

# Giving a Fish a Bath:

*The Untold Story of the Adolescent Mind*

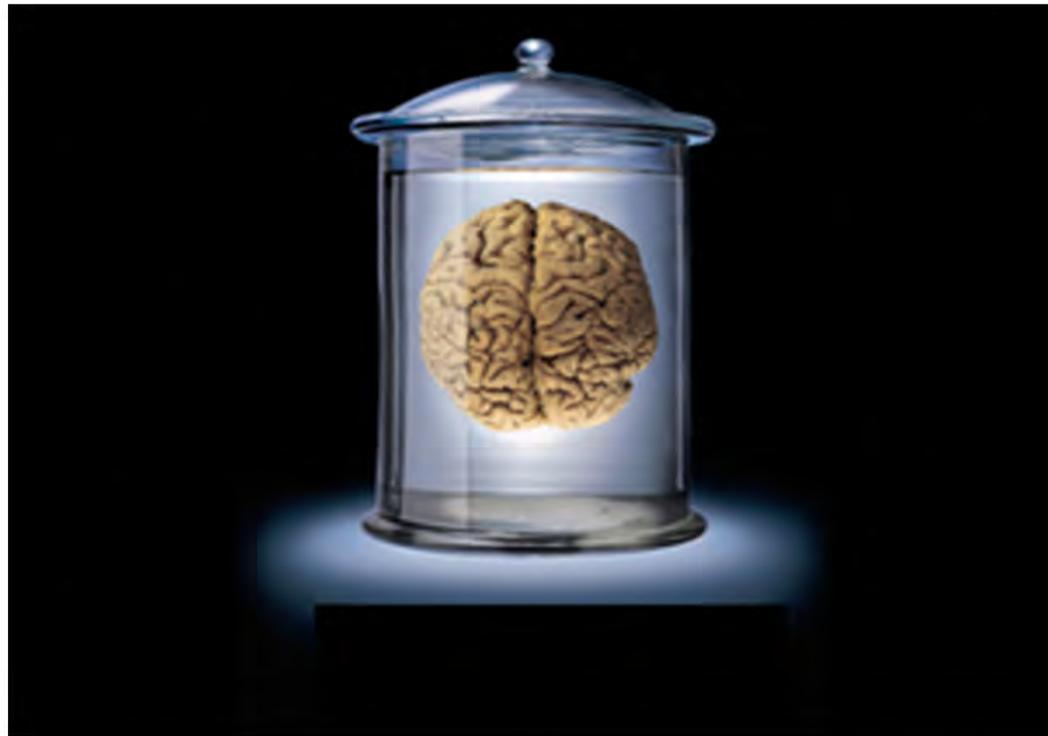
**Risky Business  
Conference  
2013**

**Heather Higgins, LCSW-C**  
Director of Training and Development



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# How is YOUR brain this morning?



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# What's The Upside Down Organization?



- A unique learning organization to “Help Adults Help Kids.”
- Nonprofit. Benefits go to kids at The Children’s Guild.
- Applied Research. We are operating schools, group homes, foster care, mental health and autism programs!
- Word of Mouth Marketing. Our participants “spread the word.” If you benefit today, please tell someone about us!

# The Children's Guild

- 4 Schools
- 2 are Non-Public
- 2 Charter (Reg-Ed)
- 3 Group Homes
- Foster Care
- OMHC
- After School



# Transformation Education

Translates the fields of neuroscience (*brain compatible approaches*) and anthropology (*culture*) to be practically applied to child-serving organizations and schools



