

Caffeine doesn't reverse the negative cognitive impact of alcohol, study shows

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People who drink may want to know that coffee won't sober them up, according to new laboratory research. Instead, a cup of coffee may make it harder for people to realize they're drunk.

What's more, popular caffeinated "alcohol-energy" drinks don't neutralize alcohol intoxication, suggest the findings from a mouse study reported in the journal *Behavioral Neuroscience*, which is published by the American Psychological Association.

"The myth about coffee's sobering powers is particularly important to debunk because the co-use of [caffeine](#) and alcohol could actually lead to poor decisions with disastrous outcomes," said co-author Thomas Gould, PhD, of Temple University, in extending the research to what it means for humans.

"People who have consumed only alcohol, who feel tired and intoxicated, may be more likely to acknowledge that they are drunk," he added. "Conversely, people who have consumed both alcohol and [caffeine](#) may feel awake and competent enough to handle potentially harmful situations, such as driving while intoxicated or placing themselves in dangerous social situations."

In the laboratory, caffeine made mice more alert but did not reverse the learning problems caused by alcohol, including their ability to avoid things they should have known could hurt them, according to the study.

Scientists gave groups of young adult mice various doses, both separately and together, of caffeine and of ethanol (pure alcohol) at levels known to induce intoxication. The doses of caffeine were the equivalent of one up to six or eight cups of [coffee](#) for humans. Control mice were given saline solution.

Gould and co-author Danielle Gulick, PhD, then tested three key aspects of behavior: the ability to learn which part of a maze to avoid after exposure to a bright light or loud sound; anxiety, reflected by time spent exploring the maze's open areas; and general locomotion.

Ethanol, as expected, increased locomotion and reduced anxiety and learning in proportion to the dose given. In other words, intoxicated animals were more relaxed and moved around more but learned significantly less well than control mice to avoid the part of the maze with the unpleasant stimuli.

By itself, caffeine increased anxiety and reduced both learning and locomotion. Compared to the control animals, mice given caffeine were significantly more inhibited, less mobile and less savvy about avoiding the unpleasant stimuli.

When the drugs were given together, ethanol blocked caffeine's ability to make the mice more anxious. Conversely, caffeine did not reverse ethanol's negative effect on learning. As a result, alcohol calmed the caffeine jitters, leaving an animal more relaxed but less able to avoid threats - a combination that the authors speculated could make people more likely to believe they are not drunk or not impaired enough to have problems functioning.

"The alcohol-energy drink combinations have skyrocketed in popularity," Gould noted. He cited other evidence that these drinks produce deficits in general cognitive ability and raise the odds of alcohol-

related problems such as drunken-driving citations, sexual misconduct, and needing medical assistance.

"The bottom line is that, despite the appeal of being able to stay up all night and drink, all evidence points to serious risks associated with caffeine-alcohol combinations," he concluded.

The Food and Drug Administration is looking into the safety and legality of combination alcohol-caffeine beverages. In November, it sent letters to 30 manufacturers asking for evidence that such drinks are safe and legal under FDA regulations. To date, the FDA has only approved caffeine as an additive in soft drinks at concentrations less than 200 parts per million and has not approved adding caffeine at any level to alcoholic beverages. Under the Federal Food, Drug and Cosmetic Act, a substance added intentionally to food (such as caffeine in alcoholic beverages) is deemed unsafe and is unlawful unless its particular use has been approved by FDA regulation or is generally recognized as safe.

More information: "Effects of [Ethanol](#) and Caffeine on Behavior in C57BL/6 Mice in the Plus-Maze Discriminative Avoidance Task," Danielle Gulick, PhD, and Thomas J. Gould, PhD, Temple University; *Behavioral Neuroscience*, Vol. 123, No. 6.

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