

Effects of Electro-Convulsive Shocks on Daily Activity of Albino Rats in Revolving Drums.

CALVIN P. STONE.

From the Department of Psychology, Stanford University.

Exploratory activity and rate of locomotion of rats in mazes and other learning situations falls off sharply if they are subjected to a series of electro-convulsive shocks.^{1,2} Their performances are characterized by delays in starting, frequent pauses, and lethargic movements. These observations suggest the desirability of further study of the voluntary activity of rats in non-learning situations such, for example, as the Slonaker-type of revolving drums. A preliminary study was undertaken with 6 adult females.

For the first 3 weeks no convulsive shocks were administered. During this time the animals had established characteristic trends of daily activity which, although variable from day to day, nevertheless seemed sufficiently stable to enable one to detect sudden deviations of large magnitude. At the beginning of the fourth week each rat received a convulsive shock daily for 5 days. This was followed by 5 days without shock, 5 days with daily shock, and so on, for 3 alternating periods of shock and no-shock, plus 2 additional post-shock periods.

To cause the convulsion, a 70-volt alternating current was applied to the rat's scalp over the forebrain for approximately .2 second through alligator-clip electrodes. The electrodes were fastened on the dorsal scalp approximately 6 mm apart and 1 cm behind an imaginary line between the eyes. The scalp was moistened with a salt solution where the clips were attached. Each convulsion had the characteristic features of a grand mal seizure, starting with vigorous tonic contractions and passing into the clonic phase after about 10 seconds. The total seizure lasted between 20 and 30 seconds. Immediately after the convulsion was over most

of the animals were hyposensitive to mild external stimuli for from 2 to 3 minutes. Then followed a short period of hypersensitivity, ushered in by startle reactions or milling about the cage when lightly stimulated by the experimenter or a cage mate. Occasionally during the hypersensitive stage an animal would attempt to bite the hand of the experimenter. The animals were replaced in the activity drum immediately after their shocks where they were free to sleep or to rotate the drum. Only one animal (No. 1) regularly revolved the drum soon after the convulsion, this occurring while she was in the hypersensitive stage.

In Fig. 1 are given the mean numbers of revolutions made by each animal during nine successive 5-day periods. The characteristic level of each rat's activity just prior to the first series of convulsions is shown in period 1. In periods 2 to 7 appear the means for alternating periods of shock and no-shock. Periods 8 and 9 show the gradual return to the pre-shock level of activity on the part of most of the rats.

As is apparent, the rats were much less active during the shock periods than during the no-shock periods. Reduction began in the first 24 hours after a convulsive shock and disappeared during the second day beyond the last shock. Rat No. 4, a relatively inactive animal, was an exception to this generalization, however. It ceased running almost altogether after its first period of electro-shocks and did not again become active during the 2 weeks beyond the last convulsion.

In this preliminary study we did not attempt to correlate changes in activity with possible disturbances of the estrus cycles. Nevertheless, the suddenness with which activity was depressed by the first convulsion clearly suggests that the primary reduction was due to some direct effect of the convul-

¹ Stainbrook, E. J., *J. Psychol.*, 1942, **13**, 337.

² Siegel, P. S., *J. Compar. Psychol.*, 1943, **36**, 61.

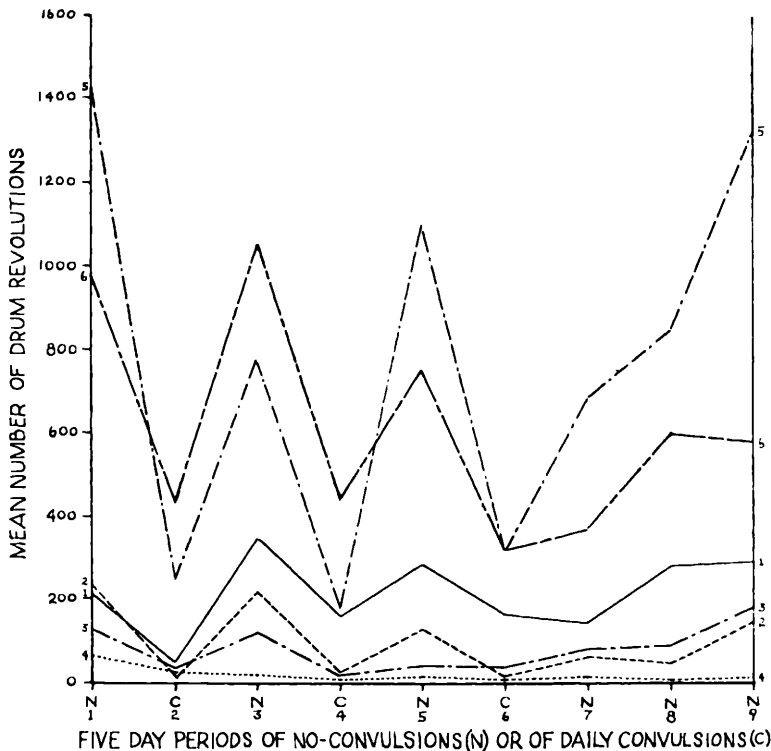


Fig. 1.

Activity records of 6 female rats. In periods 1, 3, 5, 7, 8, and 9 the usual conditions for rats in activity drums prevailed; whereas, in periods 2, 4, and 6 the rats received one electro-convulsive shock each day. Each rat's number is given on the left and right ordinate.

sive shock. Eventually, however, a disturbance of estrus might have been a contributing factor. Further studies on this and other aspects of the problem are in progress.

Conclusion. Electro-convulsive shocks in 6 female rats greatly reduced the amount of their voluntary activity for a short period

of time. The major change appears within the first 24 hours and disappears within 48 hours after the last convulsive shock is administered. Within a 2-week period following their last convulsion the majority of the animals closely approximated their pre-shock levels of daily activity.

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Changes in the Hydrogen Ion Concentration of Healing Fractures.

ORVAR SWENSON AND C. LLOYD CLAFF. (Introduced by E. C. Cutler.)

From the Laboratory for Surgical Research, Harvard Medical School, Boston, Mass.

The repair process involved in fracture healing is of great interest both from theoretical and practical standpoints. Repair of bone differs from soft tissue repair, in

that the process involves calcification and ossification. The morphological changes in fracture repair are well established and have recently been reviewed by Urist and Mc-