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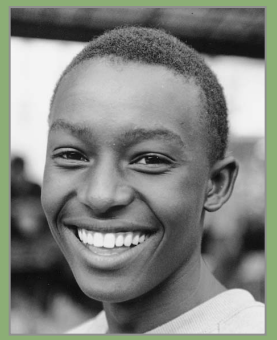

Adolescent Brain Development

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Section A

Factors That Contribute to Brain Maturation

Adolescence: Time for Great Risk and Opportunity

- It is the stage of life of the greatest risk for:
  - Emergence of psychological disorders
  - Depression, anxiety, conduct disorders (early/mid adolescence)
  - Schizophrenia (late adolescence)
  - Alcohol and drug use (mid/late adolescence)

Culture Influences the Timing of Puberty

- Monogamous vs. polygamous societies
- Presence vs. absence of father
- Exposure to pressures

Some Developmental Phenomena Occur Cross-Species

- Earlier maturation of females
- Greater risk taking of males
- Change in sleeping patterns
- Increased alcohol consumption

Epigenetics

- Genes and environment interact through epigenetic processes to influence behavior

How Epigenetics Works

- Epigenetics controls genetic influence through methylation (-CH3 group) to one of the proteins in DNA sequence, effectively silencing the gene
  - Genes surrounded by methyl groups are more difficult to transcribe or copy

Example

- The role of licking of rat pups by mother in infancy influences degree of aggressiveness when they mature (Weaver et al., 2004)

Genetic Influences on Behaviors

- Genetic influences on behaviors tend to increase with age through adolescence

- Verbal skills and cognitive functioning of adopted children become increasingly more like biologic than adoptive parents during adolescence

Genetic Differences in Brain Development

- Female is the “default” pathway for neurodevelopment

- Absent of testosterone, female brain development occurs with syndromes
  - Congenital adrenal hyperplasia
  - Androgenetic sensitivity syndrome

Sexual Orientation

- Pre- and post-natal hormonal environment of the brain may influence sexual orientation
  - Congenital adrenal hyperplasia
  - Diethylstilbestrol (DES)
  - Maternal stress
  - Genetics

Critical Periods for Male-Typical Sexual Differentiation

- Perinatal: gonadal hormones influence sexual differentiation of the brain

- Puberty: rising hormonal levels produce final maturational changes of the brain

Rising Sex Hormones Influence Sexual Interest

Church Going	Testosterone	
	High	Low
High	2	4
Low	1	3

Source: Urdy, 1985

Raging Hormones Is a Myth

- Hormones contribute only modestly to adolescent mood
- Contributions to negative affect
  - Gonadal hormones: 4%
  - Social factors: 8–18%
- Testosterone contributes modestly to male risk-taking