


Rollercoaster Highs: Substance Abuse and Adolescence

Naomi Weinstein, MPH
Center on Addiction and the Family
Phoenix House
646-505-2061
nweinstein@phoenixhouse.org


What is Adolescence?

- Period of time between childhood and adulthood
- Years between onset of puberty and assumption of adult responsibilities
- 13 – 18 years
 - May be extended

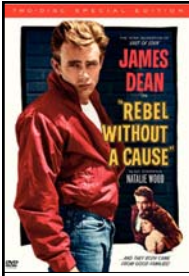


Three Developmental Tasks

- Individuation – develop personal identity
 - Become own unique person (not parent’s child)
- Separation – learn to think for yourself, without adult influence
- Autonomy – right to self-govern
 - Begin to challenge parental values




What Makes Teens Tough?



- Impulsive
- Think they’re invulnerable
- Risk-takers
- Moody
- Hormonally driven
- Rowdy
- Peer focused
- Resist authority
- Thrill seekers

Evolutionary Biology and Neurochemistry



- What is the goal: perpetuate the species
- What does it require:
 - Mating
 - Leaving family of origin
 - Skills to compete and form alliances
- What does this mean? ADOLESCENCE
 - Time with peers – find mates, acquire skills to compete, form alliances
 - Risk taking – without risks, species dies out
 - Conflicts with authority and family – need to be dissatisfied to separate

What is the science behind the teen brain?

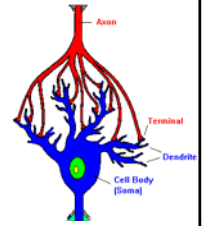
Teen Brains

- Transition to adult needs
 - Novelty seeking
 - Peer focused
 - Need higher levels of stimulation
- Synaptic pruning
 - Increased efficiency
 - “Use it or lose it”



Synaptic Pruning

- Before adolescence – proliferation of synapses
- Now – only hold onto what you need
- Experiences in adolescence determine abilities in adulthood
- Reinforced behaviors



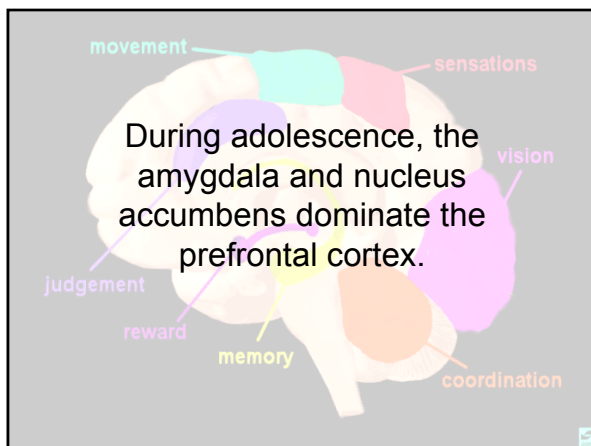
Brain Changes

- Nucleus accumbens (NAc) – motivation
 - Teens prefer low effort with high reward
- Amygdala – emotions
 - Explosive, not “controlled”
 - Misread facial expressions as anger
- Prefrontal cortex (PFC) – executive functions
 - Teens “act before they think”



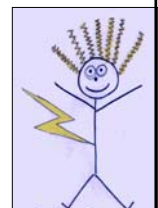
Prefrontal Cortex

- Control impulses
- Inhibit inappropriate behavior
- Initiate appropriate behavior
- Stop an activity upon completion
- Adjust behavior when situations change
- Temporary mental workspace for working memory
- Organize things
- Form strategies and plan behavior
- Set priorities among tasks and goals
- Make decisions
- Empathy
- Sensitivity to reward/punishment
- Insight



Reward Sensitivity

- Teens seek more novelty and higher levels of stimulation
- What used to be enough stimulation is now insufficient
- Function of heightened stimulation-seeking and immature self-regulatory





Uneven Development

- Risk taking:
 - Nucleus accumbens (NAc) – motivation when we have a chance to get something desirable
 - Orbitofrontal cortex (OFC) – our “stop light”
 - NAc develops first. So we take motivation is stronger than caution reflex → risks
- Decision making
 - Rely on judgment rather than visual imagery for “gut reactions” – take too long

Power of Peers



- Friends are kids with similar interests
 - Peer selection or peer pressure
- Arousal – hot cognition
 - Decision-making is more complicated

Adolescent risk taking and decision making

Risk Taking in Adolescence is...



