

Study reveals possible brain damage in young adult binge-drinkers

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It's considered a rite of passage among young people – acting out their independence through heavy, episodic drinking. But a new University of Cincinnati study, the first of its kind nationally, is showing how binge drinking among adolescents and young adults could be causing serious damage to a brain that's still under development at this age.

Researcher Tim McQueeny, a doctoral student in the UC Department of Psychology, is presenting the findings this week at the 34th annual meeting of the Research Society on Alcoholism in Atlanta.

High-resolution brain scans on a sample of 29 weekend binge drinkers, aged 18 to 25, found that [binge-drinking](#) – consuming four or more drinks in one incident for females and five or more drinks for males – was linked to cortical-thinning of the pre-frontal cortex, the section of the brain related to executive functioning such as paying attention, planning and making decisions, processing emotions and controlling impulses leading to irrational behavior.

McQueeny examined the brain's gray matter, the parts of brain cells that do the thinking, receiving and transmitting of messages. "We have seen evidence that binge drinking is associated with reduced integrity in the white matter, the brain's highways that communicate neuron messaging, but alcohol may affect the gray matter differently than the white matter," he says.

The pilot study examined whether the researchers could see a

relationship between gray matter thickness and binge drinking among college-aged young adults. They found that greater number of drinks per binge is associated with cortical thinning. McQueeny is now interested in pursuing future research to examine whether binge drinking is affecting the brain's gray matter and white matter differently, or if they're both equally affected.

"Alcohol might be neurotoxic to the neuron cells, or, since the brain is developing in one's 20s, it could be interacting with developmental factors and possibly altering the ways in which the brain is still growing," he says.

The findings affect a significant population. A publication from the National Institute on Drug Abuse reports that 42 percent of young American adults between 18 and 25 have engaged in binge drinking.

McQueeny adds that the depressant effects of alcohol emerge later in life, so for young adults, the effect of alcohol can be very stimulating and activate tolerance over time.

"In the past, in terms of what's known about the physical toll of alcohol, the focus on neurobiology has been in pathological populations and adult populations who were disproportionately male, so there was a significant gap in research in terms of when people started risky drinking. We're looking at developmental aspects at an age when binge drinking rates are highest, and we're also looking at gender effects," says McQueeny.

"There might actually be indications of early micro-structural damage without the onset of pathological symptoms such as abuse, or dependence on alcohol."

McQueeny's advisor, UC Psychology Professor Krista Lisdahl Medina, served as senior author on the paper. She adds, "Our preliminary evidence has found a correlation between increased abstinence of binge

drinking and recovery of gray matter volume in the cerebellum. Additional research examining brain recovery with abstinence is needed."

In terms of educating young adults about responsible drinking, Medina says there appear to be better efforts about communicating the dangers of drinking and driving. "However, people can still be doing damage to their [brain](#) as a result of the prevalence and acceptance of binge drinking. There is also evidence that drinking below the binge level may be less harmful," she says.

Provided by University of Cincinnati

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