

Heritable traits that appear in teen years raise risk for adult cannabis use

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While some youth experiment with marijuana but don't go on to long-term use, others develop a problematic pot habit that continues into adulthood. A major new analysis shows that at least a small portion of the risk for developing into an adult marijuana user may be related to inherited behaviors and traits that appear during adolescence.

The journal *Addiction* published the findings by researchers at Brown University and Emory University.

"Our analysis suggests that some early adolescent behaviors and traits—like depression, neuroticism and acting out—can be indicative for cannabis use later in life," says Rohan Palmer, senior author of the paper and assistant professor in Emory's Department of Psychology, where he heads the Behavioral Genetics of Addiction Laboratory.

"Decades of research has shown that behaviors can have a [genetic component](#)," adds Leslie Brick, lead author and assistant professor in the Department of Psychiatry and Human Behavior in Brown's Alpert Medical School. "And while there is not one genetically-influenced trait that determines whether you're going to be a long-term cannabis user, our paper indicates that there are polygenic effects across multiple inherited behaviors and traits that show a propensity for increased risk."

Brick, a long-time collaborator with Rohan, also holds an adjunct faculty appointment in Emory's Department of Psychology.

The Transmissible Liability Index is a well-known measure for a constellation of heritable traits that may appear during the developmental years that are associated with the risk of a substance use disorder. For the current paper, the researchers wanted to tease out which of these heritable characteristics might be associated with repeated marijuana use later in life.

"Cannabis use has been less studied than tobacco and alcohol," Palmer says. "For one thing, it's harder to get people to answer detailed questionnaires honestly about cannabis, since it's an illegal substance. And it's also much more difficult to standardize the amount of cannabis consumed, as compared to cigarettes and liquor."

Cannabis use, however, is widespread among adolescents and young adults. In 2018, more than 35 percent of high school seniors surveyed reported having used marijuana during the past year and more than 20 percent reported doing so during the past month, according to the National Institute on Drug Abuse (NIDA).

As [cultural norms](#) have shifted, including the legalization of marijuana for adult recreational use in many states, teens' perceptions of the risks of marijuana use have declined.

Those risks, however, are real.

"Adolescence is a major period of brain development," Brick says. "In fact, our brains don't stop developing until we are around 25 years old. Research indicates that cannabis has some major impacts on our biology, although its full effects are still not well understood."

The researchers drew data from the National Longitudinal Study of Adolescent Health, or Add Health, which includes a nationally representative sample of 20,000 adolescents in grades 7 to 12 in the United States who have been followed into adulthood. Comprehensive data from early adolescence to adulthood was collected on health and health-related behavior, including substance use, personality and genetics.

For the current paper, the researchers identified a large homogenous subgroup of individuals from the Add Health study, about 5,000 individuals of European ancestry, for their final analytic sample. They then leveraged existing [genome-wide association studies](#) to examine whether certain heritable behavioral traits noted during adolescence were associated with the Transmissible Liability Index, and whether any of these traits were also associated with risk for later cannabis use.

The results showed that a small portion of the risk for repeated cannabis use into adulthood can be attributed to the genetic effects of neuroticism, risk tolerance and depression that can appear during adolescence.

"While this work marks an important step in identifying genetic factors that can increase the risk for cannabis use, a substantial portion of factors that raise the risk remain unexplained," Palmer says. "We've shown how you can use existing data to assess the utility of a polygenic risk score. More studies are needed to continue to identify unique genetic and other environmental sources for the risk of long-term, problematic use of cannabis."

"Better understanding of what behaviors and traits may give someone a pre-disposition for long-term [cannabis use](#) gives us a better shot of identifying those most at risk so we can home in on effective interventions," Brick says.

A major limitation of the current study, the researchers add, is that it focused on individuals of European ancestry, because no sample size large enough for the genome-wide analysis was available for other ancestral groups.

More information: Leslie A. Brick et al, The intermediary role of adolescent temperamental and behavioral traits on the prospective associations between polygenic risk and cannabis use among young adults of European Ancestry, *Addiction* (2021). [DOI: 10.1111/add.15476](https://doi.org/10.1111/add.15476)

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