npr shots

your health treatments & tests health inc. policy-ish public health

< Why Teens Are Impulsive, Addiction-Prone And Should Protect Their Brains

JANUARY 28, 2015 2:03 PM ET

TERRY GROSS, HOST:

This is FRESH AIR. I'm Terry Gross. We're going to talk about some neuroscience that will be of particular interest to the parents of teenagers and to anyone who's ever been a teenager. New research into how the human brain develops helps explain some of the reasons teenagers can be especially impulsive, moody and not very good at responsible decision-making. New research also explains why teenagers can be especially susceptible to addictions, including drugs, alcohol, smoking and, yes, cellphones.

My guest is neurologist Dr. Frances Jensen, author of the new book "The Teenage Brain." She's a professor and chair of the Department of Neurology at the University of Pennsylvania Perelman School of Medicine and was formally a Harvard professor and director of Translational Neuroscience at Boston Children's Hospital. She was the single parent of teenage sons. Her children are now in their 20s. Later, we'll talk about something that afflicts many adults - the feeling that your brain has been overloaded with too much information.

Dr. Jensen, welcome to FRESH AIR.

FRANCES JENSEN: Great to be here.

GROSS: So you point out we know now that the brain is the last organ to fully develop and that the teenage brain is still developing, and the part of the brain that's responsible for what's called, like, executive decision-making - judgment - isn't fully developed yet. It's still starting to develop when kids are in their teens. So which part of the brain is that and how underdeveloped is it?

JENSEN: Well, that's the prefrontal and frontal cortex - the very front of your brain. And teenagers are gaining increasing access as they go through their teens to that part of the brain. It used to be thought that children turned into almost adults - as we put in the book, adults with fewer miles on them - when they pass through puberty. And they kind of looked like adults. And you had the expectation that their brain - because their body looks like an adult - that their brain should also be structurally like an adult. Well, it's far from the truth. The teenage brain is not there all the way. It takes, often, into your early 20s and possibly late-20s and, you know, maybe even beyond for the brain to fully mature to adult levels. And one of the main drivers of this is the way our brain connects regions to each other inside the brain. These connection tracts have to be insulated for very fast signaling. And we have a natural insulation that's similar to the insulation around an electrical wire, which is usually a, you know, rubber insulation. We have something - a natural insulation - called myelin. It's a fat, and it takes time. Cells have to build myelin, and they grow it around the outside of these tracts. And that takes years. It's interesting. It goes from the back of your brain to the front, so the last place to be connected, to be fully myelinated, is the front of your brain. And what's in the front? Your prefrontal cortex and your frontal cortex. These are areas where we have insight, empathy. These executive functions, such as impulse control, risk-taking behavior, is suppressed by activity in your frontal lobes.

GROSS: So what does that explain about teenage behavior?

JENSEN: So it does explain, at least in part, why they are - their frontal lobes are there. They're there, and they're built. They're just not accessed in as rapid a manner because the insulation to the wiring to them isn't fully developed, so the signals go more slowly. Hence, teenagers are not as readily able to access their frontal lobe to say, oh, I better not do this. An adult is much more likely to control impulses or weigh out different factors in decisions, where a teenager may not actually have full online, in the moment capacity. And that's why we see this increased in risk - you know, classic sort of increase risky behavior. We've talk a lot about the downside of the limitations of, oh, the teen brain, you know, no insight, no judgment. Well, of course there's some. It's a gradual process. It's not - never all or none. But there's also wonderful - this is a wonderful time in life for teenagers. This is a time where because of their enhanced synaptic plasticity, which we can talk about, they can learn faster. They can absorb more information. They can...

GROSS: Well, on a related note, you say teenagers cannot only learn faster but the memories last longer. Like, they're more deeply ingrained. Why is that?