Treatment  
Foster Care



Group Care



Regular and  
Special  
Education

# An Enriched Environment...



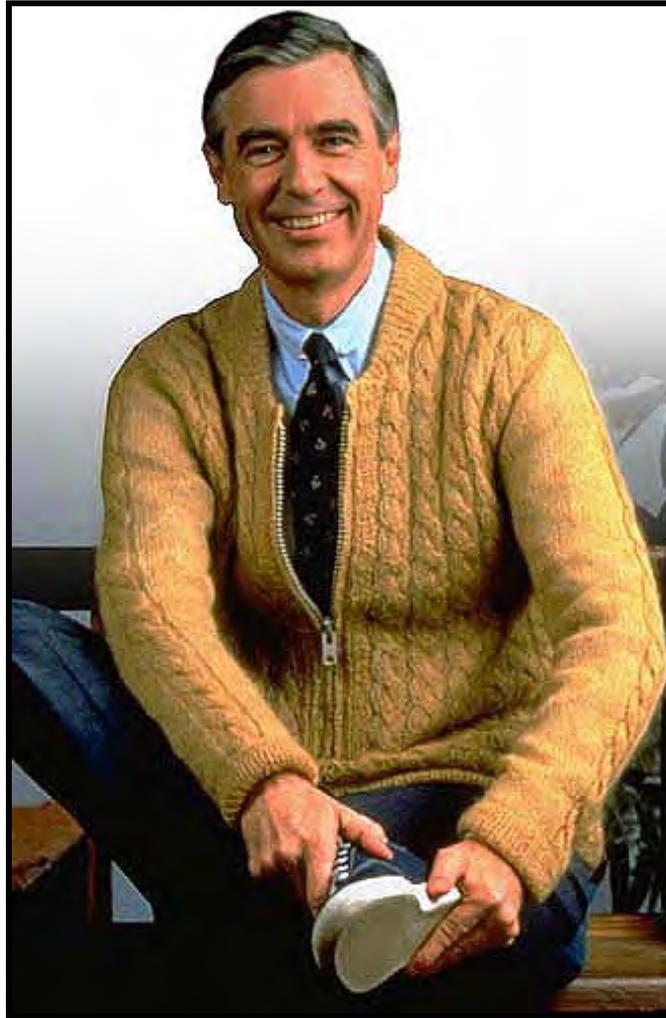


# About Your Presenter

Heather Higgins, LCSW-C is the Director of Training and Development for The Upside Down Organization and a Clinician at The Monarch Academy in Baltimore, MD. She has been practicing social work for over 10 years, specializing in clinical work with children and families. Heather obtained her BA from Loyola College and her MSW from University of Maryland, Baltimore. Heather provides keynote and workshops nationwide to educators, clinicians, child-serving professionals, parents and foster families on a variety of brain based topics — including Suicide Prevention, Gender Differences, ADHD, Bullying, and Poverty. Heather has spoken at national and international conferences and has a published article on understanding ADHD.

