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NOTE

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Failure of visual generalization following auditory avoidance training

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Following avoidance training to an auditory stimulus (buzzer), Ss received generalization testing to changes in a background visual cue (light). Results suggested that changes in avoidance behavior due to the presence of light were related to the aversive properties of light rather than to a generalization phenomenon. It was concluded that light may be an irrelevant stimulus, particularly in an avoidance situation and in the presence of a strong CS, such as a buzzer.

Generalization testing to changes in background cues has been demonstrated on several occasions. Changes in light, tone, stimulus size, and other background cues have been shown to produce decrements in both approach (Fink & Patton, 1953; Healey, 1965) and avoidance (Desiderato et al, 1966) behavior. But some studies were not able to demonstrate this phenomenon. Hearst (1965) demonstrated that lever pressing in an avoidance situation was unaffected by the presence or absence of a light. Ferster (1951) was unable to demonstrate generalization to a light cue, using a lever-pressing-approach response. It was the purpose of this study to examine the generalization gradient to changes in a visual background cue of an avoidance situation where sound was the CS. Since generalization is often greater at some acquisition levels than at others, the number of training trials was included as a parameter.

SUBJECTS AND APPARATUS

The Ss were 50 male Sprague-Dawley-Wistar rats, weighing 200-250 g. The apparatus was a

22 x 10 x 6 in. shuttlebox, painted flat black except for a 6 x 1/2 in. observation window. A 4-in.-wide guillotine door divided the box into a grid-floor conditioning compartment and a smooth-floor escape compartment. The grid could be charged with 1.0 mA from a Grason-Stadler Model E1064GS shock apparatus. A 100-dB buzzer rested in the center of and immediately behind the shuttlebox. A potential light source of 120 W came from a 6-in. circular opening in the escape-compartment wall opposite the door. Light intensity could be regulated with a Variac. Background noise and light were provided by an overhead fan and a 6-W overhead bulb, respectively. The door, buzzer, and light were hand-operated. A standard electric clock that started with CS onset and stopped with CS termination measured response latency.

PROCEDURE

Four groups of 12 Ss received a 3-min exploration in both compartments. Immediately thereafter, the door was opened simultaneously with the presentation of a 4-sec buzzer CS, followed by and continuous with a 1-sec-on/1-sec-off UCS for a maximum of five shocks or until S escaped. The light stimulus was off during training trials. The intertrial interval averaged 30 sec, following which S was manually returned to the conditioning compartment. Ss were trained to one of four criteria: (a) until 2 out of the last 3 trials were avoidances, (b) 8 out of the last 10 trials were avoidances plus 10 additional training trials, (c) 8/10 criterion plus 30 additional trials, and (d) 8/10 criterion plus 60 trials. Generalization testing began 24 h later by placing S in the conditioning compartment

facing the door. Thirty seconds later, the door was opened simultaneously with the presentation of a continuous CS plus one of three light intensities (110 V, 55 V, 0 V). When S entered the escape compartment, the door was closed, CS and light were terminated, and the latency was noted. Thirty seconds later, S was returned to the conditioning compartment. A total of 18 such test trials were given to each S, 6 trials to each light intensity. Light intensity greater than 0 but less than 55 V was not included because a pilot study indicated that light of weaker intensity did not seem to have an effect on avoidance. The order of light intensities was random within blocks of three. If no response occurred within 30 sec of the test trial, CS and light were terminated, the door was closed, and S was handled for 3 sec before commencing the next intertrial interval of 30 sec.

In order to determine whether latency differences reflected differences in the noxious properties of varying light intensities rather than generalization, a control group was used. Eight Ss were trained to a 2/3 criterion with a buzzer CS and a continuous 110-V-light background cue. Testing was identical to that for the experimental groups.

RESULTS

The mean reciprocal latency to each light intensity for each S became the score unit employed in the analysis of variance. The mean reciprocal latency for each group is plotted as a function of the light intensity in Fig. 1. The reciprocal latency to the training background cue (0 V, no light) tended to increase with increasing training trials ($p < 0.1$) except for the 2/3 group, which had a greater reciprocal latency than the 8/10 + 10 group (although not statistically significant). The reciprocal latency of all groups, including the control group, tended to decrease with increasing light intensities ($p < .01$), but there was no significant interaction between the slopes.

Fig. 1. Mean reciprocal latencies to three light stimuli as a function of training criterion. Control group was trained with 110-V light to a 2/3 criterion.

DISCUSSION

Generalization to changes in a visual-background cue was not possible under the present circumstances. The control group indicated that the aversive quality of light caused the gradients in the experimental groups. Furthermore, generalization was no more apparent at low than at high acquisition levels. Had generalization existed, it would have manifested itself by a significant interaction of the experimental- and control-group slopes. In the presence of a buzzer CS, it seems that the addition of light during testing is an irrelevant stimulus in terms of generalization, yet relevant in

terms of producing aversion. These results are consistent with those of Hearst and Ferster. Fink and Patton's ability to demonstrate generalization to a light cue is probably related to the use of an approach response that tends to give steeper generalization gradients than do avoidance responses. Desiderato et al's demonstration of generalization to visual-background cues may be due to the use of a visual CS, relative to which changes in the visual-background cues may be significant.

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