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DISTINCT EFEECTS OF D9-TETRAHYDROCANNABINOL AND CANNABIDIOL ON NEURAL ACTIVATION DURING EMOTIONAL PROCESSING

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Aims: Cannabis use can both increase and reduce anxiety in humans. The neurophysiological substrates of these effects are unknown.
Method: Fifteen healthy English-native right-handed men were studied on three separate occasions using an event-related fMRI paradigm while viewing faces that implicitly elicited different levels of anxiety. Each scanning session was preceded by the ingestion of either 10mg of D-9-THC, 600mg of CBD, or a placebo, in a double-blind, randomised, placebo controlled design. Electrodermal activity (Skin Conductance Response, SCR) and objective and subjective ratings of anxiety were recorded durign the scanning.

Results: D-9THC increased anxiety, as well as levels of intoxication, sedation and psychotic symptoms, whereas there was a trend for a reduction in anxiety following administration of CBD. The number of SCR fluctuations during the processing of intensely fearful faces increased following administration of D-9THC but decreased following administration of CBD. CBD attenuated the BOLD signal in the amygdala and the anterior and posterior cingulate cortex while subjects were processing intensely fearful faces, and its suppression of the amygdalar and posterior cingulate responses was correlated with the concurrent reduction in SCR fluctuations. D-9-THC mainly modulated activation in frontal and parietal areas.

Conclusions: D-9-THC and CBD had clearly distinct effects on the neural, eclectrodermal and symptomatic response to fearful faces. The effects of CBD on activation in limbic and paralimbic regions may contribute to its ability to reduce autonomic arousal and subjective anxiety, whereas the anxiogenic effects of D-9-THC may be related to effects in other brain regions.

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