

# Cannabis and the brain, two studies, one editorial examine associations

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Two studies and an editorial published online by *JAMA Psychiatry* examine associations between cannabis use and the brain.

Cannabis, also known as marijuana, is a popular recreational drug and its legal status has been a source of enduring controversy.

In the first study, David Pagliaccio, Ph.D., formerly of Washington University in St. Louis, and now at the National Institute of Mental Health, Bethesda, Md., and coauthors analyzed data from a group of twin/siblings (n=483 with 262 participants reporting ever using cannabis in their lifetime) to determine whether cannabis use was associated with brain volumes. The authors relied on interview, behavioral and neuroimaging data.

To determine whether any significant differences could be attributed to predispositional/familial or causal factors, brain volumes were compared across twin/sibling pairs. Among 241 twin/sibling pairs, 89 pairs were discordant (differing) for cannabis exposure, 81 pairs were concordant (in agreement) for cannabis exposure and 71 pairs were concordantly unexposed to cannabis.

The authors found that among all 483 study participants, cannabis exposure was related to smaller left amygdala and right ventral striatum volumes. Volume differences were in the range of normal variation.

However, brain volumes did not differ between siblings discordant for

cannabis exposure, according to the study. Both the exposed and unexposed siblings in pairs discordant for cannabis exposure showed smaller amygdala volumes relative to concordant unexposed pairs.

"When using a simple index of exposure (i.e. ever vs. never use), we found no evidence for the causal influence of cannabis exposure on amygdala volume. Future work characterizing the roles of causal and predispositional factors underpinning neural changes at various degrees of cannabis involvement may provide targets for substance abuse policy and prevention programs," the authors conclude.

In a another cannabis study, Tomáš Paus, M.D., Ph.D., of the Rotman Research Institute, Toronto, and coauthors investigated whether the use of cannabis during early adolescence (by 16 years of age) was [associated with variations in brain maturation](#) as a function of genetic risk for schizophrenia, as assessed with a polygenic risk score.

The authors used observations from three study samples and a total of 1,577 participants had information about cannabis use, imaging studies of the brain and a polygenic risk score for schizophrenia.

The authors report a negative association between cannabis use in early adolescence and cortical thickness in male participants with a high polygenic risk score.

"Our findings suggest that cannabis use might interfere with the maturation of the cerebral cortex in male adolescents at high risk for schizophrenia by virtue of their polygenic risk score," the authors note.

In a related editorial, David Goldman, M.D., of the National Institute on Alcohol Abuse and Alcoholism, Rockville, Md., writes: "Although siblings discordant for cannabis use were similar in brain structure, it would be wrong to conclude that it is safe to use cannabis or, as could be

wrongly inferred from the French et al study, to conclude that it would be safe for people with the right genetic makeup or women, in particular, to use [cannabis](#)."

**More information:** Pagliaccio Study: *JAMA Psychiatry*. Published online August 26, 2015. [DOI: 10.1001/jamapsychiatry.2015.1054](https://doi.org/10.1001/jamapsychiatry.2015.1054)  
Paus Study: *JAMA Psychiatry*. Published online August 26, 2015. [DOI: 10.1001/jamapsychiatry.2015.1131](https://doi.org/10.1001/jamapsychiatry.2015.1131)

Goldman Editorial: *JAMA Psychiatry*. Published online August 26, 2015. [DOI: 10.1001/jamapsychiatry.2015.1332](https://doi.org/10.1001/jamapsychiatry.2015.1332)

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