JENSEN: Well, the whole process of learning and memory is thought to be a process of building stronger connections between your brain cells. Your brain cells create new networks when you learn new tasks and new skills and new memories. And where brain cells connect are called synapses. And the synapse actually gets strengthened the more you use it. And especially if you use it in a patterned way, like with practice, it gets even stronger, such that after the practice, you don't need much effort to remember something. This actually has a scientific basis. This has been studied in slices of brain, for instance, in - from animal experiments, where it's called long-term potentiation - long-term meaning it's lasting a long time, potentiation meaning strengthening. Turns out that if you are stimulating one brain cell and recording from a second brain cell, if you do an initial stimulation, you get a small response from the second brain cell. But if you give a pattern stimulation, a fast-pattern stimulation akin to a practice session, from that point on, even if you go back to the little, small stimulus you used originally, you get a much bigger response on that second neuron. It's now remembered this, and it's - how is the response bigger? It's actually physically built a bigger synapse on the receiving end of that second cell. All the machinery of that requires more activation, more excitation of the brain. We are programmed, over development, to have more excitation, more molecules that subserve excitation during childhood and teen years than in adult.

GROSS: Teenagers are more prone to addiction. Why is that?

JENSEN: Well, addiction is actually a form of learning. And just like when I was talking about learning requires synaptic plasticity and enhancement of a synapse based on repeated exposure to facts in a memorization task, what happens in addiction is there is also repeated exposure, except it's to a substance. And it's not in the part of the brain we use for learning. It's in the reward-seeking area of your brain - the limbic system, someplace called the nucleus accumbens and the ventral tegmental area you read a lot about. And it's involving dopamine and other neurotransmitters. It's happening in the same way that learning stimulates and enhances a synapse. Substances do the same thing. They build a reward circuit around that substance to a much stronger, harder, longer, stronger addiction. Just like learning a fact is more efficient, sadly, addiction is more efficient in the adolescent brain. That is an important fact for an adolescent to know about themselves - that they can get addicted faster. It also explains why - and it also is a way to debunk a myth, by the way, that, oh, teens are resilient. They'll be fine, you know? He can adjust go off and drink or do this or that. They'll bounce back. Actually, it's quite the contrary. The effects of substances are more permanent on the teen brain. They have more deleterious effects and can be more toxic to the teen than in the adult.

GROSS: It's easier to turn off to what you just said and say, oh, all moralistic people talk that way about drugs. So are you coming at this from a moralistic, preachy perspective?

JENSEN: Absolutely not. And that's exactly why the book contains lots of facts and graphs from actual research that shows this very fact that drugs and alcohols, other substances have different effects on the teen and adolescent brain than they do an adult. This is still a very imprintable, impressionable period of brain development. So it, you know, is kind of common sense when you think about it. Good things can have a good effect on the brain in a stronger way than later in life, and bad things can have a bad effect on the brain.

GROSS: There's an interesting paradox you point out when it comes to alcohol in the teenage brain. The teenage brain is more resilient when it comes to, like, the sedative effects of alcohol. Like, you know, they're not going to get tired as quickly. At the same time, that means they might drink more (Laughter). So would you talk about that paradox?

JENSEN: Yes, so the alcohol actually - because it's affecting critical machinery in the brain that is actually at higher levels in the teenager than in the adult, there is more of target material for alcohol in the developing brain than later in life. And hence, it can have a more toxic effect. There are studies that show that binge drinking - which is probably the worst scenario actually - binge drinking can actually kill brain cells in the adolescent brain where it does not to the same extent in the adult brain. So for the same amount of alcohol, you actually get - you can actually have brain damage, permanent brain damage, in an adolescent for the same blood alcohol level that may not - may cause, you know, bad sedation in the adult but not actual brain damage.

GROSS: What about drinking's effect on memory? You know, teenagers are so good at learning and remembering. Does alcohol reverse that at all?

JENSEN: Yes.

GROSS: Or impede it?

JENSEN: Yeah, well, so one of the things that we go through in the book is to talk about how do we learn? What is learning? And what are the targets for learning? And how do drugs lock on to those targets and impair them? Well, alcohol is one of those drugs. And it will actually cause - counteract the effects of learning, so that it will certainly impede learning. And there isn't as much of a bounce back from alcohol exposure in the adolescent brain when there's - you know, looking at experiments, looking at animal tissue, we see that there's a more permanent effect on learning in the adolescent compared to the adult.

GROSS: So is alcohol likely to impair your ability to learn new things? Or will it unravel the things you have already learned?

