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Aggressive behavior in rats and Cannabis sativa

It has been described recently that chronic administration of marihuana extracts and Δ^9-THC induce aggressive behavior in starved rats (*Life Sci.* 8, 607, 1969; *Comm. Behav.* 5, 57, 1970).

The following experiments were carried out in order to further analyse this phenomenon:

1. In rats fed *ad libitum* exclusively on corn or protein-free diets, chronic treatment with marihuana failed to induce aggressiveness.
2. In aggressive rats by previous chronic treatment with marihuana *plus* starvation, glucose i.p. failed to block aggressive behavior; however, agressiveness disappeared when glucose was administered *per os*.
3. Lactic acid and ammonium chloride failed to sensitize rats fed *ad libitum* to the aggressive-inducing property of marihuana.
4. In starved rats maintained at 14°C for 24 h, the first application of marihuana elicited aggressiveness.
5. In starved rats previously treated with marihuana, *p*-chlorophenylalanine and *d,l*-Dopa strongly potentiated the aggressiveness induced by cannabis; however, such treatment failed to sensitize rats fed *ad libitum* to the aggressive-inducing property of marihuana (*European J. Pharmacol.* In press).
6. Rats fed *ad libitum* and in abstinence from previous morphine administration developed aggressiveness when treated with marihuana for the first time.

These data led us to conclude that in stressed rats, as in the cases of chronic starvation, cold and abstinence from morphine, marihuana is able to elicit a striking aggressive behavior.

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Effects of Cannabis sativa on the social behavior of rats

The behavioral effects of marihuana has been intensively studied lately. In these experiments drug effects on solely animals were studied. However, to our knowledge, there is no available data concerning the influence of marihuana on animals which are interacting. The present experiments were carried out to assess the influence of Δ^9-THC on 2 different social situations.

1. Two rats, which had been previously trained to traverse a narrow runway in order to be rewarded (*J. Comp. Physiol. Psychol.* **69**, 601, 1969), were simultaneously introduced at the opposite ends of the apparatus. When they met at the middle of the runway, the rat which pushed the partner was classified as winner. Δ^9-THC injected in one of the rats before the first contest increased its probability to be winner in most of the pairs tested; when injected in previously loser rats it promoted an inversion of the classification.

2. Pairs of rats trained in a modified Skinner box, with the lever and the water deliverer at opposite walls (*Nature* 213, 533, 1967), acquired a stable pattern of behavior in which one of the animals performs the bar pressing (worker rat) and the partner obtains the reward (non-worker rat). Δ^9-THC administered to non-worker rats increased their "parasitic" behavior. On the other hand, when administered to the worker rats it promotes an inversion of the social pattern, that is, the worker rats stop bar pressing and begin to obtain the reward.

Similar experiments were performed with chlorpromazine, amylobarbitone and mescaline. The results are tentatively explained by suggesting that Δ^9-THC is able to impair the perception of rats to known environmental stimuli, leading to a "deconditioning effect" without loss of motivation.

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Tetrahydrocannabinols (Δ^9-THC and Δ^8-THC) and state-dependent learning in rats

The aim with the present study was to answer two main questions: (a) do tetrahydrocannabinols impair the acquisition of a simple position—learning task, (b) is it possible to establish differential responding in the same learning-situation when using tetrahydrocannabinols?

Method: A T-shaped water-maze was used in the present experiments. It is *a priori* suggested that this method provides some advantages over more commonly used techniques, thus no food reward or electric shock has to be used.

Experiment I: 32 male albino rats were divided into four groups. Each group was trained to swim either to the left or to the right side of the maze. The groups were given ten trials a day for six consecutive days. The following two days the animals could not get out of the water when swimming to the previously learned position but had to go to the opposite side. The administration of the drug (Δ^8-THC 20 mg/kg i.p.) was given thirty minutes before the training.

Group I:	Initial training	drugged,	reversal training	drugged
Group II:	»	nondrugged,	»	nondrugged
Group III:	»	nondrugged,	»	drugged
Group IV:	»	drugged,	»	nondrugged