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#### NOTE

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## Effects of the marijuana homologue, pyrahexyl, on a conditioned emotional response

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*A single injection into adult male rats of the marijuana homologue, pyrahexyl, disrupted the suppressive effect in a CER situation of a stimulus previously paired with shock. The latency to resume the operant in the pyrahexyl-injected Ss was one-half that shown by control animals. Three possible explanations for the effect are discussed.*

Early research dealing with marijuana-type substances was hampered by the fact that material of fixed and known strength could not be obtained. This difficulty was overcome when Adams, Loewe, Jelinek, & Wolff (1941) succeeded in isolating tetrahydrocannabinol as the active ingredient in marijuana (*cannabis sativa*). Once isolated, synthetic tetrahydrocannabinols could be prepared and one of the many derivatives thus produced was pyrahexyl (synhexyl). Although it has been available since 1943 (Adams, Haefenist, & Loewe, 1943), there has been a paucity of research using this substance, and what research there is suffers from a grievous lack of experimental control. For some odd reason, experiments dealing with the behavioral effects of tetrahydrocannabinol compounds have been meagre, and this is puzzling since there appears to be considerable interest in marijuana-type substances (see reviews by Solomon, 1967, and Andrews & Vinenoog, 1968). The work described herein is a study of the effects of pyrahexyl, one of the marijuana homologues, on a conditioned emotional response (CER).

#### METHOD

The Ss, 28 adult male albino rats, were housed in individual cages and were kept on 23-h water deprivation. Food was available ad lib. Ss were trained to bar press for water on an FR 5 schedule until a stable response rate was reached (approximately 25 responses/min). Each S then received two foot shocks (intensity 2 mA 2-sec duration) in a shock box via a Grason-Stadler shock generator (E1064GS). A 3-min, 1000-cps sound stimulus (CS) preceded the onset of, and terminated with, the shock. The intertrial interval was also 3 min.

Six days after the shock experience, Ss were assigned to either the drug or placebo group depending on their performance levels under the fixed-ratio schedule. Ss in the experimental group were then given a 15-mg/kg i.p. injection of pyrahexyl (dissolved in 5% alcohol) while the control group received a placebo consisting only of the vehicle used to dissolve the drug. Twenty minutes after injection, Ss were returned to the bar-pressing situation and E waited for Ss to begin responding. Six minutes after the first press, the CS, which had previously been paired with shock, was introduced through a speaker built into the box. The latency to resume bar pressing after the onset of the CS constituted the dependent variable. All Ss were observed until the first response was made or until 60 min had elapsed.

#### RESULTS AND DISCUSSION

A Mann-Whitney "U" test revealed no differences between groups in the rate of responding during the 6 min prior to the onset of the CS. However, there was an

impressive difference in the mean latency to resume bar pressing in the one-trial extinction test. Mean latency for the pyrahexyl group (N = 14) was 28 min 42 sec, while the control group (N = 14) had a mean latency of 53 min 53 sec. This difference is highly significant (U = 16,  $p < .001$ ) and is akin to that reported by Boyd, Hutchinson, Gardner, & Meritt (1963). These investigators found that MOP, a methyl-octyl tetrahydrocannabinol derivative likewise disrupts the suppressive effects of a CS in the CER situation.

The possible sources accounting for the disruption of the CER are: (1) general activation of behavior, (2) interference with the inhibitory mechanism responsible for suppression, and (3) anxiety reduction. The first alternative is unlikely since Abel and Schiff<sup>1</sup> have found that pyrahexyl-injected animals are less active, not more active, than control animals in an open field. As to the second possibility, McGlothlin (1965) has noted that among humans there tends to be a reduction in social inhibitions following the use of marijuana, but this may be the result of increased suggestibility while under the influence of *cannabis*. With regard to the third hypothesis, there tends to be somewhat contradictory results in the human research: Pond (1948) reported that pyrahexyl induced a state of apprehension in his Ss, whereas Stockings (1947) noted a feeling of euphoria connected with the drug. The data from this experiment tends to support Stockings' findings; however, the final interpretation must await further experimentation.

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#### NOTE

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