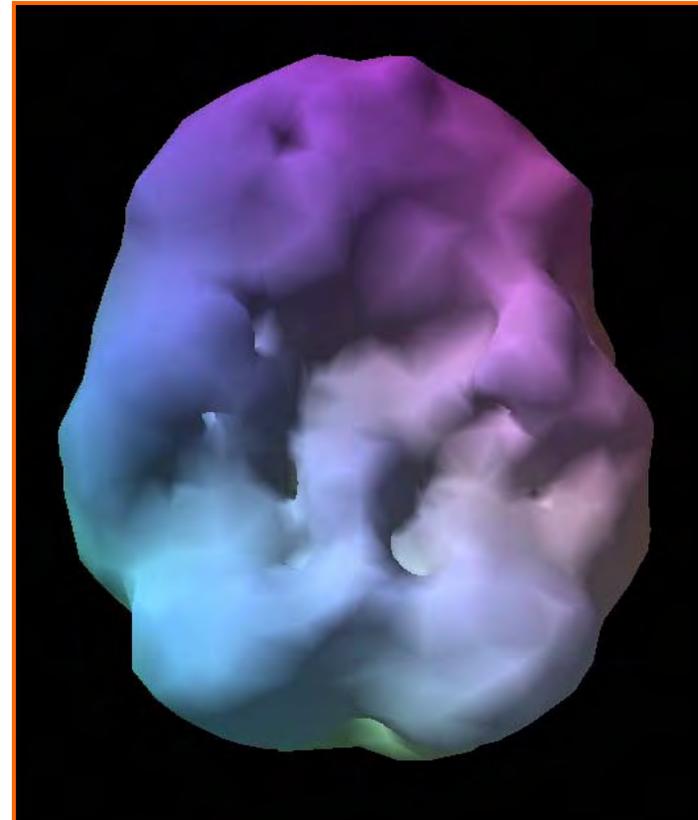
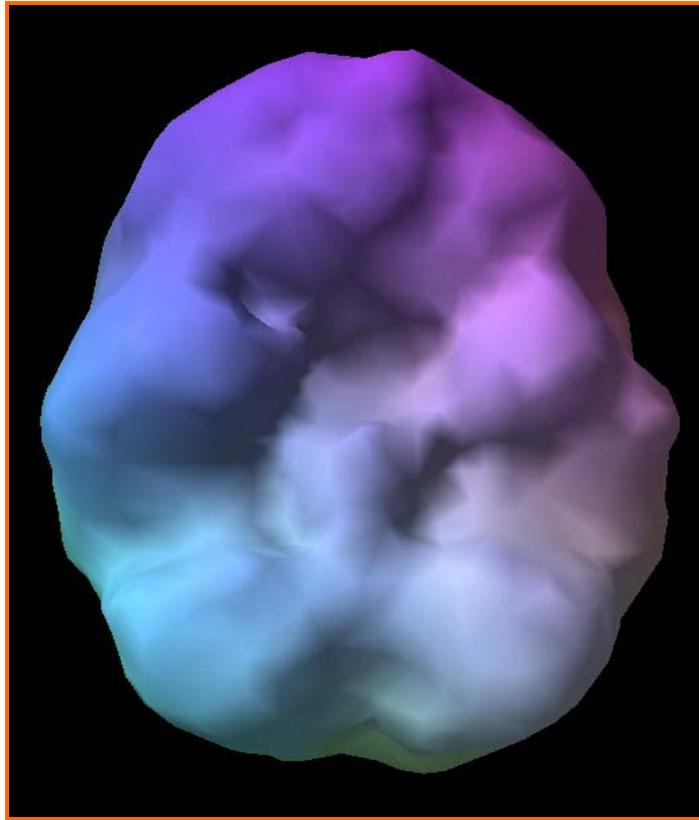


# Hello, Neighbor!



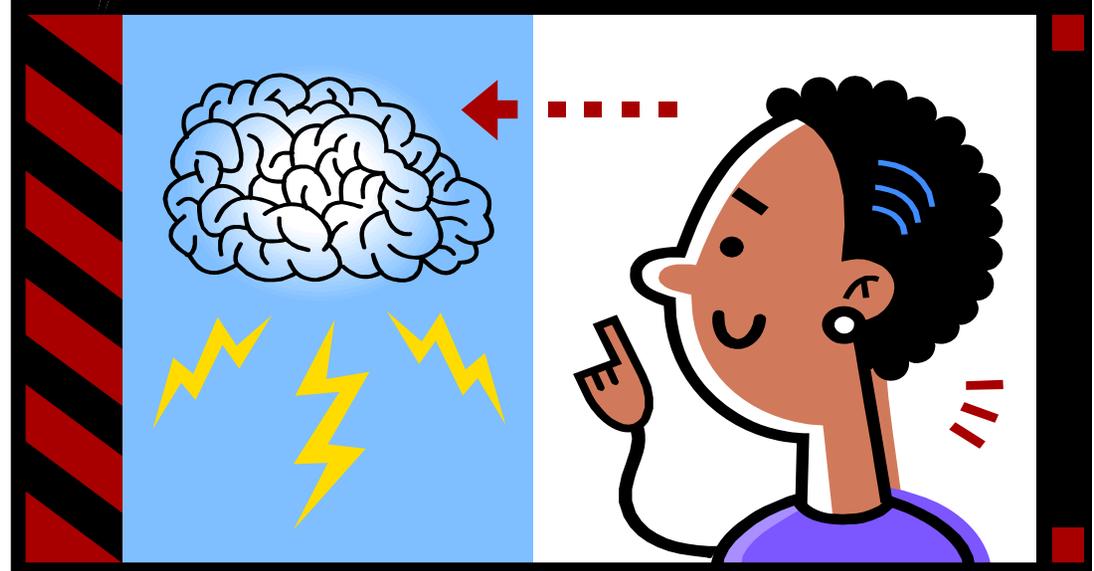
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# Grateful and Hateful



# Why the Brain?

Because the brain is involved in  
**EVERYTHING** you do!



