OUR LAST BEST CHANCE

Why Adolescence Begins Earlier, Ends Later, and Matters More Than Ever

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Overview

- Lessons from Adolescent Brain Science
- The Longest Decade
- Winners andLosers
- Cultivating Self-Regulation
- Implications and Recommendations
The Dual Systems Model

- Arousal of brain systems that govern incentive processing, emotional experience, and social cognition
- Still developing self-regulation
- Maturational imbalance is greatest in mid-adolescence
- Heightened vulnerability to risky behavior and psychopathology
- As individuals mature into adulthood, arousal declines and self-regulation improves
- Converging evidence from neural, neurological, and behavioral studies
The Dual Systems Model

Relative Strength

Cognitive Control System

Socioemotional Incentive Processing System

Age

Steinberg, 2013
Sensation–Seeking and Impulse Control in the CNLSY

Shulman et al., submitted
A Model of Adolescent Risk-Taking

Primarily Pubertal Dependent
- Reward Sensitivity
- Sensation Seeking

Primarily Pubertal Independent
- Cognitive Control
- Self-Regulation

Neurobiological
Psychological
Behavioral

Risk Taking
Decision Making
Context

Smith, Chein, & Steinberg, 2013
Adolescence is a Second Period of Developmental Plasticity

- Profound and pervasive affective, behavioral, cognitive changes
- Dramatic remodeling of multiple brain systems
- Increased sensitivity to the environment
  - Reminiscence bump
  - Stress-responsivity
  - Attentiveness to social information
  - Susceptibility to addiction
  - Psychiatric disorder
- Decline in plasticity during transition to adulthood
  - Change in neurochemical climate that shifts tendency from synaptic plasticity to synaptic stability
  - Synaptic stability in the context of continued myelination
Opening and Closing the Window of Plasticity

- Increase in plasticity sparked by puberty
  - Changes in receptor density and distribution
  - Neurogenesis
  - Synaptic pruning
  - Structural and functional connectivity

- Causes of decrease in plasticity not yet known
  - Not due to changes in pubertal hormones
  - Likely due to a combination of genetic and environmental influence
  - Does routinization of activity curtail "metaplasticity"?

- Heightened plasticity in adolescence makes evolutionary sense
  - Plastic when important to learn how to function independently
  - Stable once information and skills have been acquired

- Can the window be kept open?
  - Novelty and challenge contribute to "metaplasticity"
  - Longer sensitive period of cortical development for higher IQ individuals
  - Formal education contributes to connectivity
Adolescence begins in biology and ends in culture

- Menarche and marriage as markers

- Biological beginning of adolescence is progressively earlier (3-4 months/decade)
  - Comparable for males and females

- Cultural completion of adolescence is progressively later (12 months/decade)
  - Comparable for males and females
The Elongation of Adolescence

- **Age at Menarche**
- **Age at Marriage**

Length of Adolescence
Financial Assistance from Parents

Shulman et al., in prep.
Why is Adolescence Longer?

- The continuing decline in pubertal onset
  - Obesity
  - Exposure to endocrine disruptors
  - Increased exposure to light
  - Increased father absence
  - Increased survival of premature infants

- The continuing delay of the transition into adulthood
  - Growing demands for higher education
  - Higher cost of housing
  - Changes in status and economic power of women
  - Changes in attitudes and values of young adults (maybe)
Impact of Elongation on Adolescent Development

- Longer period of maturational imbalance
  - Longer period of risk
  - Combination of high reward-seeking and low cognitive control especially toxic
  - Increased importance of self-regulation

- Longer period of neuroplasticity
  - Increased opportunity for intervention
  - Self-regulatory systems amenable to improvement
  - Longer period of vulnerability
Winners and Losers in The Longest Decade

- Elongation of adolescence contributes to income inequality
- Large SES differences in self-regulation and executive functioning evident by early childhood
- Compounded by exposure to harsh and inconsistent parenting
- Contributors to early puberty more likely experienced by lower SES children
- Family, school, and community context of lower SES adolescents less likely to promote self-regulation
- Higher SES adolescents have opportunities to accumulate “neurobiological capital”
Cultivating Self–Regulation

- Self-regulation is more important, less heritable, and less stable than intelligence
- Importance of authoritative parenting
- Promising interventions
  - Cognitive control training
  - Mindfulness meditation
  - Aerobic exercise
  - Disciplined physical activity
  - Teaching specific self-regulation strategies
Rethinking Delayed Adulthood

- Erroneous stereotypes of the “me generation”
  - Considerable evidence of the delayed transition
  - No evidence of psychological impact
  - No evidence of greater narcissism

- Prolonging adolescence may prolong plasticity
  - Plasticity maintained by novel experiences
  - Routinization of activity in adulthood may lead to less novelty and challenge

- Wrong question: Is delaying adulthood bad?
- Right question: How can we create opportunities for more individuals to take advantage of the delay?
Recommendations

- Revise our view of adolescence
- Early intervention is an investment, not an inoculation
- Slow the declining age of puberty
- Protect adolescents from themselves
- Promote authoritative parenting
- Promote school-based interventions that facilitate self-regulation
- Expand voluntary service opportunities
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