley, alley running time was the time between S's entry into the alley and its breaking the first photoelectric beam 176 in. from the start box door, and goal running time was the time between S's breaking the first beam and its breaking the second beam 36 in. from the end wall of the goal box.

Three Ss in each pen were randomly assigned to the 100% reinforcement (C) condition, the remaining three Ss, to the 50% reinforcement (P) condition. Throughout the experiment, each S received one trial per day. In the pretraining phase (three trials), all Ss were run under the C condition and accustomed to running by being started progressively farther away from the goal box In the training phase (36 trials), the C Ss received 1 min. of exposure per trial in the goal box to E, as described by Bacon & Stanley (1963). The E, wearing a white "lab" coat, sat with his back against the end wall and his body extending into the goal box about 30 in. The P Ss received 1 min. of such exposure on 50% of the trials and 1 min. of confinement in an empty goal box on remaining trials. Reinforced trials for the P condition were assigned randomly with the following restrictions: (a) the first and last training trials were reinforced, and (b) no more than three reinforced or nonreinforced trials occurred in succession.

Details were as follows: The S was placed in the start box and approximately 10 sec. later the start box door was opened. If S failed to interrupt the second photoelectric beam within 2 min. after passing through the first photoelectric beam, the trial was terminated and 120 sec. was recorded as goal running time. This was necessary on a total of only six trials (four different Ss) and only during the early training trials.

In the extinction phase (30 trials), the same procedure

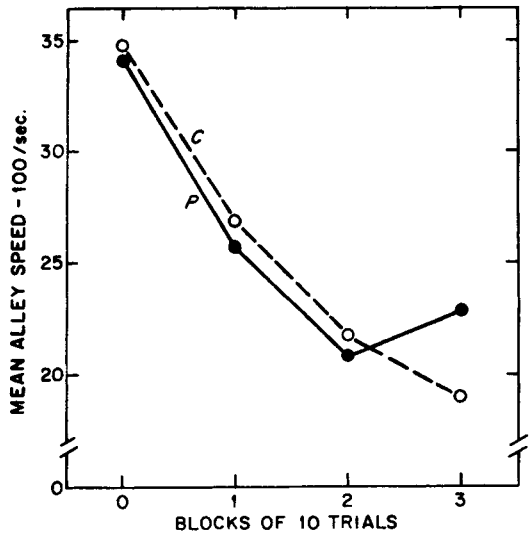

Fig. 1. Mean alley running speed during the last 10 training trials (0) and during blocks of 10 extinction trials (1-3) for the continuous (C) and partial (P) reinforcement groups.

as described for training was followed except the goal box was empty on all trials for both the P and C groups.

Results and Discussion

All time measures were converted to relative speed scores—100/time in sec. Starting, alley running, and goal running speeds were analyzed separately by appropriate analyses of variance. Analyses of the pretraining response speeds showed no significant main effects or interaction of housing (three pens) and reinforcement schedule assignment (ps > .10), indicating that Ss were not fortuitously housed or assigned to treatment in a biased manner.

To assess improvement in training performance, means over blocks of six trials for each speed measure were taken for each S. Separate analyses of variance were carried out on each speed measure to determine any main or interactive effects of trial blocks (T), reinforcer schedule (R), and housing (H). In each analysis only the T condition proved significant (ps > .001). Start, running, and goal speed means increased over trial blocks but neither their terminal levels nor rates of increase were differentially affected by R or H. Schedule of reinforcement thus had no reliable effect on the Ss' performance in the alleyway during training.

To assess decline in extinction performance, four means were computed for each S on each measure, one mean per block of 10 extinction trials and one mean for the last 10 training trials. Analyses of variance similar to those carried out on the training data indicated that only the T effect was significant ($p > .001$) for each speed measure. All other effects were statistically nonsignificant (ps > .10).

All three speed measures yielded the same general result graphically and statistically. Figure 1 portrays this result for the alley running speed measure. First, the permanent omission of the passive person reinforcer brought about the usual extinction effect—a decline in performance. These data confirm and extend previous findings on extinction in the young dog (Stanley, Morris, & Trattner, 1965; Stanley, 1965). Second, no discernible PRE occurred. The P and C groups showed equal resistance to extinction. Whether this failure is due to species, breed, age, nature of reinforcer, or procedure is not clear. It should be noted, however, that more recent unpublished data indicate that basenjis run more slowly than other breeds (e.g., Shetland sheep dogs, terrier X beagle hybrids) with a passive person reinforcer. This finding suggests that in basenjis the passive person reinforcer may be functionally equivalent to a small amount of food reward in rats. Hulse (1958) and Wagner (1961) have shown that the PRE is greatly reduced if not eliminated with small amounts of food reward.

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Note

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