

Do recreational drugs make us fail to remember?

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Have you ever forgotten to post an important letter or let an appointment slip your mind? A new study from UK researchers suggests that for those who regularly use ecstasy or other recreational drugs, this kind of memory lapse is more common. Their research, which uncovered potential links between memory deficits and cocaine for the first time, appears in the *Journal of Psychopharmacology*.

Florentia Hadjiefthyvoulou, John Fisk, and Nikola Bridges from the University of Central Lancashire and Catharine Montgomery from Liverpool John Moores University wanted to delve deeper into the link between deficits in [prospective memory](#) (remembering to remember, or remembering to perform an intended action) and drug use.

The new research into prospective memory expands on previous studies, which have shown that ecstasy or polydrug users are impaired in performing a number of [cognitive tasks](#), including verbal and spatial exercises. A team led by Fisk also published evidence in 2005 that those using ecstasy perform worse in deductive reasoning, too.

Prospective memory tasks can be either time or event based, which means that the external trigger to remember could be in response to an event, or because it is time to do something. The distinction is important because these memory tasks use somewhat different brain processes.

The researchers recruited 42 ecstasy/polydrug users (14 males, 28 females) and 31 non-users (5 males, 26 females) for the study - all were

students. The students were quizzed about their drug habits (including tobacco, cannabis and alcohol), and given questionnaires to assess their everyday memory, cognitive failures and prospective and retrospective memory. They were then given a number of lab-based memory tests, including some that required students to remember something several weeks later. The results showed that recreational drugs such as ecstasy, or the regular use of several drugs, affect users' memory functions, even when tests are controlled for cannabis, tobacco or alcohol use. According to Fisk, memory deficits were evident in both lab-based and self-reported measurements of subjects' prospective memory.

The results also suggested that ecstasy/polydrug users "possess some self awareness of their memory lapses." The authors say that although ecstasy/polydrug users as a whole are aware of their memory problems they may be uncertain as to which illicit drug is behind the defects they perceive. "The present results suggest that these deficits are likely to be real rather than imagined and are evident in both time- and event-based prospective memory contexts," Fisk says.

One interesting finding that merits further study is an association between recreational cocaine use and memory lapses. "Further research is needed to clarify whether the cocaine-related deficits are limited to the ecstasy/polydrug population or whether they might be present among those persons whose recreational use is largely confined to cocaine," Fisk said. The authors believe that this is the first study to link recreational cocaine use with prospective memory deficits.

Prospective memory performance is dependent on the brain's pre-frontal executive resources (executive functions involve planning, organization, and the ability to mentally juggle different intellectual tasks at the same time). A number of studies have shown in particular that event-based prospective memory tasks use the brain's frontopolar cortex, also known as the Brodmann area 10, or BA10, although scientists understanding of

this region is still far from complete. Event-based prospective memory tasks are also associated with the left superior frontal gyrus, which makes up around a third of the brain's frontal lobe, and is linked with self-awareness.

Meanwhile, time-based prospective memory tasks activate more diverse brain regions, including anterior medial frontal regions (linked to executive functions and personality), the right superior frontal gyrus and the anterior cingulate (linked to many functions from heart rate regulation to cognitive functions and empathy). In addition, these time-based tasks also use the BA10 and the superior frontal gyrus as event based tasks do.

The authors speculate that cocaine-related deficits observed on both the time- and event-based tasks might be due to cocaine's interaction with the BA10. Cocaine use could be associated with specific executive function deficits, which cause the prospective memory deficits.

Researchers have another difficult conundrum when investigating drugs' effects on memory: which came first - the memory defects or the drug use? It is hard to rule out the possibility of pre-existing differences between users and non-users that originated before users tried drugs. Sociodemographic factors, personal dispositions, or underlying psychopathology could all play a role.

More information: Everyday and prospective memory deficits in ecstasy/polydrug users by Florentia Hadjiefthyvoulou, John E Fisk, Catharine Montgomery and Nikola Bridges is published in *Journal of Psychopharmacology*, published by SAGE, [DOI:10.1177/0269881109359101](https://doi.org/10.1177/0269881109359101)

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