# Why the Brain?

Because the brain is  
**EVERYWHERE** these days...



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# Newsweek

## FIXING YOUR BRAIN

BIONIC  
EYES  
& EARS

HIGH-TECH  
ALZHEIMER'S  
TREATMENTS

REWIRING  
DOCTORS



# Newsweek

Ultimate Action  
Playing the Gender Card

## THE NEW SCIENCE OF THE BRAIN

Why  
Men and  
Women  
Think  
Differently



# U.S. News & World Report

CBS's New Tronibus  
Mommy's Secret Start

## BABY TALK

New research  
shows the amazing  
ways children  
master language-  
and how it wires  
their brains



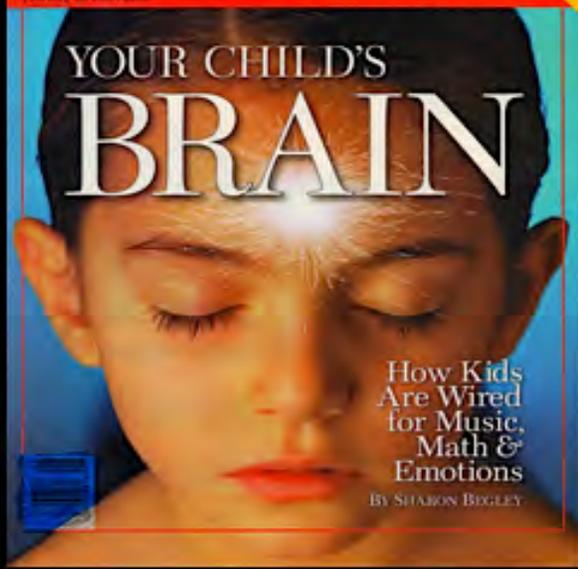
# Newsweek

Deluxe  
Oklahoma City:  
A Bizarre Defense

## YOUR CHILD'S BRAIN

How Kids  
Are Wired  
for Music,  
Math &  
Emotions

By SHARON BEGLEY



# TIME

## SPECIAL REPORT HOW A CHILD'S BRAIN DEVELOPS

And what it means for  
child care and welfare reform



# TIME

TROY:  
THE MAKING  
OF AN EPIC

## SECRETS OF THE TEEN BRAIN

Research is revolutionizing our  
view of the adolescent mind--and  
explaining its mystifying ways

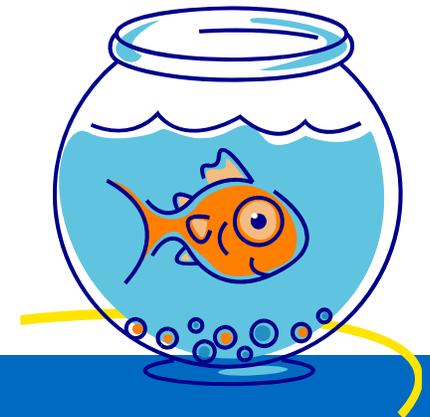


“Teaching, guiding and influencing teens is like giving a fish a bath. Teens will often see your efforts as unnecessary, burdensome and unwanted. But, in the end, they will remember the energy, enthusiasm and fun you put into ‘bath time’.”

— Margaret Baldwin



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Let's Play!



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# Facts and Myths About Adolescence

1. T F Telling teens that they are “smart” may negatively impact academic performance.
2. T F Adolescent lying is a direct result of bad morals, lack of ethics, poor parenting or all of thee above.
3. T F Most of the content that teens learn in school is directly relevant to their life outside the school walls.
4. T F The adolescent brain is like an adult brain but with several years less experience.
5. T F The start time of a teen’s school can have a significant impact on his/her academic performance.

