

# Brain imaging may help identify teens at risk of increasing alcohol use

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Teenagers with large amounts of grey matter in the brain at age 14 are more likely to increase their alcohol use over the next five years, according to a whole brain imaging study reported today in *eLife*.

The findings may help scientists understand what makes some teens more vulnerable to developing [alcohol use](#) disorders. They could also help identify teens who are at increased risk of excessive drinking and enable early interventions to curb alcohol use.

"Adolescence is a critically vulnerable time for the development of alcohol drinking habits that may lead to considerable consequences later in life, including [alcohol addiction](#)," says lead author Simone Kuehn, Professor of Neural Plasticity at the University Medical Center Hamburg-Eppendorf, and Group Leader at the Center for Lifespan Psychology, Max Planck Institute for Human Development, Germany. "During this period, teens undergo a critical period of [brain](#) development and adopt many new behaviours, making it an important time to intervene."

Previous studies have suggested that differences in certain parts of the brain in early adolescence may make some young people more vulnerable to developing addictions. Kuehn and her colleagues went a step further by using structural magnetic resonance imaging to look for differences throughout the entire brain that might predict increasing teen [alcohol](#) use over the next five years.

They looked at detailed brain images of 1,814 healthy 14-year-olds participating in the IMAGEN project, a large European study of adolescents, and compared that to the participants' self-reported drinking habits at ages 14, 16 or 17, and 19. They used computers to break the images into small 3-D cubes called voxels and built models based on this data to predict changes in the teens' drinking behaviour over time.

The models revealed that teens with more [grey matter](#) in the caudate nucleus, the region of the brain involved with learning, and the left cerebellum, which is associated with thinking and movement, had a higher chance of increasing their [drinking](#) habits over time.

Similar brain differences in adolescents have been linked to the development of psychiatric disorders later in life, which reinforces the idea that structural differences in the brain may contribute to both psychiatric and substance use disorders. But the cause of these differences isn't yet clear. However, Kuehn notes that the amount of grey matter in the brain grows through childhood and then peaks during adolescence when unnecessary brain connections are pruned away.

"Our results may reflect a slowing down of this pruning activity or an overproduction of brain connections," Kuehn concludes. "Future research involving multiple neuroimaging techniques will be needed to help answer this question."

**More information:** Simone Kühn et al, Predicting development of adolescent drinking behaviour from whole brain structure at 14 years of age, *eLife* (2019). [DOI: 10.7554/eLife.44056](https://doi.org/10.7554/eLife.44056)

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