



Brain Development, Teen Behavior and Preventing Drug Use

There's a reason that teenagers act the way they do. Understanding the brain science behind teenage behavior can help parents better prepare their kids to avoid drugs and alcohol.

Why Do Teens Act The Way They Do?

Have you ever looked at your teenager child and wondered: “Why do you do that?”

From mood swings to risk taking, “normal teenage behavior” can appear to be anything *but* normal to parents and other adults. However, research reveals that patterns of brain development during these formative years play a significant role in shaping your teen's personality and actions. In other words, there's a biological reason teens act the way they do.

Scientists have learned that it takes a brain about 25 years to fully develop. To some degree, you can consider the teen brain still on “training wheels” – it's not yet able to perform at optimal adult levels. A huge burst of development happens during adolescence, and that burst can explain a lot of unpredictable – and sometimes risky – teen behavior.

The Adolescent Brain and the Behavior it Causes

From early adolescence through the mid-20s, the brain develops somewhat unevenly, from back to front. This may help explain teens' endearingly quirky behavior, but it also makes them prone to risk-taking.

Parts of the brain drive different behaviors.

Brains develop back to front. So what? (Here's what.)
And how do we know that? (Brain imaging technology.)
Developing brains may be more prone to damage.

The parts of the adolescent brain that develop first are those that control physical activity, emotion and motivation, in the back of the brain in the cerebellum, amygdala, and nucleus accumbens respectively.

However, the part of the brain that controls reasoning and impulses – known as the prefrontal cortex – is near the front of the brain and, therefore, develops last. This part of the brain does not fully mature until the age of 25.

The staggered development of certain parts of the brain can have noticeable effects on adolescent behavior. You may have noticed some of these in your teen:

- Difficulty holding back or controlling emotions
- A preference for high-excitement and low-effort activities (this is where the classic mantra of “sex, drugs and rock ‘n’ roll” comes from)
- Poor planning and judgment (such as rarely thinking of negative consequences)
- More risky, impulsive behaviors (including experimenting with drugs and alcohol)

The development of the adolescent brain and behavior are closely linked. The prefrontal cortex, which could be called the ‘voice of reason’ in the teen brain, isn’t as influential as those parts that place a higher emphasis on emotion, excitement and short-term reward. In an instant, hormones can shift your teen’s emotions into overdrive, leading to unpredictable – and sometimes risky – actions.

Unfortunately, developing brains are generally more prone to damage. This means that experimentation with drugs and alcohol can have lasting, harmful effects on your teen’s health.

The Effects of Drugs on the Teen Brain

Finding ways to satisfy needs and desires is part of life. It’s one of the many skills being fine-tuned during the teen years. When a teen takes drugs in order to feel good, it interferes with the body’s natural ability to do so. Here’s how drugs affect the brain:

The brain is made up of billions of nerve cells. Nerves control everything from when the heart beats to what your teen feels, thinks and does. They do this by sending electrical signals throughout the body. The signals get passed from nerve to nerve by chemical messengers called **neurotransmitters**.

For example, some of the signals that neurotransmitters send cause a feeling of satisfaction or pleasure. These natural rewards are the body’s way of making sure we look for more of what makes us feel good. (For instance, when we eat something tasty, neurotransmitters tell us we feel good. Seeking more of this pleasure helps to ensure we don’t starve.) The main neurotransmitter of the “feel-good” message is called **dopamine**.

Drugs overload the body with dopamine — in other words, they cause the reward system to send too many “feel-good” signals. In response, the body’s brain systems try to right the balance by letting fewer of the “feel-good” signals through. As time goes on, the body needs more of the drug to feel the same high as before. This effect is known as tolerance, and it can be especially dangerous in the cases of drugs like heroin and cocaine.

The effects of drugs on the brain don’t just end when the drug wears off. When a person stops taking a drug, dopamine levels remain low for some time. He or she may feel down, or flat, and unable to feel regular pleasures in life. The brain will eventually restore the dopamine balance by itself, but it takes time — anywhere from hours, to days, or even months, depending on the drug, the length and amount of use, and the person.

Because teenagers have an over-active impulse to seek pleasure and less ability to consider the consequences, they are especially vulnerable when it comes to the temptations of drugs and alcohol. And because the internal reward systems are still being developed, a teen’s ability to bounce back to normal after using drugs may be compromised due to how drugs affect the brain.

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