JENSEN: That's a very good question. Alcohol will impair you from even laying down a memory because it has a sedative effect. And it's actually causing more inhibition and blocking excitation. So we need excitation to learn. And it's actually diminishing that. So the process of learning doesn't even get started. And I think in the most extreme case, of course you know after a binge drinking, there is complete amnesia around the - often - the event and even for the hours after having had a binging episode.

GROSS: Let's look at marijuana. First of all, you point out that the marijuana of today is a lot more potent than the marijuana of the 60s or the 70s. So, like, things have really changed in terms of what teenagers are getting exposed to. But does marijuana have a particularly potent effect on the teenage brain?

JENSEN: Yeah, marijuana actually does have a different effect on the teenage brain than the adult. And this is one of those things that you want to let kids know about, that because they have more plasticity, more substrate, a lot of these drugs of abuse are going to lock on to more targets in their brains than in an adult, for instance. And it's interesting because we have natural cannabinoids - they're called - in the brain. We have kind of a natural substance that actually locks onto receptors on brain cells.

It has, for the most part, a more dampening sedative effect. So when you actually ingest or smoke or get cannabis into your bloodstream, it does get into the brain, and it goes to these same targets. It turns out that these targets actually block the process of learning and memory, so that you have an impairment of being able to lay down new memories. Now, what's interesting is not only does the teen brain have more places for the cannabis to actually land, if you will, it actually stays there longer. It locks on longer than in the adult brain. So there were studies done that showed that several days out, there's still impaired learning and memory, say, in experimental adolescent animals compared to adults, where it's a more fleeting effect. So this is important for teenagers to know. For instance, if they were, you know, to be - get high over a weekend, the effects may be still there on Thursday and Friday later that week. An adult wouldn't have that same long-term effect.

GROSS: If you're just joining us, my guest is Dr. Frances Jensen. She's a neuroscientist who's the author of the new book "The Teenage Brain." Let's take a short break, then we'll talk some more. This is FRESH AIR.

(MUSIC)

GROSS: This is FRESH AIR. And if you're just joining us, my guest is neuroscientist Dr. Frances Jensen. She's the author of the new book "The Teenage Brain." She's a professor and chair of the Department of Neurology at the University of Pennsylvania Perelman School of Medicine. She's a former Harvard professor.

You recommend keeping cellphones and computers out of your teenager's bedroom, to which I say, good luck...

JENSEN: That's right.

GROSS: (Laughter) ...With that. Why do you recommend that?

JENSEN: Well, you know, that is - it may or may not be enforceable. I think the point is that you - when they're trying to go to sleep, to have this incredibly alluring opportunity to network socially or be stimulated by a computer or a cellphone really disrupts the sleep patterns. Again, it's also not great to have multiple channels of stimulation while you're trying to memorize for a test the next day, for instance. So I think I would restate that and say especially when they're trying to go to sleep to really try to suggest that they don't go under the sheets and have their cellphone on and be tweeting people. First of all, then the artificial light can affect your brain. It decreases some chemicals in your brain that help promote sleep such as melatonin. So we know artificial light is not good for the brain. That's why I think people - there have been studies that show that reading books with a regular warm light doesn't disrupt sleep to the extent that using a Kindle does.

GROSS: You suggest that maybe teens and people in their 20s now - these being the first generation to actually grow up with devices - that they were exposed to electronic distractions from the start...

JENSEN: Right.

GROSS: ...That no one else in history has been exposed to. So their brains might be different in some fundamental way. What are your thoughts about that?

JENSEN: Well, it's all very speculative at this point in time because of course the experiment hasn't completed itself. This generation hasn't fully made it to, you know, full-fledged adulthood, which I would say would be sort of your mid-30s. So I think that if we look back and see how well the human brain adapts to so many - has adapted to so many different things over the centuries - I mean, think about reading. Until about three or four centuries ago, it was very uncommon for humans to read. It was just the religious community and the academia that read. And most of the populations in even Western countries were not reading. So we've developed a reading brain over just those few centuries. And we've come to rely on it very, very heavily. So we hope that there are new skills being embedded in these brains as they learn how to deal with all this input. I guess my concern is that the teen period is rather vulnerable because the input's out there. We can't control it. We can't really control their access to it. But what is more concerning to me is that they are not mindful of how to manage this input.