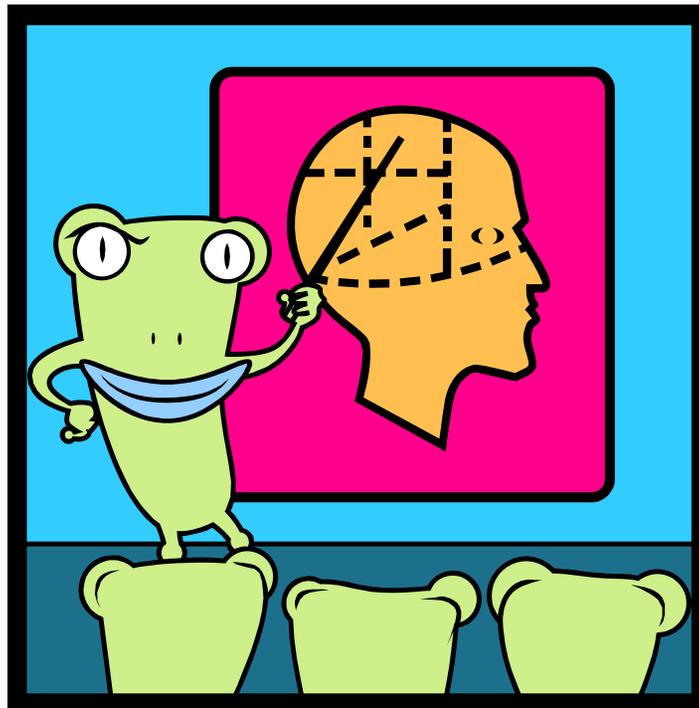


# Facts/Myths Answers

1. **T F** Telling teens that they are “smart” may negatively impact academic performance.  
*Teachers should focus praise instead on strategy and effort.*
2. **T F** Adolescent lying is a direct result of bad morals, lack of ethics, poor parenting or all of the above.  
*Often it's a typical teen brain struggling to make decisions.*
3. **T F** Most of the content that teens learn in school is directly relevant to their life outside the school walls.  
*Teens often have difficulty finding relevance to daily life in their coursework.*
4. **T F** The adolescent brain is like an adult brain but with several years less experience.  
*The teen brain is different in many ways.*
5. **T F** The start time of a teen's school can have a significant impact on his/her academic performance.  
*YES! Teens typically experience sleep deprivation resulting in perception and memory problems.*



# Let's Explore the BRAIN



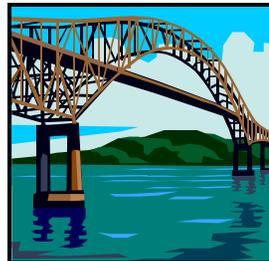
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# Brain Anatomy 101

“The Brain Made Ridiculously Simple”

