**Adolescent Angst: 5 Facts About the Teen Brain**

by Robin Nixon   |   July 08, 2012 06:50pm ET\

They are dramatic, irrational and scream for seemingly no reason. And they have a deep need for both greater independence and tender loving care.

There is a reason this description could be used for either teens or toddlers: After infancy, the [brain's most dramatic growth spurt](http://www.livescience.com/9006-brain-museum-exhibit-blow-mind.html) occurs in adolescence.

"The brain continues to change throughout life, but there are huge leaps in development during adolescence," said Sara Johnson, an assistant professor at the Johns Hopkins Bloomberg School of Public Health who reviewed the neuroscience in "The Teen Years Explained: A Guide to Healthy Adolescent Development" (Johns Hopkins University, 2009) by Clea McNeely and Jayne Blanchard.

And though it may seem impossible to get inside the head of an adolescent, scientists have probed this teen tangle of neurons. Here are five things they've learned about [the mysterious teen brain](http://www.livescience.com/13850-10-facts-parent-teen-brain.html).

**1. New thinking skills**

Due to the increase in brain matter, the teen brain becomes more interconnected and gains processing power, Johnson said. Adolescents start to have the computational and [decision-making skills](http://www.livescience.com/10748-grand-theft-auto-improve-decision-making-skills.html) of an adult –*if* given time and access to information, she said.

But in the heat of the moment, their decision-making can be overly influenced by emotions, because their brains rely more on the limbic system (the emotional seat of the brain) than the more rational prefrontal cortex, explained said Sheryl Feinstein, author of "Inside the Teenage Brain: Parenting a Work in Progress" (Rowman and Littlefield, 2009).

**2. Intense emotions**

"Puberty is the beginning of major changes in the limbic system," Johnson said, referring to the part of the brain that not only helps regulate heart rate and blood sugar levels, but also is critical to the formation of memories and emotions.

Part of the limbic system, the amygdala is thought to connect sensory information to emotional responses. Its development, along with hormonal changes, may give rise to newly intense experiences of rage, fear, aggression (including toward oneself), excitement and [sexual attraction](http://www.livescience.com/17254-adolescent-sex-brain-development.html).

Over the course of adolescence, the limbic system comes under greater control of the prefrontal cortex, the area just behind the forehead, which is associated with planning, impulse control and higher order thought.

As additional areas of the brain start to help process emotion, older teens gain some equilibrium and have an easier time interpreting others. But until then, they often misread teachers and parents, Feinstein said.

"You can be as careful as possible and you still will have tears or anger at times because they will have misunderstood what you have said," she said.

**3. Peer pleasure**

As teens become better at thinking abstractly, their social anxiety increases, according to research in the Annals of the New York Academy of Sciences published in 2004.

Abstract reasoning makes it possible to consider yourself from the eyes of another. Teens may use this new skill to ruminate about what others are thinking of them. In particular, peer approval has been shown to be highly rewarding to the teen brain, Johnson said, which may be why [teens are more likely to take risks](http://www.livescience.com/11668-friends-drive-friends-risks.html) when other teens are around.

"Kids are really concerned with looking cool – but you don't need brain research to tell you that," she said.

**4. Measuring risk**

"The brakes come online somewhat later than the accelerator of the brain," said Johnson, referring to the development of the prefrontal cortex and the limbic system respectively.

At the same time, "[teens need higher doses of risk](http://www.livescience.com/9436-teens-stupid.html) to feel the same amount of rush adults do," Johnson said.

Taken together, these changes may make teens vulnerable to engaging in risky behaviors, such as trying drugs, getting into fights or jumping into unsafe water. By late adolescence, say 17 years old and after, the part of the brain responsible for impulse control and long-term perspective taking is thought to help them reign in some of the behavior they were tempted by in middle adolescence, according to McNeely and Blanchard.

**5. 'I am the center of the universe'**

The hormone changes at puberty have huge effects on the brain, one of which is to spur the production of more receptors for oxytocin, according to research detailed in a 2008 issue of the journal Developmental Review.

While oxytocin is often described as the "[bonding hormone](http://www.myhealthnewsdaily.com/11-effects-of-oxytocin-0824/)," increased sensitivity to its effects in the limbic system has also been linked to feeling self-consciousness, making an adolescent truly feel like everyone is watching him or her. According to McNeely and Blanchard, these feelings peak around 15 years old.

While this may make [a teen seem self-centered](http://www.livescience.com/11647-brain-scans-show-teens-adults.html) (and in their defense, they do have a lot going on), the changes in the teen brain may also spur some of the more idealistic efforts tackled by young people throughout history.

"It is the first time they are seeing themselves in the world," Johnson said, meaning their greater autonomy has opened their eyes to what lies beyond their families and schools. They are asking themselves, she continued, for perhaps the first time: What kind of person do I want to be and what type of place do I want the world to be?

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1) Which of these factors do you think is the greatest cause of teen angst (for you personally, or for the majority of teens)?

2) Paraphrase the main idea of the article.