Fig. 2. Mean cumulative error function across 12 spatial SDR problems for combined D and K levels.

differences can be delineated that reflect or parallel interspecies taxonomic separation. In view of the promise shown by SDR methodology in the calibration of interspecies performance differences, as contrasted with most other behavioral tests, it appears advisable to proceed with

the isolation of the functions relating D and K to SDR measures, both within and across species.

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NOTE

1. Gossette, R. L., & Kaplan, B. Percent body weight loss in goldfish over extended deprivation intervals. Paper submitted for publication.

promises to be increasingly popular as a laboratory S (Walters, Pearl, & Rogers, 1963). The data obtained thus far indicate many differences between the rat and the gerbil, especially in shock-motivated tasks. For example, Walters, Pearl, and Rogers found the gerbil superior to the rat in acquisition of a discriminated avoidance response in the Skinner box, whereas Boice, Boice, & Dunham (1968) report shuttlebox performance for the gerbil that is inferior to that of the rat. Data for the rat (Moyer & Korn, 1964) indicate that shock intensity has a great effect on the acquisition of an avoidance response; low levels of shock are insufficient to motivate the S, but high levels of shock elicit responses that are incompatible with the appropriate avoidance response. Similar effects are probably true for the gerbil.

The unconditioned response of rats to shock is well documented; at low levels of shock rats flinch and at higher levels they make locomotor responses that mask the initial flinch response (Hoffman, Flesher, & Abplanalp, 1964; Kimble, 1955; Thompson & Enter, 1967; Trabasso & Thompson, 1962).

The present experiment investigated the effects of shock intensity on the unconditioned response to shock in gerbils. Because the gerbil's feet and tail are covered with hair, animals were tested both before and after the tail, scrotum, and feet were shaved.

SUBJECTS

The Ss were six male Mongolian gerbils (*Meriones unguiculatus*) approximately 70 days of age obtained from the Ridlow Pet Shop. The Ss were housed one to a cage on ad lib food and water.

Shock intensity and unconditioned responding in the gerbil*

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Six male gerbils were tested for their unconditioned response to shock (0.0-0.9 mA in 0.1-mA steps) before and after shaving the tail, feet, and scrotum. Results indicated that the gerbils were more sensitive after shaving than before. The Ss under both conditions made flinch responses at low intensities of shock, reaching a maximum of 0.1 mA and then declining. The Ss under both conditions showed an increase in locomotor responses from 0.0 mA to 0.9 mA. The response topographies for both the flinch and locomotor responses were similar to those of the rat (Trabasso & Thompson, 1962) but were displaced toward low shock intensities.

Fig. 1. Mean percent flinch and locomotor responses before and after shaving at each shock level.

*The authors wish to thank Bruce Whitehead for his help in statistical analysis.

Recently the gerbil has been introduced into the psychology laboratory and

Fig. 2. Mean percent run, prance, and jump responses at each shock level for unshaved Ss.

APPARATUS

The apparatus was a shuttlebox, 25 x 4 x 12 in. The floor of the box was of 1/8-in. brass rods, 1/2 in. center to center. Shock was provided by a C. J. Applegate stimulator (Model 250) and varied in 0.1-mA steps from 0.0 to 0.9 mA; a shock scrambler was not used. Shock duration of 1 sec was controlled by a timer and the 30-sec inter shock interval was timed by a stopwatch.

PROCEDURE

The procedure was identical to that of Trabasso & Thompson (1962). The S was placed in the apparatus for 5 min of habituation and then received two sessions of five shocks at each of the 10 shock levels, from 0.0 to 0.9 mA in a different random order for each session and for each S. Each S was tested before the feet, tail, and scrotum were shaved and 1 week after they were shaved.

Responses recorded were: no response—S made no visually detectable response to the shock; flinch—S made a startle response, no more than one paw leaving the grid; locomotor response—more than one paw left the grid. The locomotor response was further broken down into: jump, run, and prance—S running in place not advancing more than 1 or 2 in. These response classes are identical to those of Trabasso & Thompson (1962).

RESULTS AND DISCUSSION

Mean percentages of flinch and locomotor responses under the normal and shaved conditions are presented in Fig. 1. A separate analysis of variance was computed for flinch and locomotor responses using percentage of response at each S and with factors of shock intensity and shaved and unshaved. For the flinch

response there was significant effect of shock ($F = 23.37$, $df = 9/45$, $p < .01$) and shaving ($F = 32.12$, $df = 1/5$, $p < .01$) but no interaction. As is apparent from the figure, the flinch response reached a maximum under both conditions at 0.1 mA. For the unshaved Ss this response gradually declined over the higher shock levels, but for the shaved condition it dropped to 0% at 0.3 mA.

For the locomotor response there was a significant effect of shock ($F = 225.62$, $df = 9/45$, $p < .01$), shaving ($F = 116.54$, $df = 1/45$, $p < .01$), and the interaction of shock and shaving ($F = 10.44$, $df = 9/45$, $p < .01$). As can be seen from the figure, shaved gerbils responded with locomotor responses to lower levels of shock than did the unshaved gerbils, reaching 100% at 0.3 mA. Under the unshaved condition the gerbils increased in percent of locomotor responses, but at a slower rate, and did not reach 100% even at 0.9 mA. The interaction is apparently the result of the different slopes of the two response curves.

The mean percent response of the three response classes for unshaved (Fig. 2) and shaved (Fig. 3) gerbils were subjected to analysis of variance with factors of response class, shaving, and shock level. The percentages depicted in the figures do not add to 100% because it was possible for S to make more than one of the responses on any trial. All main effects and interactions were significant (responses, $F = 85.70$, $df = 2/10$; shaving, $F = 40.69$, $df = 1/5$; shock, $F = 58.83$, $df = 9/45$; Response by Shaving, $F = 141.65$, $df = 2/10$; Response by Shock, $F = 13.81$, $df = 18/90$; Shaving by Shock, $F = 3.37$, $df = 18/90$; and Response by Shaving by Shock, $F = 4.21$, $df = 18/90$; all $ps < .01$).

As can be seen in the figures, the shaved Ss responded more to lower levels of shock than did the unshaved Ss. For both shaved and unshaved Ss there was an increase over all shock levels of the run response and an increase and then decrease in prance response. However, for the unshaved Ss the jump response showed an increase over all shock levels, whereas under the unshaved condition, there was first an increase and then a decrease in the jump response. The source of the triple interaction is obvious from the two figures.

Compared to the data obtained on the rat in similar experiments (Trabasso & Thompson, 1962; Thompson & Enter, 1967), the gerbil is much more sensitive to shock. Rats show a peak at 0.3 mA for the flinch response, whereas gerbils reach a peak at 0.1 mA. The unshaved gerbil behaves more like the rat in terms of sensitivity than does the shaved gerbil. For locomotor responses the gerbil reaches a

Fig. 3. Mean percent run, prance, and jump responses at each shock level for shaved Ss.

100% level of response at 0.3 mA under the shaved condition and is at a 90% level at 0.6 mA under the unshaved condition; rats show a gradually increasing trend from 0.1 mA but do not reach 100% by the 0.9-mA level of shock.

Considering the three locomotor response classes, rats show an increase over all shock levels for all responses, with the prance response being the most frequent and the jump being the least frequent response. The topography of these responses is much different for the gerbils.

It would appear that the gerbil is much more sensitive to shock than is the rat and that shock intensities between 0.3 and 0.5 would be adequate in most experiments employing shock with the gerbil.

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