Democracy Dies in Darkness

Well+Being

The surprising ways cannabis may affect the aging brain

As more states legalize recreational marijuana use, here's what the research says about what cannabis is really doing to your brain.

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By Sarah Klein

Marijuana use seems to be more popular (or at least more openly talked about) than ever. Regardless of whether you're on the gummy bandwagon, you might wonder how it *really* affects your brain after the buzz wears off.

About 15.4 percent of Americans older than 12 have used cannabis in the past month, according to 2024 data from the Substance Abuse and Mental Health Services Administration. That number has been increasing as new marijuana products hit the market and more states legalize its use, according to the Centers for Disease Control and Prevention.

Older adults — those 60 and older — are the fastest-growing group of cannabis users in the country. According to a 2022 study, adults over 60 who started using did so for medical reasons, including to treat pain and arthritis, sleep disturbances, anxiety and depression.

While more than three-quarters of those people found the cannabis either somewhat or very helpful, the question remains: What are the side effects? You may be particularly curious about brain effects, given concerns about cognitive decline. So what exactly does the research say?

Cannabis use is linked to worse working memory

This probably isn't too surprising, but cannabis can affect your ability to retain information in the short term. This makes some intuitive sense to anyone who has tried it: "If you smoke cannabis, afterward, if you do a working memory test where you're trying to maintain some piece of information, like a phone number or a short list of words, you're less good at doing that while you're acutely intoxicated," said Joseph Schacht, associate professor of psychiatry and co-director of the Division of Addiction Science, Prevention and Treatment at the University of Colorado School of Medicine.

But lifetime use seems to have a similar effect. Consistent cannabis users tend to have lasting memory deficits compared with nonusers, he said. In a January 2025 study in JAMA Network Open, the largest of its kind, researchers looked at the effects of cannabis use on more than 1,000 adults ages 22 to 36 using brain imaging. Heavy lifetime users exhibited lower brain activity during a working memory task compared with nonusers after excluding recent users.

There isn't much research on potential long-term memory effects, but it's a growing area of study as more older adults use cannabis. "Essentially baby boomers who grew up using cannabis are [now] using it in older age but experiencing some of those effects on working memory," Schacht said. Available research suggests no overarching association between cannabis use and cognitive decline or dementia risk, although larger and longer studies are needed on this topic.

It's tied to changes in brain volume

Long-term cannabis use has also been associated with changes in brain volume. This is most pronounced in people who started using cannabis in adolescence, when the brain was still developing. "Cannabinoid exposure during that developmental window probably interferes with some of those normal brain development functions," Schacht said.

Some research shows changes in the white matter of the brain in people who started using cannabis before the age of 16. White matter connects and facilitates communication among various regions of the brain. Younger users show more difficulty with cognitive tasks requiring executive function, such as inhibition control, linked to lower integrity of certain parts of white matter and higher behavioral impulsivity, said Staci Gruber, director of Marijuana Investigations for Neuroscientific Discovery at McLean Hospital in Belmont, Massachusetts, and associate professor of psychiatry at Harvard Medical School. Gruber is the study's lead author.

In a 2026 meta-analysis of 77 studies in the journal Addiction, cannabis use was linked with reduced volume in the amygdala in particular, a region of the brain involved in processing and regulating emotions. But this study didn't include information on when people started using the drug.

In adults ages 40 to 70 who began using cannabis after roughly 25 years of age, lifetime cannabis use is actually associated with *greater* brain volume, according to research published this year in the Journal of Studies on Alcohol and Drugs. That's particularly true in areas of the brain with receptors for cannabinoids, the active compounds in cannabis that modulate things such as pain, mood and appetite. The study authors concluded this may be a sign of the "neuroprotective" benefits of cannabis in older adults, given that brain atrophy is common with age and is linked to cognitive decline and lower quality of life.

Those neuroprotective benefits could at least partly explain why cannabis use isn't associated with dementia risk.

We need more data on how cannabis affects mood disorders

In a review in Lancet Psychiatry, researchers found no help or harm from specific cannabinoids with relation to a number of mood-related concerns, including anxiety and post-traumatic stress disorder. It also concluded there wasn't enough data to study any potential effects on bipolar disorder or depression.

Gruber, however, noted that the study looked at either THC alone, CBD alone or a combination of THC and CBD, not the potential risks and benefits of the entire cannabis plant. (THC, or delta-9-tetrahydrocannabinol, is the psychoactive cannabinoid associated with the high caused by marijuana, while CBD, or cannabidiol, is a nonintoxicating cannabis compound.) "The idea that we would look primarily at single extracted compounds for things like anxiety is one that isn't necessarily going to be as successful as when we look at multi-compound products," she said. "The synergistic action of these things all together is significantly greater than the sum of its parts," much like how sports teams are more successful with multiple players on the field.

Schacht notes that some people use cannabis as a way to mitigate symptoms without addressing the underlying cause. "As someone who has worked in addiction and substance use for a number of years, depression and anxiety are frequently reasons that people use a number of substances, such as cannabis, alcohol and nicotine," he said. "Those drugs can be helpful in relieving those symptoms in the short term, but over the long term, I think it's fairly clear that they are not helpful and, in some cases, actually exacerbate the problem that led people to turn to them in the first place."

Using marijuana as a teenager or young adult is linked to a greater risk of some serious mental health problems. "People who start using cannabis when they are young and who have any kind of a family history of psychosis or severe mental illness are at risk for developing psychosis and severe mental illness themselves because of the cannabis use," Schacht said. The greatest association with psychosis and other severe mental illnesses is also typically strongest in the heaviest cannabis users.

Ultimately, Gruber said, more studies are needed — both larger studies and those that focus on the entire cannabis plant.

And, yet, researching cannabis is challenging because it is categorized federally as a Schedule I drug, meaning that, according to the U.S. Drug Enforcement Administration, it has "no currently accepted medical use and a high potential for abuse." The risk of abuse decreases as the schedule number gets higher. The government's strict regulations on studying these substances limit research opportunities. "It would be so much easier if people could use those things in the laboratory, for example, but we can't generally do that," Schacht said.

That would also help researchers investigate whether the method of cannabis delivery matters. More research is needed to know whether smoking, vaping or oral administration make any difference in cognitive (or other) effects.

Age matters when it comes to problematic cannabis use

To many people, other Schedule I drugs such as heroin and LSD sound much more concerning. But research suggests that 22 percent to 30 percent of people who use cannabis have cannabis use disorder, a type of substance use problem.

The risk of developing cannabis use disorder is higher in people who start using marijuana in adolescence and use it frequently. “It doesn’t mean that every single person who uses cannabis at an early age is going to have a problem, but our work and the work of others demonstrates that earlier onset of recreational cannabis use, along with more frequent and higher magnitude of use, is usually associated with worse potential outcomes,” Gruber said.

To her, future research should focus on whether the potential therapeutic benefits of cannabis can be harnessed without increasing the risk of harm to improve upon current standards of care. It will take time for research to catch up to the increasing popularity of this plant, Gruber said, but that very popularity points to some benefit: “If people didn’t yield something from it, why would they keep using this?”

In the meantime, without more research, it can be challenging for some people to decide whether cannabis might benefit them. “The best thing we can hope for is good, sound, empirical data that helps to drive individuals’ decisions as opposed to hearing somebody say ‘That should never be used,’” Gruber said. If you’re concerned about a specific aspect of your brain health, such as dementia risk, and how cannabis may affect you, consider talking to your doctor before trying legal products.