

Addictive effects of caffeine on kids being studied by UB neurobiologist

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Caffeine is a stimulant drug, although legal, and adults use it widely to perk themselves up: Being "addicted" to caffeine is considered perfectly normal.

But how strong is caffeine's appeal in young people who consume an abundance of soft drinks? What impact does acute and chronic [caffeine consumption](#) have on their blood pressure, [heart rate](#) and hand tremor?

Furthermore, does consuming caffeinated drinks during adolescence contribute to later use of legal or [illicit drugs](#)?

Jennifer L. Temple, PhD, a neurobiologist, assistant professor of exercise and nutrition sciences at the University at Buffalo and director of its Nutrition and Health Research Laboratory, is looking for answers to these three questions through a 4-year, \$800,000 study funded by the National Institutes of Health.

Her paper addressing the first question appears in the December 2009 issue of *Behavioural Pharmacology*, and is thought to be the first study to show a gender effect in the appeal of caffeinated soda in young people.

Given the effects of [caffeine](#) in adults, the researchers expected to see a difference between those who habitually consumed a lot of [soft drinks](#), and those who consumed few. However, results showed that the difference was between boys and girls: The boys in the study worked harder and longer on a computer-based exercise to obtain caffeinated

drinks.

Temple and colleagues now have completed the second part of the study -- a double-blind, placebo-controlled, dose-response study of the effects of caffeine on the teenagers' blood pressure, heart rate and hand tremor. Two papers currently are being written reporting the results.

The third, and perhaps the most important question in the study, focusing on the effect of caffeine consumption during adolescence on later use of legal or illegal drugs, is getting underway.

Temple's primary research interest is a behavior called food reinforcement. She became intrigued with caffeine consumption in children after conducting a small study in 8-12-year-olds.

"We had a lot of kids who were drinking not only soda, but coffee," she relates. "I had 12-year-old girls who said that all they had that morning was a cup of coffee. I started thinking -- "This can't be good."

These findings led her to study how hard a person will work to obtain a particular food, or in this case, a caffeine drink -- and how food reinforcement mimics drug addiction. She is trying to understand the mechanisms that underlie such reinforcement, and if it can be redirected to a more healthy habit.

The just-published study on the reinforcing value of caffeine involved 26 boys and 23 girls ages 12-17. The participants, who were not aware the study was testing caffeine's reinforcement effects, were placed into groups based on their reported caffeine consumption, in any form.

Participants underwent a baseline test to determine if they could taste caffeine in the study drinks (they couldn't), and a run-through to familiarize them with the computer-based program they would be using

in the experiment.

To give participants experience with the study drinks, they were sent home with a week's supply of test soda, randomized to be caffeinated or non-caffeinated, and were instructed to drink a 32-ounce bottle every day, for seven days, and no other soda or caffeinated products. During the second week, they obtained a week's supply of the opposite drink.

Participants then returned to a laboratory equipped with two computers, one on which participants played a computer game to earn caffeinated drinks and on the other, non-caffeinated drinks, although the drinks' caffeine status was blinded. The longer they played, the more difficult the game became.

Temple said the difference in the reinforcing potential of caffeine between males and females, but not between high and low consumers, was surprising. "These data are novel and they add to the small, but growing, body of literature on caffeine use in children and [adolescents](#)."

She speculates these sex differences could be based on the effect of circulating hormones at the time of the test, although this was not measured, and the possibility that females are less sensitive to the effects of caffeine.

Provided by University at Buffalo

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