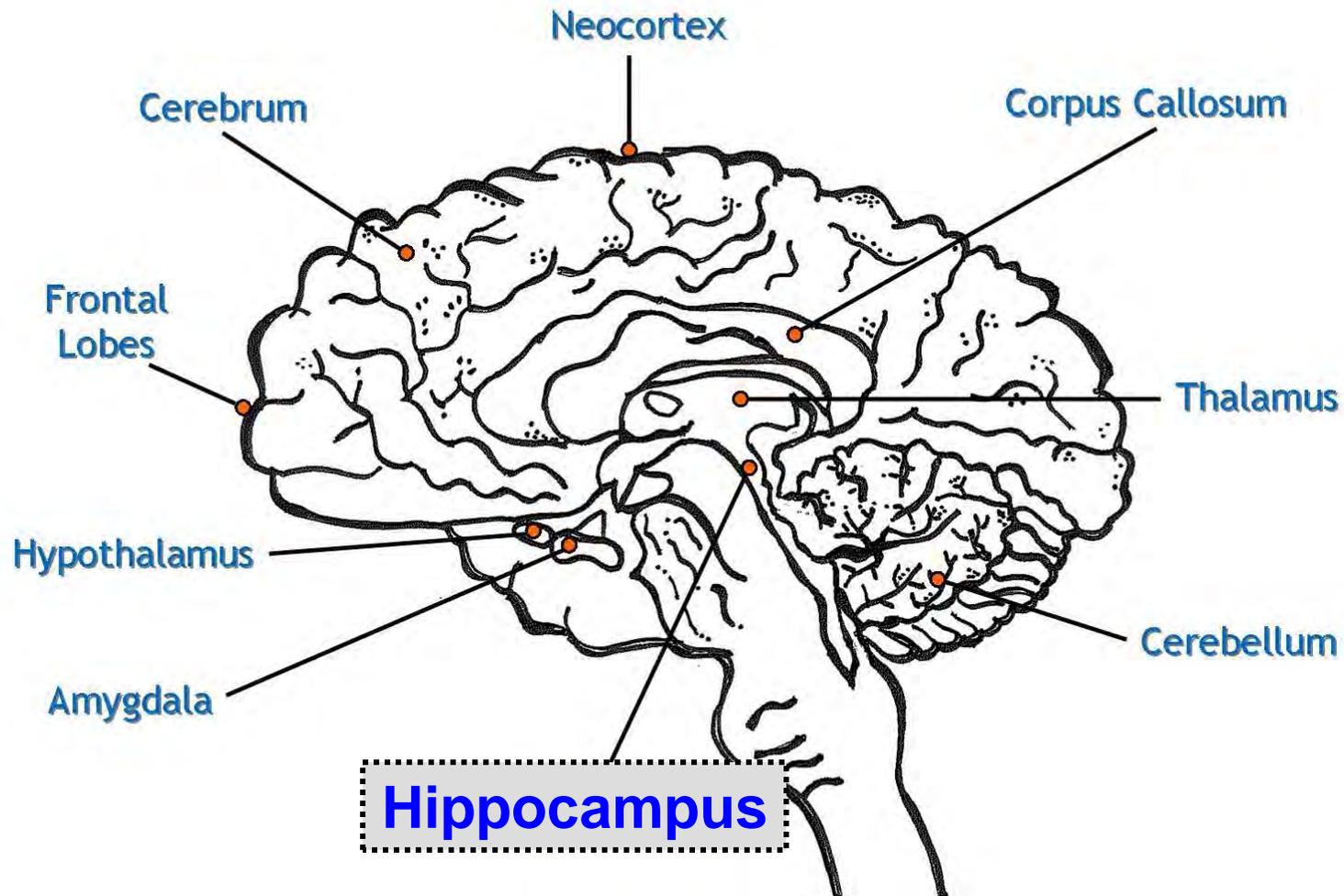
1. The Mail Carrier
2. Palace Guard
3. WIIFM?
4. Brooklyn Bridge
5. Mover & Shaker
6. Learning to Drive

Hippocampus  
Amygdala  
Hypothalamus  
Corpus Callosum  
Cerebellum  
Frontal Lobes