- Normative
- Biologically driven
- Healthy
- Necessary
- All animals have a transition period (adolescence) that focuses on novelty and risk

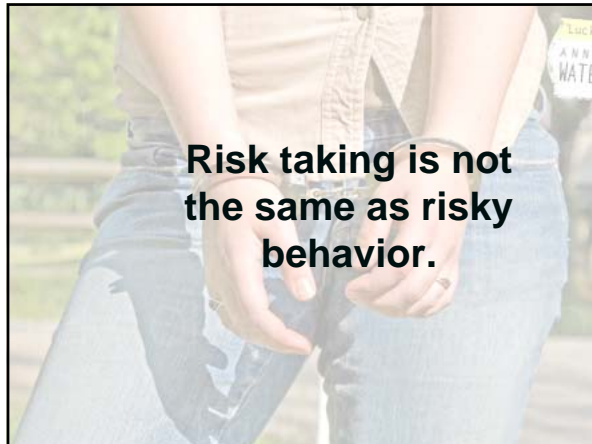
Purposes of Risk Taking

- Support independence
- Development of self-identity
- Learn consequences of risk-taking (promote long-term safety)
- Increase confidence
- Promote complex thinking
- Discover competencies



Dopamine and Risk

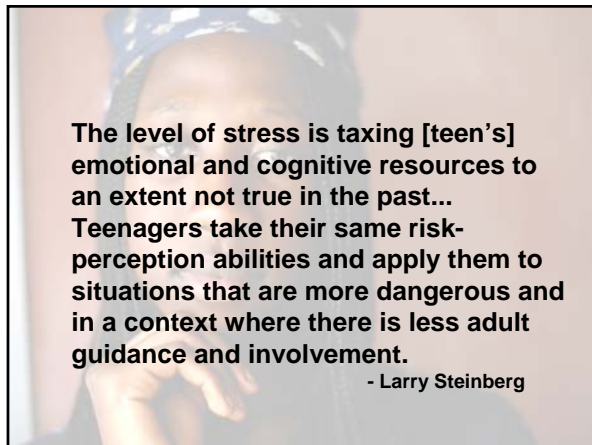
- Decreasing in NAc and reward pathway
- Increasing in prefrontal cortex
 - ↓
 - Need more stimulating experiences to get a rise
- Dopamine – wired to seek rewards that feel good – increase survival



Risk taking is not the same as risky behavior.

Healthy Risk Taking...

- Talent shows: music, dance, poetry,
- Contests (i.e., arts)
- Trying hard at school
- Sports
- Business/entrepreneurial skills
- Extreme thrills: roller coasters, rock climbing




The level of stress is taxing [teen's] emotional and cognitive resources to an extent not true in the past... Teenagers take their same risk-perception abilities and apply them to situations that are more dangerous and in a context where there is less adult guidance and involvement.


- Larry Steinberg

Factors in Decision Making

- Future orientation, sense of hope, resources and supports
- Overly optimistic about getting out of risk
- Favor own experience over probability
- Misperceive level of risk
- See risk as cumulative
- Don't see full range of options




Teens Don't Make Decisions Like Adults



- Exploring options
 - May lack knowledge to come up with all options
 - May not have ability to create options
- Considering consequences
 - Negative consequences may be benefits to teens
 - May discount future consequences more than adults

More on Teens and Decision-Making



- Reviewing facts
 - Only know what they have learned
 - Limited appreciation of their own limited knowledge
 - Difficulty interpreting meaning and credibility of information
- Managing the situation
 - Lack control over critical parts of lives
 - More influenced by emotions than adults

Adolescent vulnerability to substance use disorders

Parental Alcoholism and Vulnerability



- COAs – 4x higher risk (6x if both parents drink)
 - Preference for alcohol
 - P3 brain wave deficits (brain marker)
 - Acetaldehyde build-up – increase loss of control
 - Dopamine deficiencies
 - Low intensity reactions

Prenatal Exposure



Alcohol

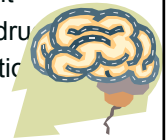
- Lifelong problems
- Mental retardation
- Difficulty knowing right from wrong
- Problem solving issues
- Poor coordination

Other Drugs

- Unclear re: duration
- Limited abstract thinking
- Impulse control
- Sensory integration
- Learning problems
- Labeled as problems
- Impulse control

Teens, Brains, and Addiction

- The earlier you start, the faster you become addicted
 - 40% of those drink pre-15 – Alc dependent
 - 10% of those drink post-21 – Alc dependent
- Addiction interrupts development
- Adolescent brains are ideal for drug
- Stress levels overlap with addiction sensitivity



Non-genetic vulnerability

- | | |
|--|---|
| <ul style="list-style-type: none"> • Prenatal exposure • Age of first drink • Multi-drug use • Adolescent brain development • Sensitivity to alcohol • Parental drug use • Emotional/behavioral disorders | <ul style="list-style-type: none"> • Victimization and maltreatment • ADHD • Learning disabilities • Stress and trauma • Gang involvement • Gender • Poverty |
|--|---|



