

THE ADOLESCENT BRAIN: FUTURE PLANNING AND DECISION MAKING

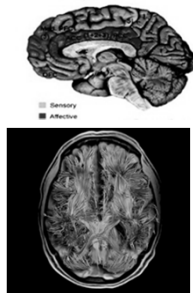
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What can we
expect?

NEW RESEARCH ON THE ADOLESCENT BRAIN

▪ Discoveries from Neuroimaging

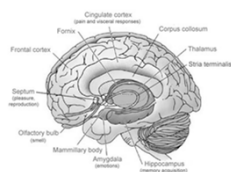
- fMRI
- Diffusion Spectrum Imaging
- SQUID Magnetometry
- MEG Magnetoencephalography



DEVELOPMENTAL CHANGES

▪ Chemical Trigger for Puberty

- Kisspeptin
- Signal to Endocrine System
- Production of New Hormones



ADOLESCENT HORMONES

■ Testosterone

■ Primary and Secondary Sex Characteristics



■ Estrogen

■ Primary and Secondary Sex Characteristics

WHAT GOES ON IN THEIR MINDS

■ Testosterone In Males

■ Estrogen In Females

- Influence size and activity levels
- of Amygdala

■ Emotional Intensity

- 2 to 4 Times Intensity
- More Frequent Change

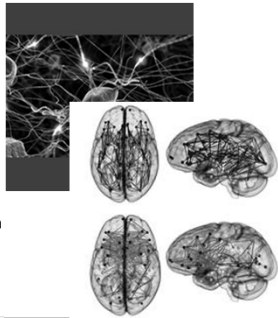


BRAIN FACTS

■ 200 Billion Cells

■ Gray Matter/White Matter

- Front to Back,
Long Range Integration



EXECUTIVE FUNCTION

■ Planning

■ Sequencing of Activities

■ Prioritizing long range goals

■ Choices and Consequences



WHY IS THIS BRAIN AT RISK?


■ Emotional Intensity


■ The Good or The Bad

■ Minute by Minute

■ Male/Female

■ Legitimate/Normal







WHY IS THIS BRAIN AT RISK?

■ Emotional Intensity

■ Mirror, Mirror

■ Male/Female Brain Differences





GIRLS VS BOYS

Stress in Girls vs. Boys

More teen girls than boys report symptoms of stress and are more likely to say stress impacts their happiness a great deal.



STRESS IN AMERICA-APA STUDY

■ 13-23

■ Highest stress First time ever

27% Extreme stress 8-10

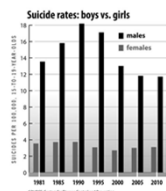
55% Moderate stress 5-7

STRESS IN AMERICA

■ Emotional cost

■ Negative emotions

- Anxiety
- Depression
- Frustration
- Anger

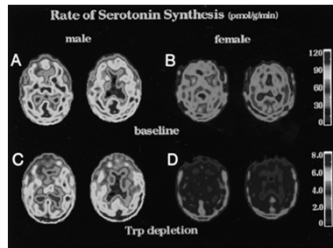


■ Shift in age for suicidal behaviors

WHY IS THIS BRAIN AT RISK? CONT.

■ Depression

■ Serotonin Synthesis



DEPRESSION AND SUICIDE

■ Aggressive Impulsive Reactors

■ Mostly Male

■ Negative Event, plus risk factors



■ Brief Period between decision and action

STRESS RESPONSE

■ Release of chemicals, including:

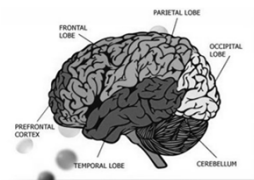
■ Nor-epinephrine

■ Cortisol B

■ Adrenaline

■ Glucocorticoids

- GATA1 Transcription Factor
 - Reduced connectivity
- Hippocampus
 - Diminished Volume



PERCEPTIONS

■ Spotighting

- Everyone is watching
 - Who else can stand up?
- Emotions intensify
 - Keep negatives short and sweet
- Pre warning



HOW CAN WE HELP?

■ Access Skills for Stress Management



HOW CAN WE HELP?

■ Emotional Competencies

- Self Awareness
- Verbal Access
- Emotional Regulation
- Empathic Response
- Passionate Interest



TEENS AND CONFLICT

■ Migration and Activation

- Cell Migration
 - L1

- Benchmarks
 - "I Know!"
 - Open Conflict

■ Don't Take It Personally



WHY IS THIS BRAIN AT RISK? CONT.

- Problem Solving
 - No Load



Social/Emotional Crisis

The Crisis Chemical THP



■ Emotional Support Essential

AT-RISK

■ Family environment

■ Emotional disorder

■ Mental health issue

■ Learning disorder

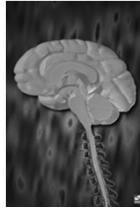
■ School failure



MOTIVATION FOR DRUG USE

■ Seek drugs for:

- Create positive effect in brain chemistry
 - Dopamine release in reward sites
- Suppress negative emotions
- Activation in specific sites



ADOLESCENT BRAIN FACTORS, CONT.

