

The results show that the majority of normal rats of either sex are right-handed. This discovery throws light on the phylogenetic evolution of handedness and at the same time overthrows the theory of outgrowth of human intelligence, the theory of primitive warfare and the theory of social tradition.

As to the heredity of handedness, the results in the literature are conflicting. Most investigators maintain that if handedness is hereditary at all, it does not seem to follow the Mendelian ratio. In order to study ten generations of human beings, a few hundred years are required. But with our discovery, we can attack the very same problem with better control in a short time.

As to the pathological significance of the problem, let us cite the following investigations. L. G. Smith found that among 2,055 school children, 4.5 per cent. of the girls and 5.5 per cent. of the boys were left-handed. Out of 500 delinquent, 6 per cent. of the girls and 11 per cent. of the boys; out of 200 feeble-minded, 11 per cent. of the girls and 8.5 per cent. of the boys were found to be left-handed. R. Ganter also reports that 21.9 per cent. of the epileptics and 18.7 per cent. of the feeble-minded are left-handed. In an earlier investigation, we found that normal rats are far superior in maze learning to those which have been depleted of vitamin B complex through their mothers' diet during the nursing period. It is therefore of interest to find out the distribution of handedness among the vitamin B depleted rats. The results for the depleted animals are presented in Tables III and IV.

TABLE III
HANDEDNESS IN VITAMIN B DEPLETED RATS

Handedness	Relative frequency in percentage	
	27 males	27 females
Right	48	33
Left	48	45
Ambidextrous	4	22

TABLE IV
HANDEDNESS IN VITAMIN B DEPLETED RATS EXCLUDING AMBIDEXTERITY

Handedness	Relative frequency in percentage	
	Males	Females
Right	50	43
Left	50	57

Comparison of the results indicates that the percentage of left-handedness is higher in the vitamin B depleted animals whose maze-learning ability was found to be much inferior to that of the normal rats. These results do not necessitate the conclusion that the left-handed are mentally inferior. They merely indicate that the percentage of left-handedness is higher among the poor learners, and that's all. Perhaps when we study a group of geniuses, we may find that the percentage of left-handedness is also higher. Professor McCollum, of the Johns Hopkins University, suggested that we study the members of the National Academy of Sciences or the "Who's Who in America." Of course the left-handed person may or may not be a genius, but he has certainly proved to be a great star in the baseball game.

As to the psychological aspects of the problem, Tsai has studied the time required by the animal to change from the direct method of eating with mouth to the indirect method of eating "from-hand-to-mouth." Also he has studied the amount of time required by each animal for making fifty consecutive attempts of hand movements a day. Both results, when plotted against five successive days, represent the abrupt curves of negative acceleration. As to the retention of hand-preference, he found that rats practically use the same hand after a month's interval. As to the modification of hand preference, we have not done anything. However, the experiment can be very easily performed. First put a rat in the cage and find out whether he is left- or right-handed. If he is left-handed, the next time he uses his left hand again give him a mild electric shock. See how much training is required and how long he will continue to use the modified hand. Besides, modification may also be achieved by paralyzing the preferred hand either with drug or operation, and the changes be studied during and after recovery.

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