

Researchers find frustration is an additional factor of addiction

March 2 2021



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A team from The University of Texas Medical Branch at Galveston (UTMB) focused on drug addiction research have pioneered a new way to study frustration as a factor in substance use disorders. The study was

published in the medical journal *Psychopharmacology*.

Traditional addiction research has focused on three aspects of substance use disorders: craving, impulsivity, or habit. Scientists hypothesized that a fourth factor, frustration, could also lead to escalation of [drug](#) use and addiction.

The *Psychopharmacology* paper noted that research into the role of frustration and substance use disorders is sparse, but a number of studies suggest that persons with substance use [disorders](#) have lower frustration tolerance. Studies have shown that sensitivity to frustration correlates with relapse among those with [substance use disorders](#).

The UTMB studies used a [rat model](#) to focus on frustration-related behavior. Rats can be trained to press a lever for food or drugs (reinforcers), and frustration is defined as when a subject is unable to achieve a reinforcer, receives less of a reinforcer than anticipated, or has to work harder to achieve a reinforcer.

"An example of frustration behavior is when someone can't get the channel on the TV to change or when an elevator takes too long to arrive. People will often respond to both situations by pressing the button repeatedly or holding the button longer with repeated attempts. This typical human response to frustration is the same in rats. In our study, rats were trained to press a lever for delivery of either a sucrose pellet or an intravenous infusion of a synthetic opioid. If they didn't get what they expected, they would press the lever more frequently and for longer periods of time," said Dr. Thomas A. Green, of UTMB's Department of Pharmacology and Toxicology.

"When a rat presses a lever repeatedly that was supposed to deliver a banana-flavored sucrose pellet, but the pellets never arrive, they hold the levers down longer as the frustration builds," he said.

Tileena Vasquez, a [doctoral candidate](#) in UTMB's Department of Pharmacology and Toxicology and the lead author of the paper, said the study showed all rats would press a lever for intravenous infusions of fentanyl, a synthetic opioid, but about 10% of rats would escalate their intake of fentanyl to about double that of the average rat.

"Even as the escalating rats take massive amounts of drug, their bar presses get longer (in some cases up to 10 minutes long), even though long bar presses do not increase the amount of drug delivered," Vasquez said, adding that the conclusion is that these susceptible rats, even though they are taking as much fentanyl as their bodies can handle, are frustrated that they are still not getting enough drug to satisfy them.

Green says the study has obvious implications for future studies of opioid use disorder and will help scientists understand how [frustration](#), as well as craving, impulsivity and habit can lead to opioid escalation.

More information: Tileena E. S. Vasquez et al, Lever-press duration as a measure of frustration in sucrose and drug reinforcement, *Psychopharmacology* (2021). [DOI: 10.1007/s00213-020-05742-2](https://doi.org/10.1007/s00213-020-05742-2)

Provided by University of Texas Medical Branch at Galveston

Citation: Researchers find frustration is an additional factor of addiction (2021, March 2) retrieved 1 May 2023 from <https://medicalxpress.com/news/2021-03-frustration-additional-factor-addiction.html>

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