The effect of handling habituation on the acquisition and retention of an avoidance response (Kamin effect) in rats

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Three groups of 10 rats were given handling habituation prior to training to a criterion of three total avoidance responses and tested for retention after 0, 1, or 24 h. Three other groups were not handled but were trained and tested in an identical fashion. Results indicated that handling habituation did not facilitate original learning, nor did it prevent a retention decrement at the 1-h interval, the Kamin effect.

The Kamin effect (1957), poorer performance in relearning of a partially learned avoidance response at intervals of 1-4 h compared to 0 or 24 h, has been hypothesized to be a result of the incubation of fear (Denny & Thomas, 1960; Denny & Ditchman, 1962). Treatments which reduce the overall level of fear should also reduce or prevent the Kamin effect. Handling habituation or gentling is frequently used to facilitate the acquisition of avoidance responses in rats by, apparently, reducing the level of fear and interfering responses (Lippman, Galosy, & Thompson, 1970). The present experiment was designed to test the hypotheses that habituation to handling will facilitate acquisition of an avoidance response and prevent the Kamin effect. One group of rats was given handling habituation prior to original handling and then tested for retention after 0, 1, or 24 h. A second group was given a minimal amount of handling prior to original training and tested at the same retention intervals.

METHOD

Subjects

The Ss were 60 male albino rats, 90-120 days of age, obtained from Sprague-Dawley, Madison, Wisconsin. The rats were housed 6 to a cage with ad lib food and water.

Apparatus

The apparatus was an automated shuttlebox, 91.4 cm long, 35.5 cm high, and 11.4 cm wide. The apparatus was painted flat black except for a 4-cm-wide Plexiglas window which ran the length of the box. The floor was of 0.3-cm brass rods, 1.7 cm center to center. Each half of the floor could be charged with a 1.0-mA dc current from a C. J. Applegate stimulator through a Grason-Stadler grid scrambler. A 65-dB buzzer was mounted at each end of the apparatus, and background noise was 55 dB. Three photocells, one in the center and one 17.5 cm on either side of the center, monitored the position of the animal and served to terminate buzzer and shock when the appropriate shuttling response was made. Electronic relay and timing equipment timed and sequenced all interstimulus and intertrial intervals. Response latencies were recorded on a BRS Foringer printout counter.

Procedure

The 60 animals were divided into two groups of 30. Group H, the handled group, received four daily handling sessions (with at least 2 h between sessions) for 3 days prior to original training. Handling consisted of being held in a white box and stroked 80 times from head to tail for 60 sec. The rat was returned to his home cage, and the procedure was repeated 5 min later. Group UH was left unhandled until training began.

All animals were trained to a criterion of three total avoidance responses and, after the appropriate delay interval, were given 30 retraining trials. All animals were given 5 min of habituation to the apparatus prior to training and 60 sec prior to retraining. A training trial consisted of the onset of the buzzer at the end of the apparatus closest to the rat, followed 5 sec later by the onset of shock. Both buzzer and shock remained on until the animal crossed the midline of the apparatus and were response-terminated. The rat could avoid shock by responding during the 5-sec CS-US interval. The intertrial interval was 60 sec.

Both Groups H and UH were divided randomly into three groups to be retrained after delays of 0 (actually 5 min), 1, or 24 h. The 0- and 1-h groups spent the retention period in a neutral box; the 24-h group spent the first 23 h in the home cage and were placed in the neutral box 1 h prior to retraining.

RESULTS AND DISCUSSION

The mean trials to criterion for original learning for the six groups are presented in Table 1. Analysis of these data by analysis of variance revealed no significant effect of either the time or handling variable ($F = 2.61$, $df = 1/54$, $p > .05$). Handling, as performed in this experiment, had no facilitating effect on the acquisition of an avoidance response.

The mean number of avoidance responses in relearning for the six groups are presented in Table 1. Analysis of variance of these data revealed no differences as a function of handling, nor was there an interaction of

Table 1
Mean Trials to Criterion in Original Learning and Mean Number of Avoidance Responses in Relearning for All Groups

	Retention Interval		
Group	0	1	24
	Mean Trials to Criterion in Learning		
Handled	13.9	18.6	20.0
Unhandled	17.2	15.5	15.2
	Mean Number of Avoidance Responses in Relearning		
Handled	25.8	15.8	20.2
Unhandled	24.9	16.0	20.5

handling with the retention interval (both $Fs < 1$). However, there was a significant effect of the retention interval ($F = 7.35$, $df = 1/52$, $p < .01$). Subsequent analysis by multiple t tests indicated that the 1-h retention group made significantly fewer avoidance responses in relearning than did the 0-h group ($p < .01$), and although making fewer responses than the 24-h group, this difference did not reach statistical significance ($.10 > p > .05$). In addition, the 0-h group made significantly more avoidance responses than did the 24-h group ($p < .05$). These results are similar to the typical results obtained in the Kamin effect design. Habituation to handling did not serve to eliminate the Kamin effect.

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