

## Individuals who drink heavily and smoke may show 'early aging' of the brain

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Treatment for alcohol use disorders works best if the patient actively understands and incorporates the interventions provided in the clinic. Multiple factors can influence both the type and degree of neurocognitive abnormalities found during early abstinence, including chronic cigarette smoking and increasing age. A new study is the first to look at the interactive effects of smoking status and age on neurocognition in treatment-seeking alcohol dependent (AD) individuals. Findings show that AD individuals who currently smoke show more problems with memory, ability to think quickly and efficiently, and problem-solving skills than those who don't smoke, effects which seem to become exacerbated with age.

Results will be published in the October 2013 issue of *Alcoholism: Clinical & Experimental Research* and are currently available at Early View.

"Several factors – nutrition, exercise, comorbid medical conditions such as hypertension and diabetes, psychiatric conditions such as depressive disorders and post-traumatic stress disorder, and genetic predispositions – may also influence cognitive functioning during early [abstinence](#)," explained Timothy C. Durazzo, assistant professor in the department of radiology and biomedical imaging at the University of California San Francisco, and corresponding author for the study. "We focused on the effects of chronic cigarette smoking and increasing age on cognition because previous research suggested that each has independent, adverse effects on multiple aspects of cognition and brain biology in people with

and without [alcohol](#) use disorders. This previous research also indicated that the adverse effects of smoking on the brain accumulate over time. Therefore, we predicted that AD, active chronic smokers would show the greatest decline in cognitive abilities with increasing age."

"The independent and interactive effects of smoking and other drug use on cognitive functioning among individuals with AD are largely unknown," added Alecia Dager, associate research scientist in the department of psychiatry at Yale University. "This is problematic because many heavy drinkers also smoke. Furthermore, in treatment programs for alcoholism, the issue of smoking may be largely ignored. This study provides evidence of greater cognitive difficulties in alcoholics who also smoke, which could offer important insights for treatment programs. First, individuals with AD who also smoke may have more difficulty remembering, integrating, and implementing treatment strategies. Second, there are clear benefits for thinking skills as a result of quitting both substances."

Durazzo and his colleagues compared the neurocognitive functioning of four groups of participants, all between the ages of 26 and 71 years of age: never-smoking healthy individuals or "controls" (n=39); and one-month abstinent, treatment-seeking AD individuals, who were never-smokers (n = 30), former-smokers (n = 21) and active-smokers (n = 68). Evaluated cognitive abilities included cognitive efficiency, executive functions, fine motor skills, general intelligence, learning and memory, processing speed, visuospatial functions, and working memory.

"We found that, at one month of abstinence, actively smoking AD [individuals] had greater-than-normal age effects on measures of learning, memory, processing speed, reasoning and problem-solving, and fine motor skills," said Durazzo. "AD never-smokers and former-smokers showed equivalent changes on all measures with increasing age as the never-smoking controls. These results indicate the combination of

alcohol dependence and active chronic smoking was related to an abnormal decline in multiple cognitive functions with increasing age."

"These results indicate the combined effects of these drugs are especially harmful and become even more apparent in older age," said Dager. "In general, people show cognitive decline in older age. However, it seems that years of combined alcohol and cigarette use exacerbate this process, contributing to an even greater decline in thinking skills in later years."

Durazzo agreed. "Chronic cigarette smoking, excessive alcohol consumption, and increasing age are all associated with increased oxidative damage to brain tissue," he said. "Oxidative damage results from increased levels of free radicals and other compounds that directly injure neurons and other cells that make up the brain. Cigarette smoking and excessive alcohol consumption expose the brain to a tremendous amount of free radicals. We hypothesize that chronic, long-term exposure to cigarette smoke and excessive alcohol consumption interacts with the normal aging process to produce greater neurocognitive decline in the active-smoking AD group."

Cigarette smoking is a "modifiable health risk" that is directly associated with at least 440,000 deaths every year in the United States, Durazzo noted. "Chronic smoking, and to a lesser extent, alcohol use disorders are also associated with an increased risk for Alzheimer's disease," he said. "So, the combination of these modifiable health risks may place an individual at even greater risk for development of Alzheimer's disease. Given the above, in conjunction with the findings from our cognitive and neuroimaging research, we completely support programs that routinely offer [smoking](#) cessation programs to all individuals seeking treatment for alcohol/substance abuse disorders."

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