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Castration and Ovariectomy on Spontaneous Activity and Ability to Learn.*

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The present investigation is directed toward the establishment of the relationship between spontaneous activity and the ability to learn, with special reference to castration and ovariectomy, on these processes. This is a preliminary report of the first experiment undertaken to establish the relationship mentioned above.

Data were collected from 5 litters containing 35 rats under 50 days of age. The ability of each rat to learn was measured by means of a maze described by Rickey.[1] Spontaneous activity was determined by the revolving cage method described by Durrant.[2] Fifteen animals were operated in an attempt to modify their activity, while 20 were used as controls. Data were collected with reference to the number of trials required to learn the maze and the number of errors made in so doing. The learning time was recorded in seconds and the spontaneous activity in number of revolutions. Table I shows the data collected up to the present time. The figures presented under "activity" represent the average daily number of revolutions run over a period of 10 days.

The data in Table I reveal the fact that in case of litters 1 and 2, castration had no effect on either the learning process or spontaneous activity. They show also that in litter 4, the castrates had a distinct advantage over the normals in all parts of the experiment. In litters 3 and 5, just the reverse is true since the normals have the advantage.

TABLE I.

Litter	No. trials		No. errors		Time in sec.		Activity	
	Controls	Castrates	Controls	Castrates	Controls	Castrates	Controls	Castrates
1	18	20	40	35	484	478	2376	2191
2	15	15	67	53	741	748	2534	2586
3	14	14	43	61	360	556	2941	1952
4	25	11	52	30	436	273	2415	2935
5	11	15	29	45	347	473	2039	1232

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Although the data in Table I indicate that there is a relationship between spontaneous activity and learning, this point is shown to a better advantage in Table II. Here, in each litter the individual rats are ranked according to their speed in learning the maze. Opposite the learning rank is the rank of activity. For example, the rat in litter 1 which ranks first in learning is second in activity.

TABLE II.

Litter 1		Litter 2		Litter 3		Litter 4		Litter 5	
Learning	Activity	Learning	Activity	Learning	Activity	Learning	Activity	Learning	Activity
1	2	1	1	1	1	1	1	1	1
2	1	2	4	2	3	2	4	2	2
3	7	3	3	3	5	3	5	3	5
4	3	4	5	4	4	4	3	4	4
5	5	5	2	5	2	5	2	5	3
6	4	6	6			6	7	6	7
7	6					7	6	7	6

The data in Table II show that in every case, except litter 2, the animal which was the most adept in maze learning was the most active animal in his litter. Furthermore, it is seen that the animals which learned slowest were the less active, except in litter 3. In the intermediate groups 5 animals fall in the same rank for both activity and learning. The arrangement of the rest of the data is such that the relationship between activity and learning is not well defined.

At the present time the data indicate that castration has no effect upon either the learning or the activity of white rats under the age of puberty. This seems to be in accord with previous investigations. Furthermore, it seems that activity and learning are closely allied, since the most active animals learn fastest, and the least active slowest.

[1] Rickey, Edna, Dissertation, Ohio State University, 1-76.

[2] Durrant, E. P., *Am. J. Physiol.*, 1924, lxx, 344.