

Brain imaging shows brain differences in risk-taking teens

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According to the CDC, unintentional injuries are the leading cause of death for adolescents. Compared to the two leading causes of death for all Americans, heart disease and cancer, a pattern of questionable decision-making in dire situations comes to light in teen mortality. New research from the Center for BrainHealth at The University of Texas at Dallas investigating brain differences associated with risk-taking teens found that connections between certain brain regions are amplified in teens more prone to risk.

"Our brains have an emotional-regulation network that exists to govern emotions and influence decision-making," explained the study's lead author, Sam Dewitt. "Antisocial or risk-seeking behavior may be associated with an imbalance in this network."

The study, published June 30 in *Psychiatry Research: Neuroimaging*, looked at 36 adolescents ages 12-17; eighteen risk-taking teens were age- and sex-matched to a group of 18 non-risk-taking teens. Participants were screened for risk-taking behaviors, such as drug and alcohol use, sexual promiscuity, and physical violence and underwent functional MRI (fMRI) scans to examine communication between [brain regions](#) associated with the emotional-regulation network. Interestingly, the risk-taking group showed significantly lower income compared to the non-risk taking group.

"Most fMRI scans used to be done in conjunction with a particular visual task. In the past several years, however, it has been shown that

performing an fMRI scan of the brain during a 'mind-wandering' state is just as valuable," said Sina Aslan, Ph.D., President of Advance MRI and Adjunct Assistant Professor at the Center for BrainHealth at The University of Texas at Dallas. "In this case, brain regions associated with emotion and reward centers show increased connection even when they are not explicitly engaged."

The study, conducted by Francesca Filbey, Ph.D., Director of Cognitive Neuroscience Research of Addictive Behaviors at the Center for BrainHealth and her colleagues, shows that risk-taking teens exhibit hyperconnectivity between the amygdala, a center responsible for emotional reactivity, and specific areas of the [prefrontal cortex](#) associated with emotion regulation and critical thinking skills. The researchers also found increased activity between areas of the prefrontal cortex and the nucleus accumbens, a center for reward sensitivity that is often implicated in addiction research.

"Our findings are crucial in that they help identify potential brain biomarkers that, when taken into context with behavioral differences, may help identify which adolescents are at risk for dangerous and pathological behaviors in the future," Dewitt explained.

He also points out that even though the risk-taking group did partake in risky behavior, none met clinical criteria for behavioral or substance use disorders.

By identifying these factors early on, researchers hope to have a better chance of providing effective cognitive strategies to help risk-seeking adolescents regulate their emotions and avoid risk-taking behavior and substance abuse.

More information: *Psychiatry Research: Neuroimaging*, www.psych-journal.com/article/S0925-4927%2814%2900064-X/abstract

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