Experimenting preteens may have different brain processes

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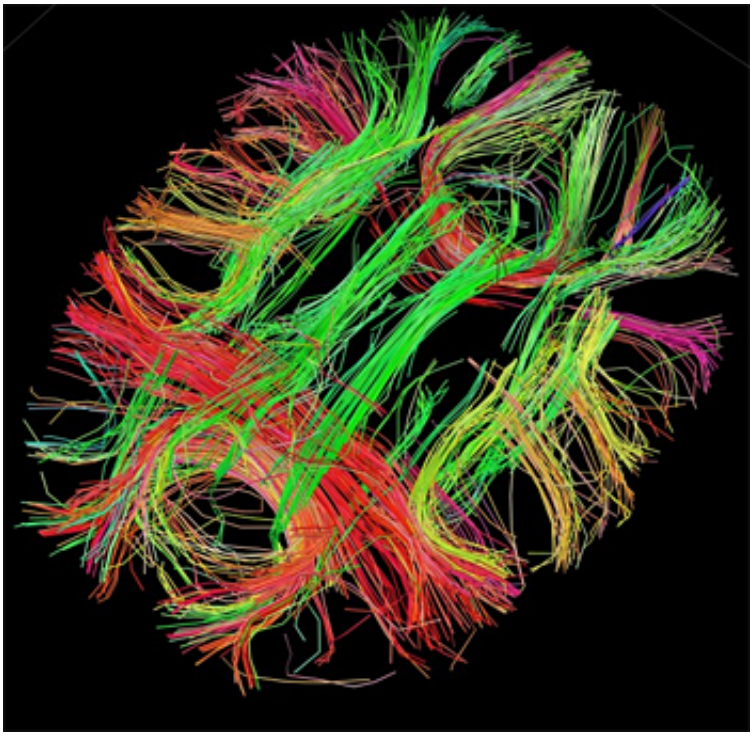

White matter fiber architecture of the brain. Credit: Human Connectome Project.

Preteens who experiment or explore new things may have brain processes that work differently than those of preteens who do not, according to a study released today that will be presented at the American Academy of Neurology's 67th Annual Meeting in Washington, DC, April 18 to 25, 2015.

"The beginning of adolescence is associated with seeking new experiences and increasing exploratory behaviors, but little research has been done to measure that increase or to look at what happens in the brain during this period," said study author Andrew Kayser, MD, PhD, with the University of California San Francisco and a member of the American Academy of Neurology. "Studies with adults have begun to look at individual differences in willingness to seek new experiences, and some studies have tied willingness to explore with an area of the brain called the rostrolateral prefrontal cortex, which is responsible for higher level decision-making."

The study involved 62 girls between the ages of 11 and 13 who completed a task that measured their exploratory and experimenting behavior. They also underwent MRI brain scans.

The reward-based task involved a clock face. The second hand of the clock made a complete rotation over five seconds. The girls were told that they would earn points based on when they stopped the second hand. As a result, they had to explore the clock by stopping it at different times in order to learn what action would be rewarded most.

Based on their behavior on the task, the group was split into 41 "explorers" and 21 "non-explorers."

The researchers then compared their brain scans and identified a connection that was stronger in explorers than in non-explorers between the rostrolateral prefrontal cortex and the posterior insula and putamen, parts of the brain sensitive to the "state of the body" and "carrying out actions," respectively. Interestingly, activity in the putamen and insula seemed to influence the rostrolateral prefrontal cortex, rather than the other way around.

"This research is fascinating because it could help us to understand how

exploration can lead to both good and bad behaviors that promote or reduce well-being in teenagers," said Kayser. "If we can better understand these brain connections, down the road we may be able to come up with a way to better identify teens most likely to engage in dangerous or risky behaviors."

Provided by American Academy of Neurology