GROSS: So in talking about some of the things teenagers are prone to because their brain is still developing, one of the things is stress. So how does the development of the teenage brain figure into the possibility of being more stressed?

JENSEN: Right. So the teenage brain, like the childhood brain, is a very impressionable brain. The environment is molding it by the minute, right? So stress, just like substances, just like good experiences, are changing the wiring diagram of the brain and changing the chemistry of the brain and setting it up for future life. So stress, just like any other kind of stimulus, has been shown to have an effect on long-term brain health. Stressful situations in adolescence have been shown to increase the risk of depression, for instance, as adults. So we have to think about, you know, what is in our environment during the teen years.

GROSS: So does the ability to learn more quickly figure into the stress, too?

JENSEN: I think...

GROSS: Like, why are teenagers more prone to stress or to being moody?

JENSEN: Well, I think...

GROSS: I don't know if those are the same thing.

JENSEN: Well, they're not actually, so...

GROSS: OK. Let's stick with the stress then.

JENSEN: More prone to stress because they have more plasticity. Their synapses are being conditioned by whatever is in their environment. If stress is in their environment, they build synapses in a different way than they would without stress. And in the case of stress during the teen years, it can increase your risk of depression. So you are altering areas of your brain that would be - that are not functioning normally in depression.

GROSS: So a stressed teenager is more likely to have depression as a teenager or into later life as well?

JENSEN: Later life as well. Now, interestingly, your mental state is very dependent upon how mature your brain is. Most mental illnesses, such as depression, bipolar, schizophrenia, tend to have their onset at the end of the teen years or early adult. This is not a coincidence. It is because to be able to actually manifest depression or schizophrenia, you need your prefrontal and frontal lobes. They are not connected yet until late teens. So it helps us understand why they these diseases are actually quite silent earlier in life. And the person can appear completely normal and then have this onset in the early college years - usually it is - or, you know, late high school. We know there's an increased risk of suicide in this window of development - probably related to this. It's a time where you have enough of your systems working in order to actually manifest a depression, yet you don't have your frontal lobes for the impulse or risk-taking behavior, and suicide in part, for instance, is an impulsive act. So there isn't that gating that's like maybe I shouldn't do this. But it's done.

GROSS: Dr. Frances Jensen will be back in the second half of the show. Her new book is called "The Teenage Brain." She's the chair of the Department of Neurology at the University of Pennsylvania Perelman School of Medicine. I'm Terry Gross, and this is FRESH AIR.

(MUSIC)

GROSS: This is FRESH AIR. I'm Terry Gross back with neuroscientist Frances

Jensen, author of the new book, "The Teenage Brain," in which she calls on new research to help explain why teenagers can be especially impulsive, moody and not very good at responsible decision-making. She's a professor and chair of the Department of Neurology at the University Of Pennsylvania, Perelman School Of Medicine.

Now, we've been talking about the teenage brain. In your neuroscience lab, you've been studying brain disorders that form in childhood like epilepsy. Just explain, briefly, why children are more prone to epilepsy.

JENSEN: First of all, epilepsy is a disorder that we think about the main component being seizures. It's not just seizures. Seizures - being an epileptic seizure - which is, a person might fall on the ground. They might shake, or they might just have a staring spell. There are many, many, many forms of epilepsy. And interestingly, the kind of epilepsy you have depends on many things, including what age you are when it comes on because it will involve circuits that are present at that different - at each developmental stage.

So actually in childhood, there's a lot of different epilepsies. There's early, early life epilepsies. There's epilepsies that are rather fleeting and you recover fully from, such as absence epilepsy of mid-childhood, febrile seizures. A large, you know - there's quite a few children will experience seizures when they have a fever, and they'll be completely normal. It is really just because the developing brain is very, very excitable. Remember when I said, you have excitation and inhibition? Well, epilepsy is just too much excitation. It's too much on time, too many circuits acting. So in development, you have much more excitatory machinery, and this is a double-edged sword. It's great for learning and memory. We've just talked about that. But it's bad because it puts you at a very close threshold to having a seizure.

GROSS: Since you study the development of the brain and brain disorders, especially those that come on while the brain is still developing, I'm wondering if you're looking forward to new forms of medication that might help with those brain disorders.

