

Binge drinkers have a decreased ability to learn new verbal information

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Binge drinking is prevalent among university students, especially in the United States. One brain structure particularly sensitive to alcohol's neurotoxicity during development is the hippocampus, which plays a key role in learning and memory. A study of the association between binge drinking and declarative memory – a form of long-term memory – in university students has found a link between binge drinking and poorer verbal declarative memory.

Results will be published in the August 2011 issue of *Alcoholism: Clinical & Experimental Research* and are currently available at Early View.

"In northern European countries, there is a strong tradition of a sporadic, drunkenness-orientated, drinking style," explained María Parada, a postdoctoral researcher at the Universidade de Santiago de Compostela, Spain and first author of the study. "In contrast, countries on the Mediterranean coast, such as Spain, have traditionally been characterized by a more regular consumption of low doses of alcohol. In recent years, the pattern of binge drinking among young people has become more widespread throughout Europe, hence the growing concern about this issue."

"I think it's important to examine alcohol's effects on the [hippocampus](#) because in animal studies, particularly in rats and monkeys, this region appears sensitive to the neurotoxic effects of alcohol, and this structure plays a main role in memory and learning," said Marina Rodríguez

Álvarez, a senior researcher at the Universidad de Santiago de Compostela. "In other words, binge drinking could affect memory of young adults, which might affect their day-to day lives."

"Our interest in studying the effects of binge drinking patterns on [declarative memory](#) results from the well-established role of the hippocampus – a small seahorse-shaped [brain structure](#) located in the medial regions of the cerebral hemispheres – in this cognitive function," added Parada. "Both animal studies as well as some neuroimaging studies in humans have shown the hippocampus to be particularly vulnerable to the effects of alcohol, so we wondered whether hippocampus-dependent learning and memory could be affected by heavy episodic drinking."

Parada and her colleagues examined 122 Spanish university students between 18 and 20 years of age divided into two groups: those who engaged in binge drinking (n=62; 32 men, 30 women) and those who did not (n=60; 31 men, 29 women). All were administered a neuropsychological assessment that included the Rey Auditory Verbal Learning Test and the Wechsler Memory Scale-3rd ed. (WMS-III) Logical Memory subtest to measure verbal declarative memory, as well as the WMS-III Family Pictures subtest to measure visual declarative memory.

"Our main finding was a clear association between binge drinking and a lower ability to learn new verbal information in healthy college students, even after controlling for other possible confounding variables such as intellectual levels, history of neurological or psychopathological disorders, other drug use, or family history of alcoholism," said Parada.

"Young adults with a binge drinking pattern of [alcohol](#) consumption who have poorer verbal declarative memory will need more neural resources to perform memory tasks and to learn new information, which probably

would affect their academic performance," observed Rodríguez Álvarez.

Parada was a little more cautious. "Although it seems reasonable to expect that these differences in declarative memory affect academic performance – because it depends on the ability to learn new information – there are many other variables that may modulate and explain this relationship, for example, student effort or class attendance," she said. "We are currently carrying out a longitudinal study of these young people, and collecting information on their academic achievements, so we hope to be able to answer this question more definitively in the near future."

One of the strengths of this study, added Parada, is that it controlled for confounding variables such as psychiatric comorbidity, genetic vulnerability, or other drug use, such as marijuana. "This allowed us to establish a clearer association between binge drinking patterns and poorer performance on memory tasks," she said.

An additional strength, said Rodríguez Álvarez, was the finding that women are not more vulnerable than men to the neurotoxic effects of binge drinking.

Both Parada and Rodríguez Álvarez noted the importance of prevention programs and policies to address this issue.

"One of the factors that appear to be behind this pattern of consumption is the low perception of risk," said Parada. "Whereas most attention has focused on negative consequences such as traffic accidents, violence or public disorder, society and students themselves are unaware of the damaging effects [binge drinking](#) may have on the brain. Policies and prevention programs in Europe aimed at controlling this pattern of consumption on campus are still rare."

Yet the opposite should be occurring, added Rodríguez Álvarez. "These results should be taken into account by parents, clinicians, university administrators, and also governments because it is vital to address all that surrounds the brain's development in our adolescents and young adults."

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