Family Planning and the Adolescent Brain:

HOW DO WE MINIMIZE RISK-TAKING IN NATURAL RISK-TAKERS?

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HEALTH IN ADOLESCENCE

- Excellent physical health
- Escalating morbidity and mortality rates
- Nearly all behaviorally-related and preventable!

Source: National Center for Injury Prevention & Control, WISQARS database, 2012
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Risks are ever-changing...
What measures do we have of adolescent risk behavior?
SEXUAL ACTIVITY AMONG HIGH SCHOOL STUDENTS, 2015

Source: Youth Risk Behavior Surveillance System, 2015
EVER SEXUALLY ACTIVE HIGH SCHOOL STUDENTS, 2015

Source: Youth Risk Behavior Surveillance System, 2015
SEXUALLY ACTIVE BEFORE 13 YEARS, 2015

Source: Youth Risk Behavior Surveillance System, 2015
DRANK ALCOHOL OR USED DRUGS BEFORE LAST SEXUAL INTERCOURSE, HIGH SCHOOL STUDENTS, 2015

Source: Youth Risk Behavior Surveillance System, 2015
DID NOT USE ANY METHOD TO PREVENT PREGNANCY, HIGH SCHOOL STUDENTS, 2015

Source: Youth Risk Behavior Surveillance System, 2015
DRIVING AND ALCOHOL USE AMONG HIGH SCHOOL STUDENTS, 2015

Source: Youth Risk Behavior Surveillance System, 2015
CIGARETTE USE AMONG HIGH SCHOOL STUDENTS, 2015

Source: Youth Risk Behavior Surveillance System, 2015
ALCOHOL USE AMONG HIGH SCHOOL STUDENTS, 2015

Source: Youth Risk Behavior Surveillance System, 2015
OTHER RISK BEHAVIORS
HIGH SCHOOL STUDENTS, 2015

Source: Youth Risk Behavior Surveillance System, 2015
INTERESTINGLY,

MANY OF THESE MEASURES HAVE ACTUALLY IMPROVED OVER TIME SUCH AS DRIVING UNDER THE INFLUENCE OR HAVING UNPROTECTED SEX—

BUT RISKY BEHAVIOR OVERALL REMAINS HIGH
WHY DO WE CARE ABOUT HIGH RISK BEHAVIOR?

- Preventable loss of lives
- Adolescent behavior can have immediate and long-term consequences
  - Smoking
  - Substance Abuse
  - Risky Sexual Activity
  - Poor diet
  - Lack of physical activity
WHY DO TEENS TAKE RISKS?

- Bored?
- Curious?
- No clue about consequences?
- Inexperience?
- Hormones?
- Inability to weigh risk and benefit?

**Turns out, maybe we have been wrong about a few things....**

**The Immortality Myth**
ACTUALLY...

“The logical reasoning and basic information-processing abilities of 16 year-olds are comparable to those of adults; adolescents are no worse than adults at perceiving risk or estimating their vulnerability to it.”

-Laurence Steinberg, Temple University

Driving experiment
THEN WHY DO THEY DO WHAT THEY DO?
Pros and cons of risk-taking in adolescents?
HARDWIRED TO TAKE RISKS

“The teen brain is neither broken nor defective. Rather, it is wonderfully optimized to promote our success as a species.”

~Jay Giedd, MD
ADOLESCENT BRAIN DEVELOPMENT...WHAT DO WE KNOW?

- **Old school**: Brain mature by onset of puberty
- **New school**: Enormous brain growth and change throughout adolescence and well into mid-20’s
BRAIN FACTOIDS

• There are over 100 billion nerve cells (neurons) and trillions of connections between them (synapses)

• It is not your neurons multiplying but the connections between them

• Pruning occurs …use it or lose it!

• Added insulation (myelin) over time adds speed and coordination to processing
NEUROTRANSMITTERS

Here’s how people communicate.

Transmitter  Receptor

Here’s how brain cells communicate.

Neurotransmitter  Receptor

Concept courtesy: B.K. Madras
WHY ON EARTH ARE WE TALKING ABOUT NEUROTRANSMITTERS?

- May have a big impact on behavior!

- Examples of neurotransmitters:
  - Dopamine
  - Serotonin
  - Epinephrine
  - Oxytocin
PREFRONTAL CORTEX

- Planning
- Reasoning
- Judgement
- Impulse control

It is the last part of the brain to reach complete maturation...usually by mid 20’s
THE LIMBIC SYSTEM
(EMOTIONAL BRAIN)

- Increased activity kicks in around puberty
- Pleasure and new experience seeking surges. Reward Center
- Maturates around 18/19 yrs

Big changes in the brain’s dopamine system happen during adolescence and these changes may help shape socioemotional development.
THE PEER EFFECT

- Functional MRI’s show activation of the reward center when a teen has an audience of peers...not so when teen is alone
- Peers increase the reward even in things that are already rewarding

This is why peer behavior or perceived peer behavior impacts what teens do and why risky behavior may happen more in groups

“Jessica, I don’t think we should hang out anymore. You’re turning me into a criminal when all I want to be is a petty thug.”
MAKING RISKY DECISIONS (REYNA)

Two paths to making risk judgements:
Classical/logical...cost vs benefit
- Fact and detail oriented...overly deliberative
- Most frequent strategy used by children and adolescents
Gut reasoning ...gist of a situation
- Intuitive, relies on situational cues
- More black and white
- Used more with increased age and experience
- Used more by expert decision makers (informed intuition) Leads to better decisions
SCENARIOS

- Teen alone in her house with boyfriend deliberating whether to have unprotected sex....
  - Deliberates the odds, risk low...benefit high???