JENSEN: Absolutely. We call this translational neuroscience. It's taking basic understanding of the building blocks of the brain and going from the animal into potentially finding targets that are relevant to diseases and finding therapies that attack those targets and putting them into clinical practice. That's the translation - what you hear about the bench-to-bedside translation. There's a very active amount of translation going on right now in the field of epilepsy, in fact because of our new knowledge of brain circuits. By using this functional MRI, new knowledge of new molecules that we are - there's been an explosion of neuroscience recently.

And epilepsy affects so many different functions of the brain that there are many opportunities for treatment, and much is being done along those lines. One interesting type of treatment that you might want to talk about is the use of cannabis in epilepsy - in early childhood epilepsies. Remember when I said that we have normal receptors for - we have cannabinoids in our brain. We have cannabinoid receptors. And there is a movement to try to understand whether there's a good medicinal use of marijuana for treatments of overactivity of the brain, such as early life epilepsy. There are especially...

GROSS: Can I just stop you there? So there's a possibility that children with seizures would be treated with marijuana.

JENSEN: A certain part of the marijuana composition. So there's...

GROSS: So they're not going to be sitting around, smoking weed.

JENSEN: No, they're not going around smoking weed. So marijuana is - contains both tetrahydrocannabinol - THC - and cannabidiol. It's the THC that is the mind-altering component - the psychoactive component that people experience when they get high. But the second component, cannabidiol, doesn't have those kind of affects. So there is a lot of work to try to enrich the marijuana plants for the second component, cannabidiol, and use it medicinally.

GROSS: And what does that do?

JENSEN: So using it, it actually dampens excitability of the brain. Now, it's not good for a normal brain either because you don't want to dampen excitability. You're going to affect learning and memory. But in cases of unrelenting epilepsy in young - in very small children, we look for anything that will block these seizures. And it turns out there is a group of children with early life epilepsy, such as Dravet's and a couple of other of these disorders, that actually appeared to possibly be responding when they haven't responded to any other conventional treatment to the cannabidiol compounds.

This is undergoing a lot of study. I was formerly president of the American Epilepsy Society, and we've put out a statement, for instance, saying, you know, it's under investigation. It might be promising. But it doesn't mean you go off and you start, you know, getting your kid high by any means, but it is a very intriguing area of research. We're always looking for new targets.

One of the interesting things is that the developing early childhood and teen brain don't necessarily respond to adult drugs - drugs that are useful in the adult - in the way that adults do. In my work, neonatal seizures - seizures that happened around infancy - they don't respond to drugs that are perfectly good and perfectly useful in the adult in the emergency department that might come in with a seizure - doesn't work.

GROSS: Would that be like Gabapentin?

JENSEN: It could be Dilantin, phenobarbital, barbiturates, things like that that work well in the adult brain because they're actually targeting inhibition. Well, there's not much inhibition in the children's and the infant's brain, as I've mentioned, so having a drug that only promotes inhibition is kind of a moot point when you don't have a lot of it to start with.

GROSS: Like you're targeting something that isn't there...

JENSEN: That isn't there yet, right. So we've been working to look for novel targets - and of course, the over-excitation, the excitability molecules, are great targets - or other targets - in this case, the cannabinoid receptors which are there - may be ways to, you know, decrease the excitability of the brain.

Another example of how a developing brain doesn't respond in the same way as an adult is the example - you may recall this, maybe 10 years ago - where it was realized that certain antidepressants caused an increase in suicidality in the teenager. Well, again, it's not an adult brain. You're giving adult doses that have adult chemistry to a not-adult brain. And you get unusual results and not the same result. And in this case, it was found that there was enhancement in suicidal behavior in kids that got certain SSRIs - certain antidepressants - which was unexpected, but actually probably explicable because their brain is not in the same developmental state.

GROSS: So this is going to sound like a kind of dumb question, but in terms of the language that we're using, the cannabinoids - the cannabinoid receptors in the brain - are they named after the cannabis in marijuana, or is it vice versa?

JENSEN: Often, we name receptors in the brain by whatever substances that bind to them. And so in this case, it seemed that cannabinoid substances bound to these receptors, and hence, they got their name. But it does turn out that we have what we call endocannabinoids in us. And endo means inside, so we have our own internal cannabinoids that are just in the right balance and being used to modulate our signaling in our brain.

