Is there a Space for Brain Sciences in Education?

Alice Kim, PhD
August 30, 2017

Roper vs. Simmons
Adolescents' behavioral immaturity mirrors the anatomical immaturity of their brains. To a degree never before understood, scientists can now demonstrate that adolescents are immature not only to the observer's naked eye, but in the very fibers of their brains.
Roper v. Simmons: The Role of the Science Brief

Aliya Haider*

Scientific advances in brain research indicate that the adolescent brain has not yet fully developed, the decision-making capacity and risk-taking behavior of adolescents are far different from those of adults; thus adolescent offenders are less culpable. These scientific findings were central to the oral argument. Moreover, this article notes that Justice Kennedy’s opinion overturning the juvenile death penalty relied on the amicus brief’s research and conclusions to support his rationale for deeming the juvenile death penalty cruel and unusual punishment in contravention of the Eighth Amendment.

Ohio State J Crimin Law, 2006
Prefrontal Cortex

Executive Functioning:
- Planning
- Decision making
- Strategy Implementation
- Inhibition
- Working memory

Longest period of brain maturation
Sequence of Brain Development

Casey et. al (2005) TRENDS in Cognitive Sciences

Prefrontal Cortex

Executive Functioning:
- Planning
- Decision making
- Strategy Implementation
- Inhibition
- Working memory

Longest period of brain maturation

Psychosocial Maturity

- Inhibition
- Future orientation
- Resistance to peer influence (decision making)

Risk taking during a video driving game

Steinberg (2007) Curr Direct Psychol Sci
Risk taking during a video driving game

- Adolescents
- Young Adults
- Adults

Crashes

Steinberg (2007) Curr Direct Psychol Sci

Psychosocial Maturity
- Inhibition
- Future orientation
- Resistance to peer influence (decision making)

Main Findings:
- General intelligence (GI) and 2 different measures of inhibition accounted for variance in GPA scores
- Inhibition control accounted for more variance than GI

Research paper
Separate contributions of general intelligence and right prefrontal neurocognitive functions to academic achievement at university level
Quito Brain and Behavior Laboratory, Universidad San Francisco de Quito, Quito, Ecuador

Changes in context

Knowledge & Awareness

Increased cigarette prices

Antismoking education

Centers for disease control and prevention, 2002
Changes in context


Steinberg (2007) Curr Direct Psychol Sci

Massed practice is not effective for long-term retention.

Spacing Effect

Balota et al., 2006, Psychology and Aging
How much to space out?

### August 2017

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- **Deadline:**
- **Cram 2 days before??
- **Breaking up work over 2 weeks?**

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20 hours

Breaking up work over 2 weeks?
## How much to space out?

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## Retrieval from memory is important

Retrieving information is a more effective learning strategy than re-reading.
Retrieval Practice

How can we put this into practice?

Karpicke & Roediger, 2008, Science

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Onwards and upwards!

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