Teaching Current Directions in Psychological Science

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C. Nathan DeWall, University of Kentucky, and renowned textbook author and APS Fellow David G. Myers, Hope College, have teamed up to create a new series of Observer *columns aimed at integrating cutting-edge psychological science into the classroom. Each column will offer advice and how-to guidance about teaching a particular area of research or topic in psychological science that has been the focus of an article in the APS journal* Current Directions in Psychological Science. Current Directions *is a peer-reviewed bi-monthly journal featuring reviews by leading experts covering all of scientific psychology and its applications and allowing readers to stay apprised of important developments across subfields beyond their areas of expertise. Its articles are written to be accessible to non-experts, making them ideally suited for use in the classroom.*

Resolving the Adolescent Mystery

by C. Nathan DeWall

Galván, A. (2013). The teenage brain: Sensitivity to rewards. *Current Directions in Psychological Science*, 22, 88–93.

Teenagers can baffle even the most attentive parent. Seismic shifts occur between pre-adolescence and adolescence that change how teenagers navigate their environment. They overreact to success and failure. They crave novelty and excitement. They take occasional, unwarranted risks. And they demand independence. Are these changes grounded in neurological changes? Or do they merely exist within the heads of confused and stressed parents? Galván (2013) argues that the adolescent brain undergoes profound changes in reward sensitivity. Drawing on research using humans, rats, and primates, she highlights several reliable effects:

Like adolescent humans, adolescent rats and nonhuman primates easily become attracted to drugs (Brenhouse & Anderson, 2008; Nelson et al., 2009).

Adolescent humans and rats demonstrate a spike in sensation-seeking behavior (Douglas, Varlinskaya, & Spear, 2003; Steinberg et al., 2009).

Compared with adults, adolescent humans demonstrate greater activation in a brain reward center — the ventral striatum — when they earn money (Ernst et al., 2005).

The greater the ventral striatum activation adolescents exhibit in response to anticipated reward, the more they report using drugs (Bjork et al., 2011).

Many of the peaks in reward sensitivity drop off just as college students begin their education. Therefore, our first suggested activity invites students to wax nostalgic about their adolescent experiences. Ask students to jot notes about their lives at ages 14 and 15. What were their relationships like? What sorts of risks did they take? Were they constantly on the prowl for excitement? If they had a job, what was it like when they received their paycheck? Next, have students answer the same questions about their current life circumstances. Finally, have them predict how they think they will answer these questions in 10 years. What changes do they notice? What does this say about their brain development?

To tee up the second activity, instructors can provide a brief primer on the fundamental attribution error, in which people rely on dispositional as opposed to situational factors to explain why events occur (Jones & Harris, 1967). Ask students to imagine a person of their gender age 14 or 15. Explain that this student is a freshman in high school, began experimenting with drugs by smoking marijuana, loves to ride on the back of motorcycles without wearing a helmet, and dreams of going skydiving. Have students select a partner, and ask them to discuss why the imaginary student engaged in these behaviors and whether these sorts of behaviors will continue. After five minutes, the instructor can call on groups and write down some of their explanations.

Now the students can reflect on what they wrote about their own lives at the same age. If they had to explain their own behavior, how might their explanations differ from how they made sense of another person's behavior? Were they more forgiving of their own behavior than of the other person's? Why? Did they predict that the imagined person's behavior would continue into the future? Instructors can encourage students to consider what they know about changes in brain development to help them understand why people experience shifts in behaviors and motivations during adolescence.

What use do these changes in the adolescent brain serve? A final activity encourages students to answer this question by conducting a thought experiment and mock election. Have the class imagine two people who are the same in all respects except one: the first person shows the usual shift toward increased reward sensitivity during adolescence, whereas the second person does not. Separate the class into two large groups, each group representing one of these fictitious people.

Ask each group to discuss the costs and benefits associated with their group's person. How might a hypersensitive ventral striatum help or undermine an adolescent's ability to transition from dependence to independence? If adolescents did not show this shift toward reward sensitivity and novelty seeking, how might that influence their relationships? Would they have a difficult time relating to their peers who constantly seek out opportunities to experience reward and excitement? Have a representative from each group voice the perceived costs and benefits to the class. Finally, have all students vote which of the two fictitious people they believe will have an easier time transitioning from adolescence to adulthood. Tally the votes and report the results. What did you find?