GROSS: So parts of our brain have been named after marijuana, basically?

(LAUGHTER)

JENSEN: I guess you could say that.

GROSS: If you're just joining us, my guest is Dr. Francis Jensen. She's a neuroscientist who's the author of the new book "The Teenage Brain." She's also the chair of the Department of Neurology at the University Of Pennsylvania, Perelman School Of Medicine. Let's take a short break, then we'll talk some more about the teenage brain. This is FRESH AIR.

(MUSIC)

GROSS: This is FRESH AIR. And you're just joining us, my guest is neuroscientist Dr. Frances Jensen. She's chair of the department of neurology at the University of Pennsylvania Perelman School of Medicine and author of the new book "The Teenage Brain."

Dr. Jensen, can I ask you how old you are?

JENSEN: I'm 58.

GROSS: Are you noticing changes in your brain?

JENSEN: I'm noticing that I need to control my multitasking. I do need to make sure I get sleep. I'm a big sleeper, so I can always sleep, you know, nine hours plus. And I never get that, but I know I do a lot better when I get at least something close to eight hours of sleep. I find that I have learned to write notes to myself. I also have employed strategies like imagery to remember names and places and important facts. That's - for me, I'm more of a visuospatial learner, so I do better taking notes on a piece of paper and, you know, making diagrams and circles, and I remember what was on the top left and underneath the arrow. I think I find it harder actually to take notes for myself on a computer - just memorize - you know, just writing lines and lines and lines and lines.

GROSS: Is that too automatic?

JENSEN: It's too automatic, and it wasn't the way I learned in the first place. I'm much - I - you know, we all used to handwrite notes, right? So our generation, we used to handwrite notes. And converting to everything is just line by line by line in print is - for me, it's not as rich, visually.

GROSS: So you mentioned that now at the age of 58, you're trying to control your multitasking. What has changed for you in multitasking?

JENSEN: Well, I'm - I - first of all, I - up to this point I don't tweet. I may start doing that. I don't blog up to this point. I may start. That's going to be very hard for me to - another stream of information coming. My email is coming at me, you know, 60 emails an hour kind of thing. That's enough of a distraction for me. I have taken up reading again, trying to find time to actually read books. I find it's remarkably sort of enriching, and you feel - your brain feels so satisfied after you read a book and get into a book that you can't put down. That's an amazing feeling. And I lament not having as much time to do that. I think that's great exercise for your brain. And I know I come out of reading a good book much sharper than I do if I go to a movie and just it's all passive learning or passive, you know, entertainment.

GROSS: You used an expression before the interview started that I found very intriguing. And the expression is dementia of the preoccupied. So I want a definition of that.

JENSEN: (Laughter). OK. Now, this is not a medical fact, everybody. But in a way to explain my own shortcomings in my life with so many things coming at me in one direction - having to switch modes from clinical to basic research to patients to administration, like, you know, on an hourly basis, just so much is coming at me. And you do - things fall through the cracks. They fall through the cracks. So I just have now decided to call it the dementia of the preoccupied because I refuse to think that

I'm actually becoming demented - that I just know it's all environmental. It's got nothing to do with my age or what's happening inside to my brain. I'm not there yet. I haven't hit that slide.

GROSS: So - but what are the symptoms that make you think, like, what's going on here? You know, seriously 'cause I think so many people are dealing with that. And since you're a neuroscientist, I'd love to hear it from your mouth.

JENSEN: Well, I think we're not dwelling on tasks long enough to consolidate our memories, frankly.

GROSS: I - yes, I know.

JENSEN: I think that's it.

(LAUGHTER)

JENSEN: And we're being forced to move fast - you know, move, move, move. And it is - you - I feel like a little robot sometimes, you know? I start on this, and then somebody rushes into the office - sign that. I sign that, and I go back to what I was writing. I'm like, I don't even know what the next sentence was that I was going to type here. You know, it just - and on and on - we've all done that classic of you go upstairs to get your keys, and you forget that you're going to get your keys, and you notice your coffee cup. You have a sip. You go to the next room meaning to go get - refill your coffee, and you find yourself in the next room not knowing why you're there. And eventually you realize it was something about the keys. But we just distract ourselves.

