

# Drugs and the Teen Brain

Adolescence is a critical time in brain development. That means teens are at greater risk of experiencing the harmful effects of drugs and alcohol.

“Taking chances isn’t always bad—it’s part of growing up. But not thinking through consequences can be dangerous when it comes to decisions about drugs and alcohol.”

BY THE TIME YOU ARE A TEENAGER, many parts of your brain have developed so much that you may be able to perform complicated calculations and even have a sharper memory than some adults (like how you might be able to memorize your home’s random 11-character Wi-Fi password—while your parents never can!).

But one critical part won’t be developed until your mid-twenties—putting teens at a higher risk for the harmful effects of drugs and alcohol.

## Under Construction

The key brain part that’s still developing is the **prefrontal cortex** and it’s the area you use in critical thinking, such as when you weigh pros and cons before making a decision.

Because the prefrontal cortex is not yet fully developed, teens automatically rely more on the **limbic system** to make decisions. This system’s network of brain structures is linked to emotions and experiencing rewards rather than critical thinking.

Because their prefrontal cortex is in development, teens are more likely to make decisions based on what provides instant gratification, such as a feeling of happiness. This focus can lead them to take more risks than adults. For example, your peers might pressure you to do something you later regret, such as pulling a prank that lands you in trouble. Rather than thinking carefully about the negative outcomes, the teen brain focuses more on getting the reward of your friends’ acceptance.

Of course, taking chances isn’t always a bad thing—it helps you grow into an adult and become independent. But not thinking through consequences can be dangerous when it comes to decisions related to drugs and alcohol.

That’s one reason teens are more likely than adults to binge drink. Binge drinking is when someone consumes four to five alcoholic drinks within a few hours. Teens may be less able than adults to judge when to stop drinking (remember: underdeveloped prefrontal cortex!). The scary part? Studies have shown that even a few sessions of binge drinking can cause harmful changes to a developing brain.

## Addiction Risk

Teens are also at a higher risk of developing the disease of **addiction**. Scientists believe that addiction is closely linked to **dopamine**, a chemical that helps transmit signals in the brain. A person taking drugs causes a surge of dopamine in the brain.

Any rewarding activity, such as enjoying a slice of pizza, causes a dopamine release. But the surge is much higher and more intense with drugs. Over time, repeated drug use can “teach” the brain to seek the substances over other, healthier rewards. That is addiction.

Teens have a higher risk of addiction because their limbic systems are very sensitive to dopamine. As a result, they may crave drugs more strongly than adults. The earlier someone starts drug use, the higher his or her addiction risk.



## Brain Changes

As you grow and learn, your body strengthens pathways between **neurons** (nerve cells) in the brain and gets rid of ones that aren't used. These connections, called **synapses**, determine how your brain processes information. The network of synapses is what supports everything from your memory to your ability to learn and feel emotions.

Exposing the teen brain to drugs can change how these pathways are organized and how the brain functions. The negative impact

of drug use can cause problems with attention, memory, and problem solving that can last all the way through adulthood.

The good news is that by thinking through your actions now, you can have a positive impact on your brain for the rest of your life. Taking on challenges to build abilities and skills—such as learning a new sports move or picking up a foreign language—helps build new connections that make your brain stronger and better able to tackle future tasks. If you are good to your brain, it will be good to you.



### Because the brain's **prefrontal cortex**

(the part in charge of critical thinking) is not yet fully developed in teens, they rely more on the limbic system (which is tied to rewards and emotions) to make decisions.

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