

The Power of the Adolescent Brain: A TAG Talk

Transcript — Segment 6: Questions and Answers

Frances Jensen:

It's important to realize that mental illness often has its first manifestations in the teen or young adult age window, and so therefore we have to be a little extra vigilant about changes in our teenagers. I would say changes in their social behavior, if they're isolating themselves to an excessive amount, if they're dropping contacts with their friends, changes in their appetite, weight loss, weight gain, major changes in sleep, excessive irritability are all signs of a possible problem in your adolescent. What we really mean is this is all on an individual basis.

If you see a change occurring over weeks or months from what used to be your teenager's baseline to something different, that is a cause to stop and try to learn more, and if necessary contact your healthcare professional. There are some slight differences in brain development rates between girls and boys. In fact, on average girls are approximately two years ahead of boys in the developmental trajectory. That means for a given age, girls will appear to be about two years ahead of boys on average. There are late girls and early boys, so it really is a very individual process.

There are often big differences between girls and boys in early teen years or mid teen years with respect to the amount of organizational behavior they exhibit. Girls tend to be a little bit more organized and putting together planning to a greater extent than boys. This is likely because they're that much further along in development and in that frontal lobe connectivity. Similarly, studies show that males are often greater risk takers than girls, especially towards the end of the teen years. This may be explained by the fact that in general male brains reach maturity later than female brain, and in late adolescence the frontal lobe of males may be less connected than females.

As adults around teenagers we may think about treating girls differently from boys, however actually it's a very individual process. I think we have to be mindful of where our teenager is with respect to their risk taking behavior or ability to plan, and, again, where necessary give a frontal lobe assist. Teenagers are naturally novelty seeking. This is actually a consequence of their brain stage, in that their reward systems, their novelty seeking systems are actually on high energy compared to later in life, and at the same time their frontal lobes are less connected than they will be later.

This is of course one of the root causes of them taking risks, and sometimes those risks can be dangerous. However, there are good risks to take too, and we have to think about how we can take advantage of that natural novelty seeking behavior of a teenager to ask them to experiment with positive influences in their life. After all, we shape our brains through trial and error, nature versus nurture. The environment shapes our brains, so teenagers have an opportunity to even get more out of the environment than the adult for a given experience. We could imagine letting the teenager experience community service or a summer job, or giving them new responsibilities at home, as well as of course all the opportunities that are available to them through their school.

A really important message for adults especially parents is that teen behavior can be at times very frustrating to us as adults, and really provoke a sense of anger at times in adults. I would implore adults to use the new research on the teenage brain to actually be more patient with their children. Actually, behavior can be explained a lot by biology, and if you just step back and take that into account, it might help you to count to 10 and not alienate your teenager. They're going to need you for help with

planning, assessing risk, and this is where we've often said an adult whose frontal lobe is healthily attached can give their teenager a frontal lobe assist.

One thing that teenagers do have is an incredible ability to learn, and to learn lessons. As adults we can use events that are happening around the teenager in their own life, or even events from your own personal history to explain to them the cause and effect, especially when it is around risk taking and dangerous risk taking, and bad consequences. I think it's important that adults help the teenager understand where they are in development, and that they have hidden strengths that they're not going to have again. One important message is that the brain is changing every day, every week during this window of development, so what environment that the teenager is in during those days and weeks and years of adolescence actually shapes their brain.

It's a time of incredible scaffolding of the brain, and therefore I think we can explain to them that they have the ability to change their brain for better or worse, and of course we'd like the former, not the latter. One message to teenagers is to use the research and the data that we have available to us from neuroscience to teach them these new facts. Teenagers are part of a data-driven generation. We can use that to help them guide themselves, and recognize that this is a window of opportunity. I often say mind your brain now and it will mind you later.

In this series we've pointed out several times that the teenage brain, the adolescent brain has hidden strengths. One of those hidden strengths is their ability to learn. They have more synapses in their brains. We do our learning at our synapses, the connections between our brain cells, and they are able to grow more synapses and shape more synapses with experience than they will later in adulthood. Therefore it is a window of opportunity for them. Importantly, negative things can impact their ability to learn, which is a little ironic given the one thing they do really well is learn, and yet they put themselves in positions that might threaten their ability of the brain to learn. These include sleep deprivation, substance abuse, and stress.

I think as adults we can inform teenagers of the effects of these negative influences on their brain's ability to grow, develop, and to sustain that heightened ability to learn. Sleep is a really important factor in the brain's ability to function normally. We consolidate our memories during sleep. Sleep deprivation impairs our ability to learn at any age, but of course teenagers because they're learning so fast are even more vulnerable to the effects of sleep.

Interestingly, teenagers have a different sleep cycle than adults. I think many people think that teenagers are just lazy. They're not. It is because their sleep cycle is shifted. They release a hormone called melatonin at a later time than adults, and this brain chemical actually is what stimulates sleep and makes our brain want to go to sleep. We as adults put melatonin out at about 8:30, 9:00 at night, and about an hour and a half we feel sleepy. Teenagers on the other hand release melatonin more like 10:30, 11:00, so they aren't even ready to sleep until after midnight.

In addition, they threaten their ability to sleep because they stimulate themselves with numerous electronic devices and light that will prevent their brain from going to sleep. As a result teenagers can get sleep deprived very easily. Because their sleep cycle is shifted, we are waking them up at a time that their brain is naturally still wanting to sleep, so at 6:00 or 7:00 a.m. when the day starts for most of us, teenagers are basically in the same place as an adult would be at about 3:00 a.m., because of this shift. Therefore they may start the day in a somewhat sleep deprived state.

We know a lot about the effects of sleep deprivation on the process of learning, and in fact sleep deprivation can prevent your synapses, those connection points, from actually becoming stronger

during learning. Sleep deprivation can weaken that process. On the other hand as I said before, sleep can actually strengthen learning that has already happened, so that if you fall asleep after you've learned something you will actually consolidate that memory better. It really matters what the teenage brain is exposed to on a daily basis, and there can be long term consequences of chronic exposure to negative things.

Just like drugs and chronic use of drugs can affect later life brain function, chronic stress can actually affect the brain as well. It's been shown that chronic stress during adolescence can actually cause an increase in the risk of depression in adulthood. Of course, there's a lot of research that's very well established about the effects of stress and impoverished environments on children, but importantly new research shows that this vulnerability extends to adolescence as well, that adolescence and young adulthood is also a time where stress can leave a long lasting mark on the brain.