GROSS: But seriously, is there a new kind of distraction - I guess disorder would be too strong a word - but a new kind of distraction that many of us are experiencing because we're focusing on six or seven things at the same time? And there's all these, like, short bits of information coming at us that don't necessarily synthesize into a larger, coherent whole. There's all these, like, disjointed bits that are going to remain disjointed 'cause they don't necessarily relate to each other. And you're expected to keep ingesting them and managing them and behaving in a coherent way in spite of all of this incoherent pattern of information that you're responsible for.

JENSEN: I agree 100 percent with everything you've just said. And there is research that's ongoing looking at the effects of quick task changes, interruption in tasks with fMRIs, for instance.

GROSS: Right, OK.

JENSEN: And there was a study that looked at what was the optimal age for this sort of distracted learning. Well, there was another study that was done looking, at across different ages, at when were you the best at multitasking and going back to a task, like, being distracted from a task and going back to the task and staying directly on track and continuing. Turns out that this study showed - and it had functional MRIs to - as an outcome as well - that it's like your mid-to-late-30s. It's, like, that's probably your meanest and leanest time (laughter) where you've got a lot of excitability still in your brain. The degeneration hasn't started yet. And you have all the connectivity, myelination is complete. And you're really, you know, firing on all cylinders. Now, they didn't go much past that. But they saw that it got increasingly optimal up to that point and then it plateaued. I don't think I'd want to be a subject in that study. I don't want to know how I would do.

(LAUGHTER)

GROSS: But it just seems to me that we're in this kind of paradoxical state of mind now where on the one hand, we crave and we - and we're committed to ingesting all these streams of information during the course of a day.

JENSEN: It's tempting. It's novelty-seeking.

GROSS: Right. And we kind of are obligated to do it - many of us - because of our work. And at the same time, it kind of feels very like it's short-circuiting your brain sometimes.

JENSEN: Well, it is a different way of learning. And actually in the medical education field - here's an interesting fact. That over the last two or three decades, learning had - it was determined that learning had to be done in a different way. There were just simply too many facts to memorize during medical school. There's a burgeoning amount of information now.

So about 20, 25 years ago in a few schools, including at Harvard, they started to do a different form of learning, which is really teaching students how to access information rather than absorbing, digesting and ingraining that information. And, frankly, that today's modern physician does operate much more in that mode because, of course, there's always this new information coming every month about new treatments, new patterns of practice that you should be employing. You couldn't possibly stay, you know, up to date by memorizing everything. So it's more teaching you how to access information. And I think this is going to be really interesting future because we have it where so - it's such an information-driven society that on the one hand, you think we're being very superficial. But on the other, maybe, you know, at least our students are developing a skill of scanning and also validating information sources and knowing where to go when. This actually is playing out very - in a very real way in the medical education field, I can tell you that.

GROSS: That's really interesting. So, like, when your doctor has to look something up, it's not 'cause they don't know what they're doing.

JENSEN: No, it doesn't mean that they're a bad doctor. It means that they're probably doing you a huge favor, that they're making sure that there isn't a better drug available that might have just come out or a new test that they can look for that mysterious disease that they still haven't made a diagnosis on.

GROSS: We are out of time, but I just want to ask you if there's any quick tip you can give us to preserve our brain health - something that you would suggest that adults do?

JENSEN: I think time to reflect on what you've done every day, to underscore for yourself the most important things that happen to you that day and to not respond to conflict - to try to not respond to conflict in the midst of your working environment, for instance, because it will color your efficacy.

GROSS: If you get too caught up...

JENSEN: If you get too caught up...

GROSS: ...In being annoyed or angry or...

JENSEN: ...Yeah.

GROSS: OK. This has been fascinating. Thank you very much for talking with us.

JENSEN: It's been great having a chance to talk to you. Thank you.

GROSS: Dr. Francis Jensen is the chair of the department of neurology at the University of Pennsylvania, Perelman School of Medicine. Her new book is called "The Teenage Brain." You can read an excerpt on our website, freshair.npr.org. Coming up, John Powers considers the success of the film "American Sniper" and the partisan controversy surrounding it. This is FRESH AIR.

SHARE