These activities may not dispel common teenage stereotypes. But they will help students gain perspective on how crucial changes in the adolescent brain can help resolve part of the mystery behind teenage behavior.

References

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Submitting the Teen Brain to a Student Jury

by David G. Myers

Albert, D., Chein, J., & Steinberg, L. (2013). The teenage brain: Peer influences on adolescent neurocognition. *Current Directions in Psychological Science, 22,* 114–120.

Bonnie, R. J., & Scott, E. S. (2013). The teenage brain: Adolescent brain research and the law. *Current Directions in Psychological Science, 22,* 158–161.

Compared with children and adults, adolescents take more risks. They are more likely to experiment with controlled substances, chance unprotected sex, commit crime, and drive recklessly. The synopses of research on the adolescent brain and behavior by Albert, Chein, and Steinberg (2013) and Bonnie and Scott (2013) suggest thought-provoking discussion questions. To prime the pump for such discussion, introductory or developmental instructors can invite students to start by writing notes for 30 seconds on each question below.

An alternative strategy is to have groups of students debate contentious questions, such as numbers 3 and 4. By random assignment, one team of three argues for one side, and another team of three argues for the other side. Members of both teams wait outside of class for three minutes while the class deliberates about which side made the most convincing argument. Team members re-enter the classroom and receive the decision. By repeating the process in other class sessions, all students can be given an opportunity to argue for or against a position.

1. ***Do examples of risky teen behaviors come to mind from your middle and high school days?*** Did you observe or engage in behaviors that, on reflection, seem pretty dumb?

Why are adolescents more risk-prone? Are teens more stupid about assessing risks? Do they not appreciate the long-term consequences of tobacco addiction, or the possibility of pregnancy, or the dangers of speeding? Actually, teen comprehension of risk tends to be quite accurate. Adolescent risk-taking instead appears to stem from: *a. a not-yet mature prefrontal cortex.* Thus immature executive control of planning and controlling behavior, and

b. greater peer influence. Teens, more than children and adults, are herd animals. In real life, teens tend to commit delinquent acts in groups, while adults more often offend solo. In laboratory driving simulations, teens likewise — when in the presence of other teens — take more risks, such as running more yellow lights, leading to immediate rewards but risking accidents. It is as if the presence of peers shortens teens' time focus, making them more attuned to immediate rewards.

Think of it this way: Peer influence steps on the gas pedal, and still-developing frontal lobes do not yet have full braking power.

1. ***If 15-year-olds have immature brains that are attuned to social influences and immediate rewards, but that also have limited braking capacity, should they — after committing a violent crime — not be tried and sentenced as adults?*** In response to violent juvenile crime increases, legislatures during the 1980s and 1990s decided it was time to get tough: Give violent youth punitive long sentences that remove them from society. Others object to trying juveniles as adults, noting that many teen offenses are a temporary product of the adolescent brain. What say you?
2. ***Teen driving risk is highest given a mix of a) nighttime driving, b) peers in the car, and c) alcohol. In your opinion, do these facts justify proposals for "graduated licensing," which increases teen driving opportunities only gradually?*** For example, 16-year-olds might be allowed daytime driving alone or with an adult for the first six months, then nighttime driving, then (say, during their 18th year) driving with one peer, and thereafter — after the brain has further matured and peer influence becomes less commanding — unrestricted driving. Or is graduated licensing a bad or unworkable idea?
3. ***Could research on adolescent brains and cognition inform judicial decisions about individual teens — explaining, for example, that a particular 15-year-old defendant has an especially immature brain compared with other 15-year-olds?*** Bonnie and Scott (2013) caution: Although today's science should inform public and legal policies that protect adolescent interests, it provides no basis for judging the brain maturity of particular individuals.

Through constructive discussion and debate, students can grapple with how psychological science informs their experiences, attitudes, and future behaviors. And they can learn to engage and respect others’ ideas.