

Heavy alcohol use suggests a change in normal cognitive development in adolescents

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Alcohol, to an adolescent, is often seen as a rite of passage. Many teenagers view alcohol (as well as other drugs) as a gateway to adulthood, but are often blissfully unaware of the damage that it can cause to their bodies. A new study of the effects of excessive alcohol and other drugs in adolescents has shown that both alcohol and marijuana overuse can cause serious detrimental effects on the development of the teenage mind.

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

"The effects of [alcohol](#) and marijuana use on cognition in adults have been researched for decades but are only now beginning to receive attention in [adolescents](#)," said Robert J. Thoma, a Clinical Neuropsychologist and Associate Professor of Psychiatry at the University of New Mexico School of Medicine. "Both animal models and observational studies in humans suggest that binge drinking during adolescence alters normal developmental processes in a way that negatively impacts learning and social adjustment into adulthood."

Thoma added that during adolescent brain development, the frontal lobe plays an important role in the development of judgment, social skills, and decision-making. "Heavy drinking may disrupt normal neurodevelopmental processes that hone and sharpen attention and executive function during adolescence in that alcohol may selectively

target the frontal lobes."

The researchers assessed 19 adolescents that have been diagnosed with substance abuse/dependence, and 14 individuals that have a family history of substance abuse with no history of personal usage. This, in addition to the 15 individuals in the control group, helped the researchers analyze the neurophysiological changes associated with substance abuse.

The researchers discovered, after a battery of psychological tests on the experimental groups, that both frequent alcohol and marijuana use significantly affected the adolescent mind. As drinking intensity increased, individuals demonstrated a significant decrease in attention and executive function (which is involved with planning and selecting appropriate actions based on a selective stimulus). Meanwhile, increased [marijuana](#) use in both groups was also heavily associated with a decrease in memory performance.

"It could be that intense drinking during adolescence leads to delays or incomplete development of frontal brain regions, which in turn leads to problems with attention and executive functioning," said Susan F. Tapert, a Professor of Psychiatry at VA San Diego Healthcare System and the University of California San Diego.

Tapert also noted that if the adolescents were to abstain from alcohol, it may help in recovering the lost function in brain cells, which is a well-established treatment for alcohol-induced brain trauma in adults.

Thoma agreed. "Recovery of function with cessation of drinking is a well-established finding in adults," he said. "And there is reason to believe that the same would hold in youth, who tend to be resilient. If decrements in attention and executive function are indeed caused by alcohol, it is likely that these effects would abate with abstinence from or at least reduction of drinking."

But, this research is only the first step in helping children diagnosed with substance abuse disorders. Thoma and his team plan to continue their research and determine if the effects on the brain are dose-dependent and if modest alcohol use would therefore require intervention.

"We also hope to design studies to test complex models concerning how adolescent [substance abuse](#) develops and either persists or abates over time. Development of a substance use disorder involves a complex interplay of cognitive, behavioral, and genetic factors that science is only beginning to pinpoint."

Provided by Alcoholism: Clinical & Experimental Research

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