

Neuroimaging suggests resilience to drug addiction may come from better control over compulsive behaviors

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A team of researchers at the University of Cambridge has found evidence suggesting that people who are addicted to drugs may find

gaining control over compulsive behaviors a path to recovery. In their paper published in *Proceedings of the National Academy of Sciences*, the group describes their study of fMRI images of the brains of volunteers and what they learned from them.

Treatment for [drug](#) addicts tends to focus on ways to prevent them from continuing use of a certain drug, such as cocaine or heroin, or even alcohol. But prior evidence has suggested that there may be a link between compulsive personalities and addiction—many addicts are addicted to many substances, or switch from using one drug to another when trying to quit the first. Scientists have also been unable to figure out why some people become addicted to a given drug easily, while others are able to use the same drug recreationally. By studying the brains of addicts and their [family members](#), the researchers sought to learn more about the connection between compulsive disorders and [drug addiction](#), and whether it might be related to the ease and quickness of addiction.

The work involved administering fMRI scans to 162 volunteers and studying the results. Some of the volunteers were stimulant addicts. Others were non-addicted siblings of the addicts. Also, some of the volunteers had no family history of addiction but were regular non-addicted stimulant users. Control volunteers with no drug abuse history were also included in the study.

In comparing the brain scans, the researchers found that volunteers who did not develop an addiction to stimulants despite using them regularly and who had no familial risk had a strong connection between the [frontal cortex](#) and the striatum in two distinct brain networks. The first of those networks were made up of the medial caudate nucleus and the lateral [prefrontal cortex](#)—the second was made up of the superior medial frontal cortex, the supplementary motor area and the outer part of the lentiform nucleus. Prior research has shown that such networks play a

role in shaping goals, controlling behavior and habit regulation. The researchers suggest this finding hints at the possibility of differences in [brain](#) connections playing a role in compulsion, and by extension, addictive responses to various drugs. They believe their findings could lead to new ways to treat people addicted to drugs, particularly those in at-risk groups.

More information: Karen D. Ersche et al. Brain networks underlying vulnerability and resilience to drug addiction, *Proceedings of the National Academy of Sciences* (2020). [DOI: 10.1073/pnas.2002509117](https://doi.org/10.1073/pnas.2002509117)

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