

Young age at first drink may affect genes and risk for alcoholism

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The age at which a person takes a first drink may influence genes linked to alcoholism, making the youngest drinkers the most susceptible to severe problems.

A team of researchers, led by scientists at Washington University School of Medicine in St. Louis, studied 6,257 adult [twins](#) from Australia. They wanted to learn whether twins who start [drinking](#) at an early age are more likely to develop a more heritable form of alcohol dependence than those who begin drinking later in life. The researchers found that the younger an individual was at first drink, the greater the risk for alcohol dependence and the more prominent the role played by genetic factors.

"There seemed to be a greater [genetic influence](#) in those who took their first full drink at a younger age," says first author Arpana Agrawal, Ph.D. "That's very consistent with what has been predicted in the literature and in the classification of types of alcohol dependence, but we present a unique test of the hypothesis."

Agrawal and her colleagues examined previously collected data from identical and fraternal, male and female twins, using statistical methods to measure the extent to which age at first drink changed the role of heritable influences on symptoms of alcohol dependence. Using the twin model, they were able to tease out genetic influences, shared environmental influences and non-shared environmental factors.

Agrawal's team found that when twins started drinking early, genetic

factors contributed greatly to risk for alcohol dependence, at rates as high as 90 percent in the youngest drinkers. For those who started drinking at older ages, genes explained much less, and environmental factors that make twins different from each other, such as unique life events, gained prominence.

The twins in the study were 24 to 36 years old when they were interviewed, but some reported taking their first drink as young as age 5 or 6. The researchers found that those who were 15 or younger when they started drinking tended to have a greater genetic risk for alcohol dependence. Some who were 16 or older before they took their first drink later became alcohol dependent, but their dependence was related more to environmental factors.

"We don't have actual gene expression data in this study, but we could hypothesize that exposure to early-onset drinking somehow modifies the developing brain," Agrawal says. "Particularly frequent or heavy early drinking may influence gene expression and contribute to more severe outcomes. Our research cannot prove that, but it's something that neuro-imaging and gene expression studies certainly should investigate."

Another possibility is that early drinking exposes adolescents to certain environment influences, such as their peer groups, that somehow enhance genetic influences that contribute to risk for alcohol dependence.

"Something about starting to drink at an early age puts young people at risk for later problems associated with drinking," Agrawal says. "We continue to investigate the mechanisms, but encouraging youth to delay their drinking debut may help."

"Some early-onset drinkers do not develop alcohol problems and some late-onset drinkers do — we are working on why that is the case, but it is

important to note that this is one risk factor among many and does not determine whether a person will, or will not, develop alcohol dependence," says Agrawal, an assistant professor in the Department of Psychiatry. "But age at first drink is a well-known risk factor, and there have been two main hypotheses about why: One has been that common genetic and environmental factors contribute both to the risk for alcohol dependence and to the likelihood a person will be younger when consuming their first drink. A second hypothesis suggests starting to drink at a younger age exerts an influence on alcohol dependence that is independent of these shared factors. Our findings suggest there may be some truth to both hypotheses."

Agrawal says studying twins offers advantages when attempting to learn about genetic and environmental influences on alcohol dependence. Since identical twins share 100 percent of their DNA, differences in drinking behavior between a pair of twins must come from environmental factors. Similarities between identical twins tend to be influenced by [genes](#) and family environment.

"Particularly identical twins offer us the opportunity to study the perfect natural experiment of genetically identical individuals whose drinking trajectories are modified by their shared and unique life experiences," she explains. "They are important assets in the study of complex behaviors, such as [alcohol](#) consumption."

The study results will be published in the December issue of *Alcoholism: Clinical & Experimental Research*, but they are available online through the journal's Early View.

More information: Agrawal A, Sartor CE, Lynskey MT, Grant JD, Pergadia ML, Grucza R, Bucholz KK, Nelson EC, Madden PAF, Martin NG, Heath AC. Evidence for an interaction between age at first drink and genetic influences on DSM-IV [alcohol dependence](#) symptoms.

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