

What the science says about microdosing

Scientists have insight into what happens when someone takes enough psychedelics to experience hallucinogenic effects. But little research has been conducted on the effects of small doses.

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Updated Apr 8, 2022 - 11.09am,
first published at Mar 24, 2022 - 11.49am

The effect of psychedelics on the brain is dependent on the dose. While brain imaging studies have given scientists insights into what happens when someone takes a “macro” dose – enough for someone to experience the hallucinogenic effects – little research has been conducted on the effects of small doses.

Each person has what is called a default mode network (DMN) in their brains – a network of interacting brain regions that is constantly operational in the background, but is most active when someone is resting, daydreaming, or simply letting their mind wander.

When we’re idle, our brains are actually the most active, with the DMN lighting up and connecting parts of the brain that don’t usually interact. This goes some way to explain why people often come up with their best

ideas when drifting off to sleep, or doing an activity that requires little thought.

Counterintuitively though, when someone takes a high dose of a psychedelic, there is markedly less activity taking place in the DMN. But, connectivity in the rest of the brain increases.



What happens when someone takes a sub-perceptible amount of psilocybin or LSD largely remains a mystery. **Getty**

Enosis Therapeutics founder [Dr Prash](https://www.afr.com/life-and-luxury/arts-and-culture/why-professionals-are-taking-psychedelic-drugs-20181205-h18r0w) [https://www.afr.com/life-and-luxury/arts-and-culture/why-professionals-are-taking-psychedelic-drugs-20181205-h18r0w]

Puspanathan says the brain is forced to make new connections when there is reduced activity in the DMN, almost unlocking a childlike phase of learning. “There’s a number of ways to think about it – it’s like you’re on a ski slope at the end of the day, and you’ve got these distinct tracks going

down where 1000 skiers have gone before. Invariably, you go down one,” he says.

“You can think of psychedelics as like a snowstorm that comes down and wipes away all those tracks, and you can go down a path you wouldn’t usually have taken.”

In the same way that children have unique neural activity, the adult brain – when on psychedelics – is capable of making new connections. But what happens when someone takes a sub-perceptible amount of psilocybin or LSD largely remains a mystery.

This, however, is the question Macquarie University senior research fellow from the School of Psychological Sciences, Vince Polito, is trying to answer [<https://www.smh.com.au/national/microdosing-may-de-stress-but-doesn-t-live-up-to-psychedelic-hype-study-finds-20190206-p50w5q.html>]. Polito conducted his first study looking at microdosing in 2017 (the research was published in 2019), which tracked the experiences of more than 63 Australians who self-identified as microdosers.

It found a general increase in reported psychological functioning across all measures on dosing days, but limited evidence of residual effects. The study also showed reductions in reported levels of depression and stress, lower levels of distractibility and increased imagination.

Similarly, a study published in November in *Nature* analysing the experience of more than 4000 self-selected microdosers, and more than 4600 non-users, found lower levels of anxiety, depression and stress among individuals who microdosed, compared to those who didn’t. The study found they were also less likely to use alcohol frequently and were more likely to abstain from alcohol.



Vince Polito is the lead researcher of studies investigating microdosing. **Louie Douvis**

When Polito published his work it was one of only four scientific articles on microdosing, but scientific research into the practice has since exploded and there have now been about 50 studies into microdosing, either concluded or commenced.

For Polito's next study, which kicked off with its first patient in February, he is examining the effects on the brain using magnetoencephalography (MEG) scans.

The motivation for the study is to determine whether changes do, in fact, take place in the brain, or if microdosing acts as a placebo, with people's experiences influenced by their belief around what will happen.

The study will involve 80 participants, who will mix up their psilocybin microdoses with placebo capsules, placing them in identical envelopes, with a code on the inside so that the study administrators know which is which.

They will come to the university and be given a microdose on two occasions, but only one will contain the psychedelic substance. On both occasions, they will undergo an MEG scan.

For both this study and his 2017 study, Polito says he was surprised by the number of participants he had sign up. “There are a lot of people in Sydney who are microdosing,” he says. “I thought we’d have to work to recruit people ... but I only did a few online posts, and we were overwhelmed by people.

“If it does turn out there are pharmacological changes, there’s two more directions for research – a proper clinical trial looking at how microdosing could be a medical tool ... and use for cognitive enhancement.”

Josh Ismin, who co-founded biotech start-up Psylo (which is developing psilocybin-based treatments for severe mental illness), experimented with psychedelics in his youth, but has so far steered clear of microdosing.

He says most clinical trials examining the use of psychedelics to treat severe mental illness have been focused on acute (large one-off) doses. Microdosing research, he says, is a few years behind.

Some in the microdosing community say it’s no more dangerous than coffee, and less so than alcohol, but Ismin says there are negative health effects to consider. “Psilocybin is not geared toward taking on a regular basis. It targets a receptor called 5-HT_{2B}, and it creates a heart liability if you take it chronically,” he says.

“We are working on something targeted to a more microdosing application, but we’re trying to address the safety issues with naturally

occurring psychedelics.”

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