

Pitt expert talks about teenage brain development at AAAS Annual Meeting

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Teenage exploration and risk taking could be explained by dramatic changes in the brain that allow elaborate planning and are driven by the need for immediate reward, according to a University of Pittsburgh neuroscientist who will be talking about her research in a panel discussion and press briefing at the American Association for the Advancement of Science annual meeting, Feb. 13 to 16, in San Jose, Calif.

Using an elegant model in which eye movements, or saccades, reveal insight into executive brain function, Beatriz Luna, Ph.D., Staunton Professor of Psychiatry and Pediatrics, Pitt School of Medicine, has studied hundreds of young [volunteers](#) to examine [brain development](#) during the transition between childhood and adulthood.

"Our studies are beginning to challenge the traditional concept that the teenage brain can't plan because of an immature prefrontal cortex," Dr. Luna said. "Our findings indicate that the teen prefrontal cortex is not much different than in the adult, but it can be easily overruled by heightened motivation centers in the brain. You have this mixture of newly gained executive control plus extra reward that is pulling the teenager toward immediate gratification."

In the experiments, volunteers are instructed to immediately look away from a small light that randomly appears on a screen in front of them. This "anti-saccade" test shows if the brain is able to engage the planning centers of the [prefrontal cortex](#) to overcome the impulse to look toward

the light rather than away from it. Dr. Luna's team has found in previous studies that children succeed in about half their tries, teens in about 70 percent of tries and adults in about 90 percent of tries. People with mental illnesses typically struggle with the task.

The study team had volunteers do the same tasks while scanning their brains with functional MRI. They found that much of the architecture of mature brain is in place by adolescence, but the ability of the networks to talk to one another and integrate information is still a work in progress.

"Further enhancement of this network integration is likely why adults can switch and very quickly adapt their behavior to changing circumstances, which is more difficult for adolescents," Dr. Luna explained.

She added that while parents and teachers sometimes find bewildering the choices teens might make, their brains are perfectly adapted to explore and take some chances as they become independent adults.

"Across societies and species, we know that adolescence is a period of increased sensation seeking that can lead to [risk taking](#), which increases mortality rate," Dr. Luna said. "Also, we often see during this period the first signs of [mental illnesses](#) such as schizophrenia, depression and eating disorders. All of these have a neurobiological basis, so if we know how the [brain](#) is changing, we might be able to figure out a way to intervene earlier in life."

More information: Dr. Luna and researchers from the Children's National Medical Center, Washington, D.C.; Columbia University Medical Center; and University of California, Berkeley, will present their work from 1:30 to 4:30 p.m., Saturday, Feb. 14, during a AAAS session called "From Womb to Tomb."

Provided by University of Pittsburgh Schools of the Health Sciences

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