

Resiliency during early teen years can protect against later alcohol/drug use

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Resiliency is a measure of a person's ability to flexibly adapt their behaviors to fit the surroundings in which they find themselves. Low resiliency during childhood has been linked to later alcohol/drug problems during the teenage years. A new study has examined brain function and connectivity to assess linkages between resiliency and working memory, finding that higher resiliency may be protective against later alcohol/drug use.

Results will be published in the August 2012 issue of *Alcoholism: Clinical & Experimental Research* and are currently available at Early View.

"Research in the 1980's found that lower [resiliency](#) in children between three to four years old was related to subsequent adolescent drug usage," said Barbara J. Weiland, a researcher at The University of Michigan and corresponding author for the study. "We subsequently found that low resiliency measured in preschoolers was associated with onset of [alcohol](#) use by age 14 and of drunkenness by age 17."

"It is well known that individuals with a family history of alcoholism are high-risk for developing problems with alcohol and other drugs, however, we know little about the factors associated with resiliency in the offspring of alcoholics," said Peter R. Finn, professor of psychology at Indiana University, Bloomington. "This study provides very important information about the possible neurocognitive mechanisms underlying the association between low resiliency and a vulnerability to alcohol

problems in the families of alcoholics."

"Other researchers had proposed that resiliency may depend on maturation of frontal neural circuits that help in self-regulation," said Weiland. "Neuroimaging studies of how the brain performs working-memory tasks have found involvement of some of the same regions involved in self-regulation, including the basal ganglia, anterior cingulate and prefrontal cortex. It was this overlap that made us suspect that resiliency and working memory might be linked through common brain regions."

The researchers probed working memory in 67 (43 men, 24 women) 18-to-22 year olds from a larger community study of alcoholism through use of functional magnetic resonance imaging, and investigated functional connectivity between task-related regions with psychophysiological interaction analysis. Resiliency had been measured during the participants' early teen years and for this study was compared to early-adulthood measures of drinking/[drug use](#), task activation and connectivity. The study authors also examined relationships with other risk factors such as family history, age of drinking onset, and various alcohol problems.

"Our findings show that high resiliency in early adolescence may be a protective factor against substance use in later teen and early adult years, which extends the period of influence of this personality trait," said Weiland. "We also found that higher resiliency is related to better performance on a working memory task, and that resiliency may have a neural link with working memory through functioning of the basal ganglia. We suspect that the complex tasks involved in working memory are supported by similar brain processes involved in decisions about risky substance use, and resiliency may be a personality trait that influences these processes."

"The link, or association, between low resiliency during childhood and later alcohol problems is relatively modest in this study," said Finn.

"However, since not all offspring of alcoholics are truly vulnerable and there are numerous factors that are associated with vulnerability, the relatively modest association between low resiliency and alcohol problems is still quite significant. Furthermore, the link between low resiliency, low working memory capacity, and differences in activation level in specific brain areas is a very important and valuable finding because it tells us a little about where the problem may lie, and, possibly where one might target prevention or interventions. For instance, recent research suggests that cognitive training can have an impact on reducing risk for alcohol problems."

"Our work suggests that a key basal ganglia structure called the STN causes one to make slower and more accurate choices through proactive inhibition of impulsive responses, therefore allowing the prefrontal cortex to focus and control actions," said Weiland. "In other words, perhaps this is the brain mechanism that makes resiliency a protective trait."

"The current study builds upon our research by identifying a specific neurocognitive mechanism that may explain aspects of the associations that we have observed," added Finn. "The results are very interesting and are sure to inspire some of our future investigations into the neurocognitive processes that mediate vulnerability to substance use disorders."

"During adolescence, youth are often in situations which test their self-control, adaptability, and decision making," noted Weiland. "[Working memory](#) is one measure of executive function that involves multiple, complex tasks such as storing information, evaluating options, making and acting on decisions. These results suggest that interventions for children or adolescents at risk for substance abuse might focus on

boosting resilient behaviors such as learning to deal with uncertainty or unfamiliar situations."

"Any extreme in behavior, whether it involves consistent out-of-control behavior or overly inhibited behavior, should be a signal that one's child is not adapting well to different contexts," said Finn. "It is important to pay attention to such a child and encourage more flexibility in behavior in different situations. This may involve altering the situations, providing more support to one's child to foster greater flexibility, or working with the key agents in the different situations, such as teachers. The best rule of thumb is to pay attention, provide positive support, and don't panic. The causes of behavior are complex and differ widely across children. It might be comforting to know that even in cases where there apparently is low resilience, many such children do not develop problems."

Provided by University of Michigan

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