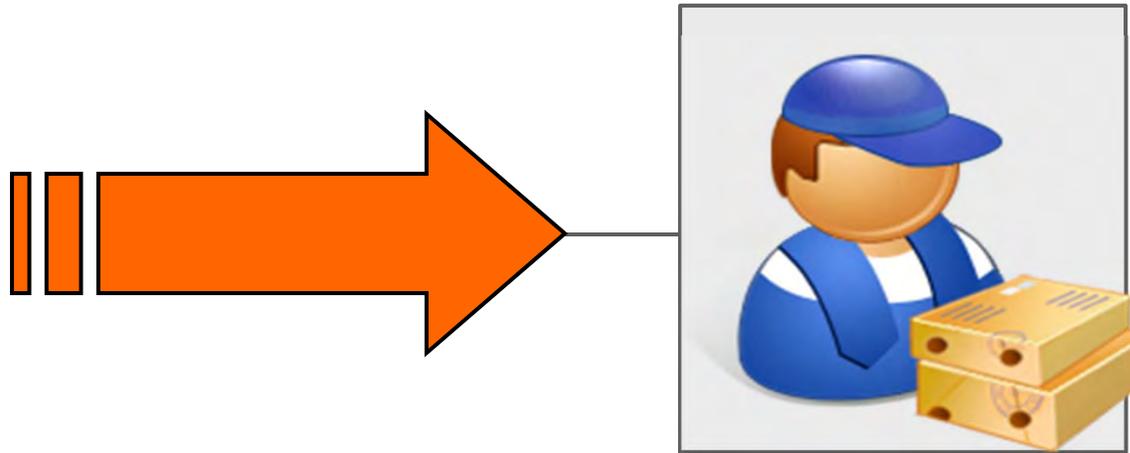
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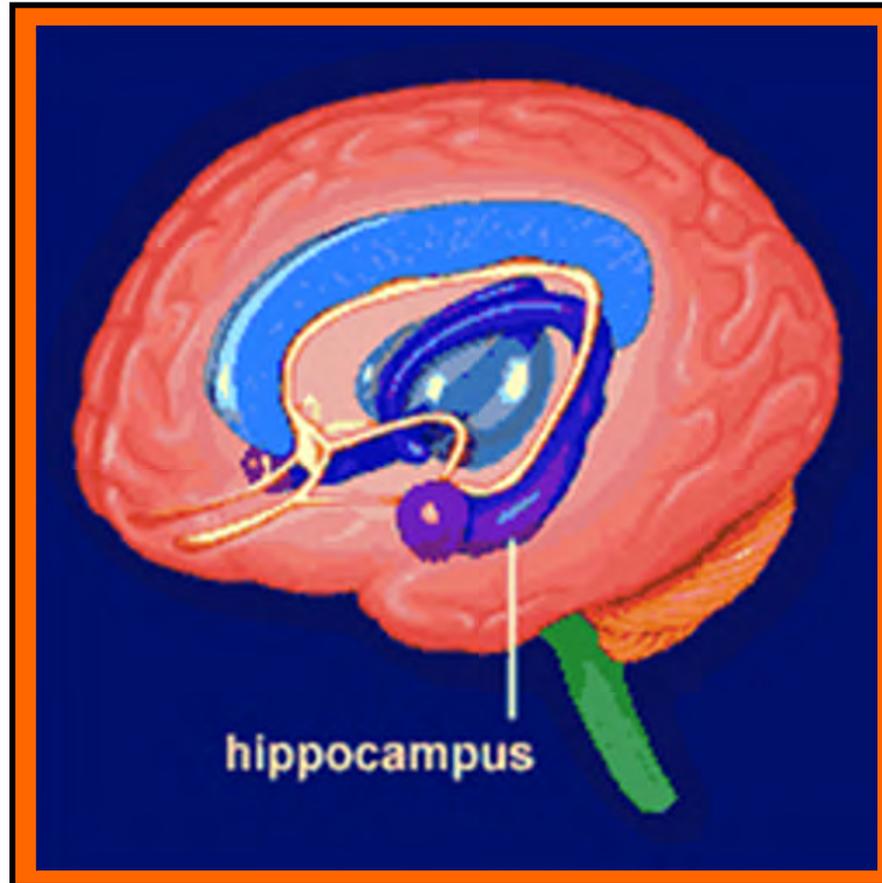
# Basic Brain Anatomy



