

doses very much larger than those used in this study were administered (Longo, 1966). Thus it seems possible to differentiate the cardiac from the hippocampal effects of septal stimulation. Figure 2A clearly indicates that HR slowing was evident before any EEG changes occurred, and that the deceleration may even take place without any concomitant changes in hippocampal activity.

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NOTE

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The effect of prior rewarded goal box placements on incentive reduction behavior¹

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Two groups of rats received 92 preacquisition rewarded goalbox placements or 92 preacquisition handling trials. These were followed by 24 large-reward trials for both groups. In a third phase (incentive reduction) all Ss received 16 small-reward trials. The results indicated greater disruption of performance during the incentive-reduction phase for the group receiving the preacquisition placements. The greatest disruption of performance was noted in the start measure. Possible interpretations are offered.

A recent study by Davis & North (1968) was concerned with the effect of number of large-reward trials given before an incentive-reduction phase. The results indicated that

Ss given a large number of such trials showed a greater disruption in performance, especially in start speeds, during incentive reduction than a group receiving a small number of large-reward trials before the reduction of incentive. One possible explanation for these results stems from frustration theory (Amsel, 1958; Spence, 1960), and more specifically the assumption that strength of conditioning of r_g-s_g during acquisition increases with increase in the number of rewards at the goal. Consequently, one would expect greater elicitation of frustration during incentive reduction for the group receiving the large number of preshift trials. Similarly, it would be expected that r_g-s_g would be more strongly conditioned for a group of Ss receiving a series of preacquisition rewarded goal-box placements as compared with a group receiving a series of nonrewarded handling trials before acquisition. If the number of acquisition trials preceding incentive reduction is equated for both

groups, then incentive-reduction behavior should be more disrupted for the group receiving the preacquisition goal-box placements. The present experiment was designed to test this prediction.

SUBJECTS

Twenty-four male, albino rats purchased from the Holtzman Company, Madison, Wis., served as Ss. The Ss were approximately 90 days old at the beginning of the experiment. All Ss were housed in individual cages with water continuously available. During the experiment the Ss were maintained on a daily deprivation schedule consisting of 12-14 g of Purina Lab Chow per S. All Ss were fed 15-30 min after the completion of the daily experimental session.

APPARATUS

The apparatus (more fully described in Davis & North, 1967) was a single 4-ft 10-in. straight runway having a white start box and black run section and goal box. Photocells located 8 in., 14 in., 32 in., and 40 in. beyond the start door yielded start, two run, and goal times on standard electric timers. The total time from the raising of the start door to the breaking of the last photobeam in the goal box was shown on a fifth timer.

PROCEDURE

Following 1 week of experience with the deprivation schedule, all Ss received an 8-day pretraining phase. Pretraining consisted of handling and taming, habituation to the reward pellets in a neutral box, and habituation to the unbaited apparatus in groups of three and singly. At the end of the pretraining phase the Ss were randomly assigned to two equal groups (P and H). Ss in Group P received 92 direct, large-reward (15 45-mg Noyes pellets) goal-box placements, followed by 24 large-reward runs. Ss in Group H received 92 nonreward handling trials, followed by 24 large-reward runs. A handling trial consisted of placing S into a cardboard box (12 x 12 x 12 in.) for 15 sec and then returning him to his home cage. Following the 24 large-reward runs both groups received 16 small-reward (1 45-mg Noyes pellet) runs. Trials were administered at the rate of four trials per day during the handling/placement phase, and at the rate of one trial per day during the last two phases. The daily order for running Ss was completely randomized. On all trials Ss were removed from the apparatus as soon as the last piece of food was taken into the mouth.

