What can Pavlov's dogs tell us about drinking?

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Humans aren't much different from other animals. Just like Pavlov's dogs, we can become conditioned to associate environmental cues with rewards. Innocent enough when the sight of your sneakers makes you want to go for a run, but not necessarily so when the sight of the liquor store prompts you to want a drink.

Indeed, Pavlovian cues that predict alcohol can lead us toward addiction. And sometimes those cues can become desirable in and of themselves, as shown in a new study published in *Frontiers in Behavioral Neuroscience* by researchers from Concordia University in Montreal.

"Alcohol addiction is compounded by our ability to learn about predictive cues," says Nadia Chaudhri, the study's lead author and professor in the Department of Psychology.

"Conditioned reactions to those cues can trigger behaviours that result in drinking, like turning into the SAQ or reaching for a beer."

The results of the study suggest that cues that predict alcohol can become highly desirable; therefore, people may keep drinking because of the pleasure derived from our interactions with them.

According to this research, drinkers wishing to make a change in their habits shouldn't just focus on the booze itself, but on all the factors that surround alcohol consumption.

"Many people have specialized glassware for different kinds of drinks, and strong preferences for what they drink," Chaudhri explains.

"These preferences could be driven by the sensory properties of alcohol, like its taste, smell and how it looks. It is important for people to realize that drinking alcohol is a complex behaviour, and in addition to what alcohol does to our brains, it also plays a role in regulating our behaviours."

For the study, Chaudhri and her co-authors, former Concordia student Chandra Srey and postdoctoral researcher Jean-Marie Maddux, worked with 25 lab rats who were conditioned to associated a specific cue with the presence of ethanol—the main kind of alcohol found in alcoholic drinks.

The researchers paired a visual cue with the ethanol so that rats would come to expect alcohol every time they saw that cue. Eventually, when the cue was presented, rats approached the location where alcohol was about to be delivered. But after a time they stopped performing this behaviour and instead began approaching and interacting with the cue.

This happened even though the rats gained nothing by playing with the cue, and would actually have been better served by approaching the location where alcohol was about to be delivered.

The researchers also noted that the rats would work to earn presentations of a cue that was previously paired with alcohol, even when alcohol was not dispensed along with that cue. These results suggest that a cue that predicts alcohol can become highly desireable.

So how can rat behaviour help explain human addiction?

"Lots of our behaviours are governed by fundamental learning

mechanisms that are also present in other animal species," says Chaudhri. "By modelling these behaviours in rats we can better understand the factors that control how these behaviours are acquired and maintained in humans."

She explains that we can use animal models to figure out ways to minimize unwanted behaviours like responding to cues that predict alcohol.

"This knowledge can then be brought back to the clinic, where we can test similar strategies in humans," says Chaudhri.

"Rat models can also be used to inform us of the brain mechanisms that are important for behaviour. These basic science studies provide a critical foundation for the development of treatments for disorders like alcohol abuse and addiction."

Chaudhri will soon present the results of this and other related studies at the upcoming Society for Quantitative Analyses of Behavior annual symposium taking place May 27 to 28 in Chicago.

More information: Chandra S. Srey et al. The attribution of incentive salience to Pavlovian alcohol cues: a shift from goal-tracking to sign-tracking, *Frontiers in Behavioral Neuroscience* (2015). DOI: 10.3389/fnbeh.2015.00054

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