

Alcohol dulls brain 'alarm' that monitors mistakes, study finds

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Most people have witnessed otherwise intelligent people doing embarrassing or stupid things when they are intoxicated, but what specifically happens in the brain to cause such drunken actions? A new study testing alcohol's effects on brain activity from the University of Missouri says that alcohol dulls the brain "signal" that warns people when they are making a mistake, ultimately reducing self control.

"When people make mistakes, activity in a [part of the brain](#) responsible for monitoring behavior increases, essentially sending an [alarm signal](#) to other [parts of the brain](#) indicating that something went wrong," said Bruce Bartholow, associate professor of psychology in the MU College of Arts and Science. "Our study isn't the first to show that alcohol reduces this alarm signal, but contrary to previous studies, our study shows that alcohol doesn't reduce your awareness of mistakes – it reduces how much you care about making those mistakes."

During the study, Bartholow's team measured the [brain activity](#) of 67 participants, ages 21-35, as they completed a challenging computer task designed to elicit some errors. About one third of the participants were given alcoholic drinks, while the rest were given no alcohol or a placebo beverage. In addition to monitoring their brain activity, the researchers also measured changes in participants' mood, their accuracy in the computer task, as well as their perceived accuracy.

The findings showed that the brain's "alarm signal" in response to errors was much less pronounced in those who had consumed alcohol, and the

response was largest for those in the placebo group. However, those in the alcohol group were no less likely to realize when they had made a mistake than participants in the other groups, indicating that alcohol's reduction of the brain's "alarm signal" did not occur simply because those in the alcohol group were unaware of their errors. The findings also showed that those who had consumed alcohol were less likely to slow down and be more careful in the task following errors.

"In tasks like the one we used, although we encourage people to try to respond as quickly as possible, it is very common for people to respond more slowly following an error, as a way of trying to regain [self-control](#). That's what we saw in our placebo group. The alcohol group participants didn't do this," Bartholow said.

The researchers also found that the size of the brain's alarm signal was strongly associated with participants' mood at the time of the test, and that most of the participants in the alcohol group reported feeling "less negative" after drinking than before. Bartholow said the findings are an important step forward in understanding how alcohol's effects on the brain contribute to the kinds of mistakes and social blunders people sometimes make when they're drunk.

"There are certain circumstances under which reducing the brain's alarm signal could be seen as a good thing, because some people, like those with anxiety disorders, are hyper-sensitive to things going wrong. In some people, a small amount of [alcohol](#) can take the edge off those anxious feelings, but consistently drinking as a way to reduce anxiety can lead to serious problems, including alcoholism," said Bartholow. "But generally speaking, having a strong brain response to mistakes promotes better self-control and helps people avoid making further mistakes in the future."

More information: The study "Alcohol Effects on Performance

Monitoring and Adjustment: Affect Modulation and Impairment of Evaluative Cognitive Control," will be published in the *Journal of Abnormal Psychology*.

Provided by University of Missouri-Columbia

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