Vulnerability to Alcohol



- Less sensitive to sedative/motor effects
- Don't feel hangovers as intensely
- More sensitive to social disinhibition
- More sensitive to learning and memory effects

Chronic Stress



- Oversensitive HPA pathway
 - Focused on survival
 - Jeopardizes social and cognitive learning
 - Wears out hippocampus – memory
- Wears out dopamine receptors
 - Increases vulnerability to substance abuse

Prenatal Exposure



Alcohol

- Lifelong problems
- Mental retardation
- Difficulty knowing right from wrong
- Problem solving issues
- Poor coordination

Other Drugs

- Unclear re: duration
- Limited abstract thinking
- Impulse control
- Sensory integration
- Learning problems
- Labeled as problems
- Impulse control

Risk, resiliency, and protective factors

Resiliency, Protective Factors, and Coping Skills

- Resiliency
 - Successful adaptation despite challenges
 - Personality traits + environment
 - Dynamic process
- Enhanced by protective factors
- Coping mechanisms
 - Survival skills
 - Contextual
 - Developed because of negative experiences



Protective Factors



- Individual
 - Positive sense of self
 - Problem solving skills
- Family
 - High level warmth
 - Absence of criticism
 - High expectations
 - Clear rules
- Peer Factors
 - Positive peer activities
 - Positive peer group norms
- School Factors
 - High expectations
 - Clear standards
 - Clear behavior rules
- Community
 - Caring and support
 - Participation opportunities
- Societal Factors
 - Counter-advertising
 - Low AOD accessibility

After San Francisco earthquake, teens who were allowed to participate in disaster relief work were less likely to get involved in risky behaviors



Adolescent substance abuse



Teen vs. Adult Substance Use

- Rapid progression of disease
- Narrow repertoire of coping skills
- Stronger denial system (shorter hx)
- Stronger enabling system
- Maturational delays
- Episodic use more likely than daily use
- Greater number of substances → more complicated withdrawal
- Developmental changes may mimic or exacerbate drug effects
- More likely to have co-occurring problems
- May "outgrow" AOD use without formal intervention

And treatment

Who Needs Treatment?

Continued use despite negative consequences

- Family problems
- Friendship changes
- Personality changes
- Physical appearances
- Abusive language
- Self-injury
- Eating disorder
- Sexual activity
- Legal problems



Intervention/Treatment Needed

- Certain drugs (crack cocaine, meth)
- Early onset of use
- Large quantities of drugs used
- Use in inappropriate settings (school)
- Experience negative social or psychological effects
- Have certain risk factors in absence of problem (family hx, conduct disorder, etc.)



Drug of Choice

- More than half – marijuana
- 10% - alcohol
- 19% - alcohol + something else (usually marijuana)
- Only 10% of teens in need get into treatment
- Not enough teen-specific programs



Special Issues in Teen Treatment



- Developmental awareness – older v. younger teens
- School issues
- Ethnicity and culture
- Sexuality/orientation
- Mental health co-morbidity
- Family factors
- Maturational delays caused by AOD use
- Peer focus
- Emotional extremes
- Habilitation, not rehabilitation

Post Acute Withdrawal Symptoms



- Disrupted thought patterns
- Memory gaps
- Emotional hypersensitivity
- Sleep problems
- Physical coordination problems

Co-morbidity is the Norm

- $\frac{3}{4}$ of kids – co-occurring issue
 - Conduct disorder
 - AD/HD
 - Depression
 - Anxiety
 - Bipolar
- Half of these kids have 3+ diagnoses



Cravings and Teens



- First sign of problem – cravings don't stop with abstinence
- Teens can't think of coping strategies
- Fears
 - if discuss cravings, will have them
 - If tell parents, will get explosive response
 - If tell other adults – sets wheels in motion
- Don't want to distance from friends, even if they trigger cravings (assume they can handle it)

Worries about Post-Treatment Life



- Staying clean, given prevalence
- Reality of same v. new school
- Newly improved family relationships will deteriorate
- Staying connected for support after treatment

Teen Relapse



- Only 7% have continuous abstinence over four years
 - only 1/3 returned to heavy or pre-tx use levels (2 year follow-up)
- 44% relapse when socializing with pre-tx friends
- Frequently involves alcohol, whether or not it is drug of choice
- 23% of initial relapses involve multiple substances,
 - less than half involved drug of choice
- If drug of choice, more rapid return to and greater severity of problem

Key Responsibilities

- Encourage healthy risk-taking
- Screenings and assessments should be routine
- Identify resiliencies and resources
- Make sure treatment is developmentally appropriate
- Be aware of mental health issues
- Treatment for serious drug abuse - always