RESULTS

Figure 1 shows mean start, run (24-in. section), and goal speeds over blocks of two trials at terminal acquisition (TA) and during the incentive-reduction phase. A trend analysis of variance was performed for each of these measures with the following results being obtained. The trials factor was significant for the goal measure ($F = 4.48$,

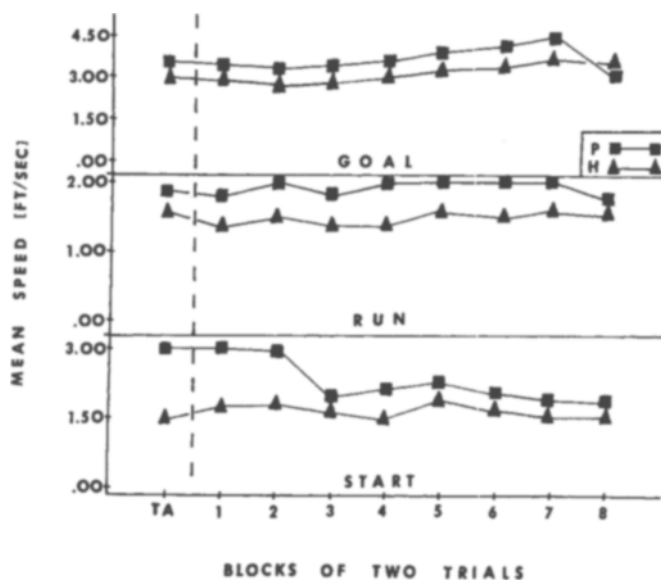


Fig. 1. Mean speeds at terminal acquisition (TA) and during incentive reduction.

$df = 8/176$, $p < .01$). The groups factor ($F = 4.68$, $df = 1/22$, $p < .05$), trials factor ($F = 2.21$, $df = 8/176$, $p < .01$), and Groups by Trials interaction ($F = 2.70$, $df = 8/176$, $p < .01$) were significant for the start measure. No other significant differences were obtained.

DISCUSSION

Figure 1 shows that Group P had faster mean TA start speeds than did Group H, but only slightly (if at all) faster run or goal speeds. Such a finding would be expected if incentive motivation at the goal approached asymptote more quickly than near the start (because of gradual generalization of r_g to runway segments remote from the goal).

The failure of incentive reduction to significantly disrupt run and goal speeds was paralleled in the earlier study by Davis & North (1968). On the other hand, strong disruptive effects on these speeds are usually observed following incentive withdrawal (extinction). Why the difference? Probably incentive reduction, even to 1/15 of the former magnitude, is considerably less frustrating than is incentive withdrawal. The notion, admittedly speculative, is that the

degree of frustration is a positively accelerated increasing function of the amount by which incentive magnitude is reduced.

It is interesting to note that recent studies (Ludvigson & Gay, 1966, 1967) in the area of differential conditioning have also obtained stronger effects at the start than at the goal area. These studies have shown that responding to an S- (lesser of two rewards) is depressed relative to that of a control group receiving the same lesser reward on both stimuli, and further that the amount of S- depression increases with an increase in the magnitude of the S+ reward. Frustration theory has been extended to account for these findings and makes use of the notion of a generalized or intermediate r_g which occurs in the S- situation. Frustration occurs upon the receipt of the S- reward (i.e., a smaller r_g than the generalized or intermediate value).

Due to stronger conditioning of r_g -S_g in the goal box, the prediction of the greatest disruption in performance in the goal measure can also be made in this situation. However, the greatest disruption consis-

tently occurs in the start measure. Ludvigson & Gay (1967) suggest that upon the presentation of the cues that elicit frustration there is a strong frustration reaction which rapidly dissipates. In their study such a cue was experienced at or near the start box whenever the S- occurred; in the present study near the start box also, presumably after frustration had generalized to the start box region. In incentive-reduction studies such a mechanism would result in an early transitory disruption of goal speeds and a later, more prolonged, and perhaps larger disruption of start speeds. The results of the present study would appear to be in agreement with this type of interpretation, except that no substantial disruption was observed at the goal. The lack of a significant disruption in the goal measure does not necessarily preclude this interpretation. It may simply indicate that under the present conditions frustration dissipates very rapidly at or near the goal, but less rapidly near the start. Possibly this difference is attributable to the fact that the response near the goal (unlike at the start) is preceded by an approach sequence and is more proximate to at least some reward. Obviously, more research is called for in this area.

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NOTE

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