Adaptation to the conditioning chamber in multi-session avoidance learning¹

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To assess the effect of adaptation upon avoidance learning, hooded rats were given 10 avoidance conditioning trials daily either following 20 min. adaptation to the apparatus, or prior to being retained 20 min. in the apparatus, or without any adaptation. A significant days and treatment interaction suggests that adaptation occurring prior to avoidance conditioning facilitates performance. Subsequent pre-trials exposure suppresses responding due to the fear-inducing properties of apparatus cues.

The drive related properties of the paired presentation of the CS-UCS series in avoidance conditioning has been emphasized by various investigators (Mowrer, 1947; Miller, 1948; Solomon & Wynne, 1954). A recent study by Black et al (1964) on the adaptation and habituation of heart rate to handling in the rat showed that handling produced a marked acceleration in heart rate which dissipated in a negatively accelerated fashion over 3 hr. The results of the study indicate a background level of arousal against which the CS-UCS pairings are presented. That the level of arousal induced by handling may influence Ss performance in an avoidance conditioning task is suggested by the results of a study by Zerbolio et al (1964) wherein it was shown that superior conditioning of a wheel-turn response occurred if Ss were given a 30-min. rather than a 5-min. pre-session habituation period in the apparatus immediately prior to the experimental session. The present experiment was designed to examine the effect of adapting Ss to the avoidance conditioning chamber both prior to and following a daily series of conditioning trials.

Method

Thirty-six Long-Evans rats, 100-135 days of age, selected from the colony maintained at West Virginia University Animal Behavior Laboratory were randomly assigned to three experimental treatments. Each S received 10 avoidance conditioning trials per day over five consecutive days for a total of 50 trials. The Ss in a pre-trial adaptation group were confined in the shuttlebox for 20 min. prior to each day's conditioning trials while Ss in a post-trial adaptation group were confined for 20 min. following the 10 trials. A control group of Ss were placed in the shuttlebox, tested for 10 trials, and removed immediately.

The Ss were tested in four identical Miller-Mowrer type shuttleboxes 30 in. long, 10-1/2 in. wide, and 6 in. high. A light source, producing a 10 ft. candle change in illumination at the grid, projected through two flashed opal panels of glass in the ceiling at the

ends of the boxes served as the CS. The UCS was a scrambled shock source adjusted to produce a dependable running response. The intertrial interval, measured from the beginning of one trial to the beginning of the next trial averaged 1 min. An avoidance response was recorded if the S crossed the mid-point of the shuttlebox within a 5 sec. CS-UCS interval.

Results and Discussion

The results are shown graphically in Fig. 1. The difference in mean number of avoidance responses between the control group and the post-trial adaptation group was not significant.

The 20-min. pre-trial exposure resulted in a lowered average performance when compared with the other groups combined ($F=4.26$, $df=1/33$, $p<.05$). A significant day's linear by treatment ($F=4.26$, $df=1/132$, $p<.05$), and a significant day's quadratic by treatment ($F=6.31$, $df=1/132$, $p<.05$) reflect the fact that pre-trial adaptation had a facilitating effect on day one while the same treatment resulted in a lower rate of avoidance acquisition for the successive four days. The difference in mean avoidances on day one between the pre-trial confinement group and the other groups combined, however, was not significant ($t=1.29$, $p<.15$).

The significant interaction of treatment and sessions indicates that pre-trial adaptations has a differential effect depending on whether confinement in the conditioning chamber occurs prior to or subsequent to conditioning trials. The facilitative effect of pre-trial adaptation on day one is in agreement with the results

Fig. 1. Mean avoidance responses for pre-trial and post-trial adaptation and controls.

obtained by Zerbolio et al (1964) and suggests that the motivational or emotional effects of handling demonstrated by Black et al (1964) interferes with the acquisition of an avoidance response. On days two through five the 20 min. pre-trial confinement period occurred following ten conditioning trials on the previous day. It would appear that rather than an adaptation effect the pre-trial confinement resulted in a higher level of arousal presumably through the conditioning of fear responses to apparatus cues. An investigation of changes in heart rate under the conditions of the present experiment is now being conducted in our laboratory.

References

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Note

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