■ Duke University study

- Low negatives
- High positives

■ At-Risk population

■ Genetics

- High sensitivity
- One-third to one-half as likely
- 10% - 20% of population CYP2E1 enzyme

ALCOHOL: NEW PRODUCTS

■ Alcohol treats



■ Pocket Shots



ALCOHOL: NEW PRODUCTS, CONT.

▪ Whipped Cream



▪ Jell-O Shots



▪ Palcohol



ALCOHOL: NEW PRODUCTS, CONT.

▪ Malt Beverages

▪ Malt brewed beer

▪ Sugars

▪ Flavors

▪ 20 – 24 ounces

▪ 7 – 13% alcohol



ALCOHOL: IMPACT ON ADOLESCENT BRAIN, CONT.

▪ NMDA pathways

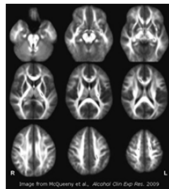
▪ 48 hours – calcium overrun

▪ Cell death

▪ One year of binge drinking

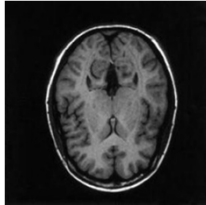
▪ 10% loss of PFC volume

▪ Logic, reason, executive function



ALCOHOL: IMPACT ON ADOLESCENT BRAIN, CONT.

- One year of binge drinking
 - 10% loss of hippocampus volume
 - Memory
 - Motivation
 - Social behaviors
 - Learn how to study
 - Appropriate social interaction
 - Ask for help



IMPULSE CONTROL

- PRDM2
 - Down regulated
 - Disrupts impulse control

ECM-extracellular matrix
PNN-perineuronal nets



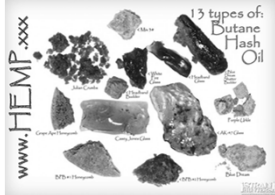
NEW FORMATS



NEW PRODUCTS

- Butane Hash Oil

- Amber, Shatter, Ear Wax



MARIJUANA RISKS

- Non-responsive

- High dose - no divided attention
- Operation of *any* moving vehicle
- 2x more likely to have accident

- Not attentive to environmental risks



- Cognitive impact

- Measurable impact on memory and learning
- IQ drop in early age onset
- Potential paranoia and/or psychotic in vulnerable individuals

HOW CAN WE HELP?

- Evaluation

- Early Intervention

BRAIN FACTS

▪ Risk Taking

▪ New Sites of Activity

▪ Influence of Peers

▪ Male/Female

▪ Emotional Reward



BRAIN FACTS

▪ Influence of Peers

▪ Be All That You Can Be



CULTURAL AND ENVIRONMENTAL INFLUENCES

▪ Role Models



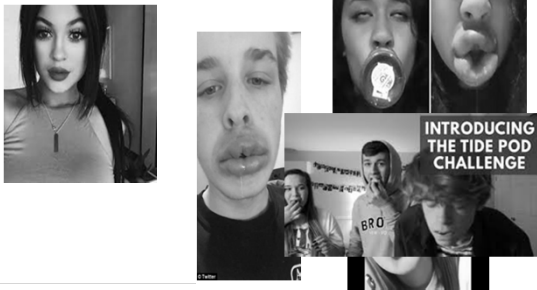
▪ TV

▪ Social Media



RISK TAKING

■ Kylie Jenner Challenge



RISK TAKING



HEALTHY OPTIONS

■ Evaluate Risk Spectrum

■ Introduce Activities

■ Role Model

■ Create Opportunities



FUTURE LIFE DOMAINS

- Education

- Career

- Family



ACADEMIC SUCCESS

- Praise and Encouragement

- Positive Reinforcement

- Perseverance
- Effort
- Strategies
- Learn from failure



WHAT YOU CAN DO

- Provide Multiple Experiences

- No Fear of Failure

- The Flexible Future

THE ROLE OF ADULTS

▪ Beliefs and Expectations

▪ Encouraging Autonomy




SOCIAL CAPITAL

▪ Micro-Systems

▪ Adult

▪ Peer




GETTING READY FOR ADULTHOOD

▪ Positive Talk for Post High School Education

▪ Not focused on degree

▪ Variety of “College Experiences”

▪ Value of Lifelong Learning



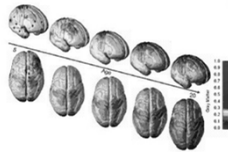
TALK THE TALK

- Eye contact - keep it brief
- Side by side
- Metaphors help
- First person stories



WHY IS THIS BRAIN AT RISK? CONT.

- A Work In Progress
 - Stages of Adolescent Development
- Emerging Adult Brain
 - The Long and Winding Road



COMPONENTS OF TRUST

1. Reliability
2. Predictability
3. Falth



WRAP UP

- **Validate Emotions**
- **Social Bonding**
- **Risk-Taking Opportunities**
- **Crisis Support**
- **Early Intervention**