Whereas an adult:

Skips to main issue: risk of disease/unwanted pregnancy can’t be weighed against immediate rewards

Getting teens to quickly compute an emphatic “no” instead of weighing odds, is not easy
“The adolescent brain just isn’t yet optimized for making that adult beeline to the bottom line.”

Eric Wargo,

“Adolescents and Risk: Helping Young People Make Better Choices”, ACT for Youth Center of Excellence, Research Facts and Findings, Sept 2007
SO, MAYBE THE IMBALANCE IN BRAIN DEVELOPMENT IMPACTS BEHAVIOR

Many cognitive skills on par with adults but impacted by limited experience, limited executive functions (planning, working memory, judgment, weighing options) and when limbic system is triggered, it trumps all!
A THEORY:

“Risk-taking increases between childhood and adolescence as a result of changes around the time of puberty in the brain’s socioemotional system that lead to increased reward seeking, especially in the presence of peers.

Risk-taking declines between adolescence and adulthood because of changes in the brain’s cognitive control system—changes which improve individuals’ capacity for self-regulation which occur gradually and over the course of adolescence and young adulthood.

The differing timetables of these changes—the increase in reward seeking, which occurs early and is relatively abrupt, and the increase in self-regulatory competence, which occurs gradually and is not complete until the mid-20’s, makes mid-adolescence a time of heightened vulnerability to risky and reckless behavior.”

Laurence Steinberg, Temple University
SOME KIDS ARE AT HIGHER RISK...

1) Early puberty = Increased risk
Higher rates of alcohol and drug use, delinquency and risky behavior.*

2) Temperament

3) Environment (home, stress, peers, etc)

*Age at first use of alcohol/drugs and first sexual experience has decreased as age of puberty onset has decreased
4. Lesbian, Gay, Bisexual and Transgender Youth

- LGBT youth are more likely than their heterosexual peers to engage in sexual risk-taking behaviors
  - Earlier age at first sexual intercourse
  - More sex partners
  - Report likely to report drinking alcohol or using other drugs prior to last sexual intercourse
  - Less likely to use a condom during intercourse.

- LGBT students are frequently bullied and harassed and are more likely than heterosexual students to experience a higher prevalence of dating violence and forced sexual intercourse.

SO WHAT DO WE DO?
EDUCATION IS IMPORTANT!

- Can inform choices, especially during calmer moments
- Adolescents cognitive abilities are strong
- Consider developmental level
BUT REMEMBER…

- Over 1 billion $ spent annually on education to adolescents about risky behavior

- Most research on effectiveness indicates that even the best programs are better at increasing knowledge than changing behavior
ENVIRONMENTAL SUPPORTS

- Risky activity stems from social/emotional parts of brain and not cognitive

- And, neuroscience suggests that brain development is strongly biologic and may be impossible to change or speed up…

“Perhaps efforts to prevent or minimize risk should focus on changing the context in which risky activity takes place rather than mainly attempting to change what adolescents know and the ways they think…”
CHANGE THE CONTEXT IN WHICH ACTIVITY OCCURS:

- Raise the price of cigarettes
- Enact Tobacco 21 policy
- Raise the legal driving age
- Restrict presence of peers in car
- Improve surveillance of alcohol sales to minors
- Increase access to contraceptives and condoms (Ex. OTC Plan B)
- Expand mental health services
OTHER PROTECTIVE FACTORS

- Authoritative Parenting: warm, firm, communicating
- Structure, clear boundaries, MONITORING, know peers
- Increased connection to school
- Increased participation in social and skill building activities
- Lower stress
- Parents modeling healthy behaviors
- Relationships with emotionally healthy adults outside the family unit
- Opportunities for positive risk-taking
IN FAMILY PLANNING?

Ideas?
BROAD INTERVENTION STRATEGIES

(Dr. Reyna)
- Don’t assume adolescents think they are immortal, they don’t
- Help adolescents see benefits differently, not just risks (esp. short term)
- Use positive images of healthy behaviors and negative images of unhealthy ones (assist gist-based thinking, reminders of safe behaviors)
Use analogies to lead adolescents away from categorical thinking
(ex russian roulette)

Develop emotional and personal cues
...personalize risk (ex HIV)
Give adolescents practice at recognizing environmental danger cues and thinking through “escapes”

Teach self-efficacy, give opportunities to practice concrete skills (refusal skills)

Train in strategies to avoid risk
- Limit exposure to risky substances and situations
- Monitor and supervise younger adolescents
APPROACH:

- Expectation of risk
- Assessment of client risk
- Assessment of peer risk
- Helping adolescent plan re: risk
IN THE CLINIC:

- **Assess risk-taking with visits:**
  - Do you do anything you consider risky?
  - What?
  - How many of your classmates do things you consider risky?
  - What kinds of things?
  - How many of your four closest friends do things that are risky or dangerous?
  - What kinds of things?
“Some things just take time to develop and mature judgement is probably one of them.”

Laurence Steinberg, Temple University

I don't know! I don't know why I did it, I don't know why I enjoyed it, and I don't know why I'll do it again! Bart Simpson