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## Daily Marijuana Use Is Not Associated with Brain Morphometric Measures in Adolescents or Adults

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### Abstract

Recent research has suggested that marijuana use is associated with volumetric and shape differences in subcortical structures, including the nucleus accumbens and amygdala, in a dose-dependent fashion. Replication of such results in well controlled studies is essential to clarify the effects of marijuana. To that end, this retrospective study examined brain morphology in a sample of adult daily marijuana users ( $n = 29$ ) versus nonusers ( $n = 29$ ) and a sample of adolescent daily users ( $n = 50$ ) versus nonusers ( $n = 50$ ). Groups were matched on a critical confounding variable, alcohol use, to a far greater degree than in previously published studies. We acquired high-resolution MRI scans, and investigated group differences in gray matter using voxel-based morphometry, surface-based morphometry, and shape analysis in structures suggested to be associated with marijuana use, as follows: the nucleus accumbens, amygdala, hippocampus, and cerebellum. No statistically significant differences were found between daily users and nonusers on volume or shape in the regions of interest. Effect sizes suggest that the failure to find differences was not due to a lack of statistical power, but rather was due to the lack of even a modest effect. In sum, the results indicate that, when carefully controlling for alcohol use, gender, age, and other variables, there is no association between marijuana use and standard volumetric or shape measurements of subcortical structures.

[gray matter](#) [marijuana](#) [morphology](#) [MRI](#)

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