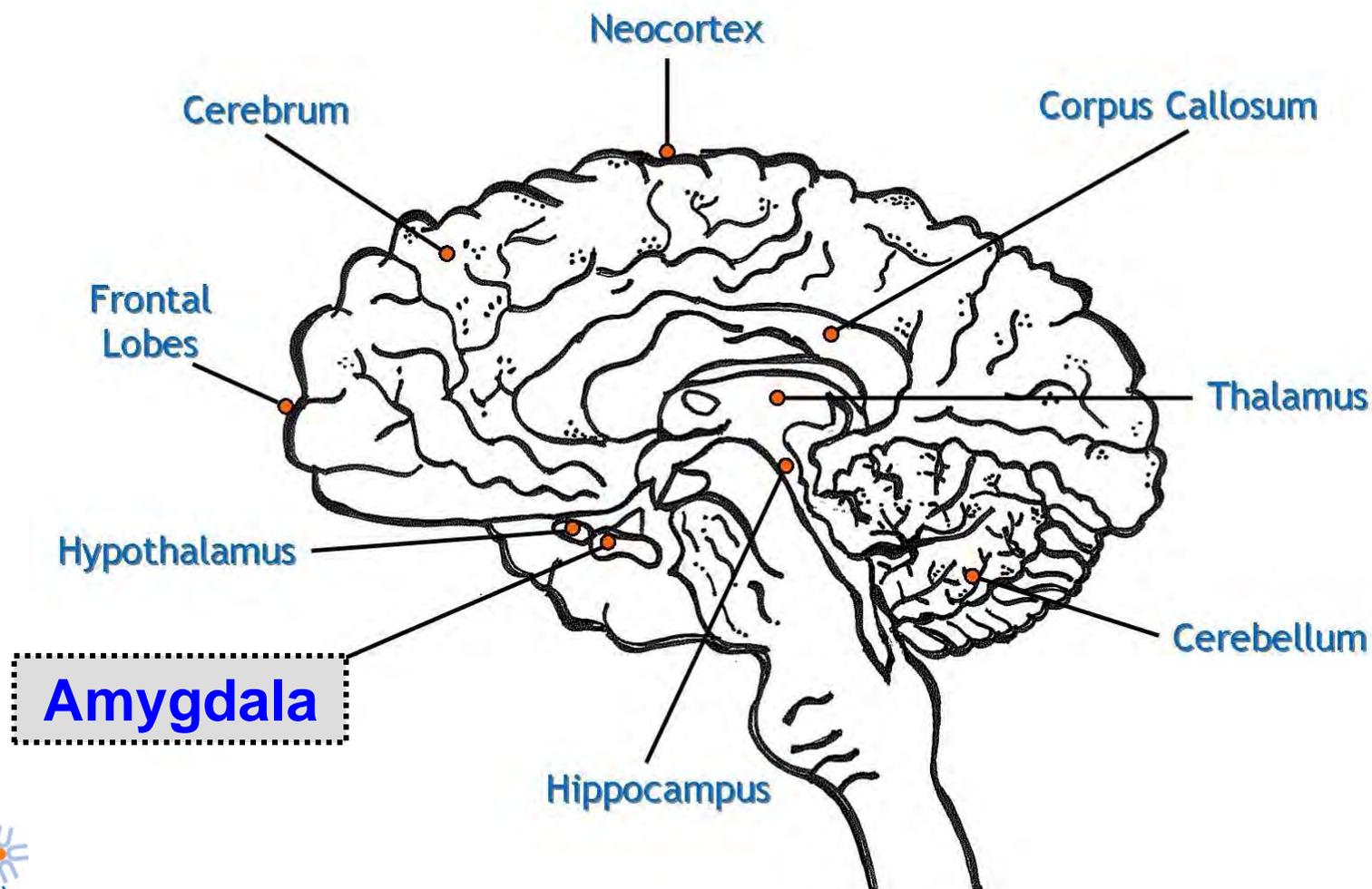
# Brain Anatomy 101

## 1. The Mail Carrier: HIPPOCAMPUS



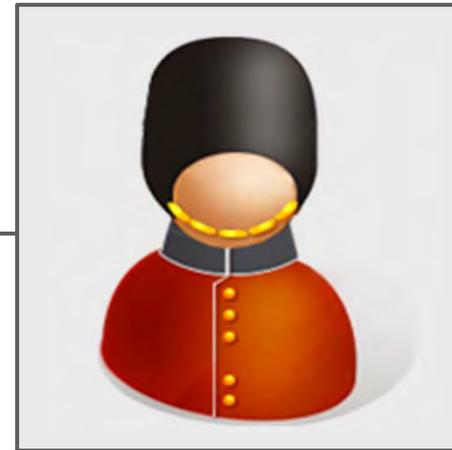
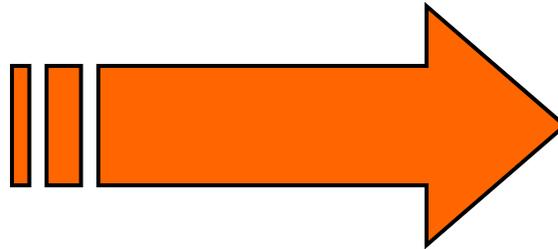


# Basic Brain Anatomy

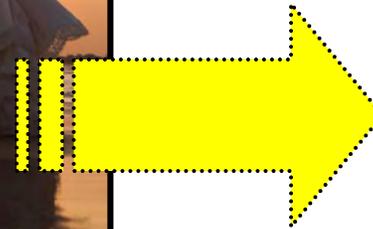


# Brain Anatomy 101

## 2. Palace Guard: AMYGDALA



# Amygdala creates emotional memories.



**Positive**



Or negative...



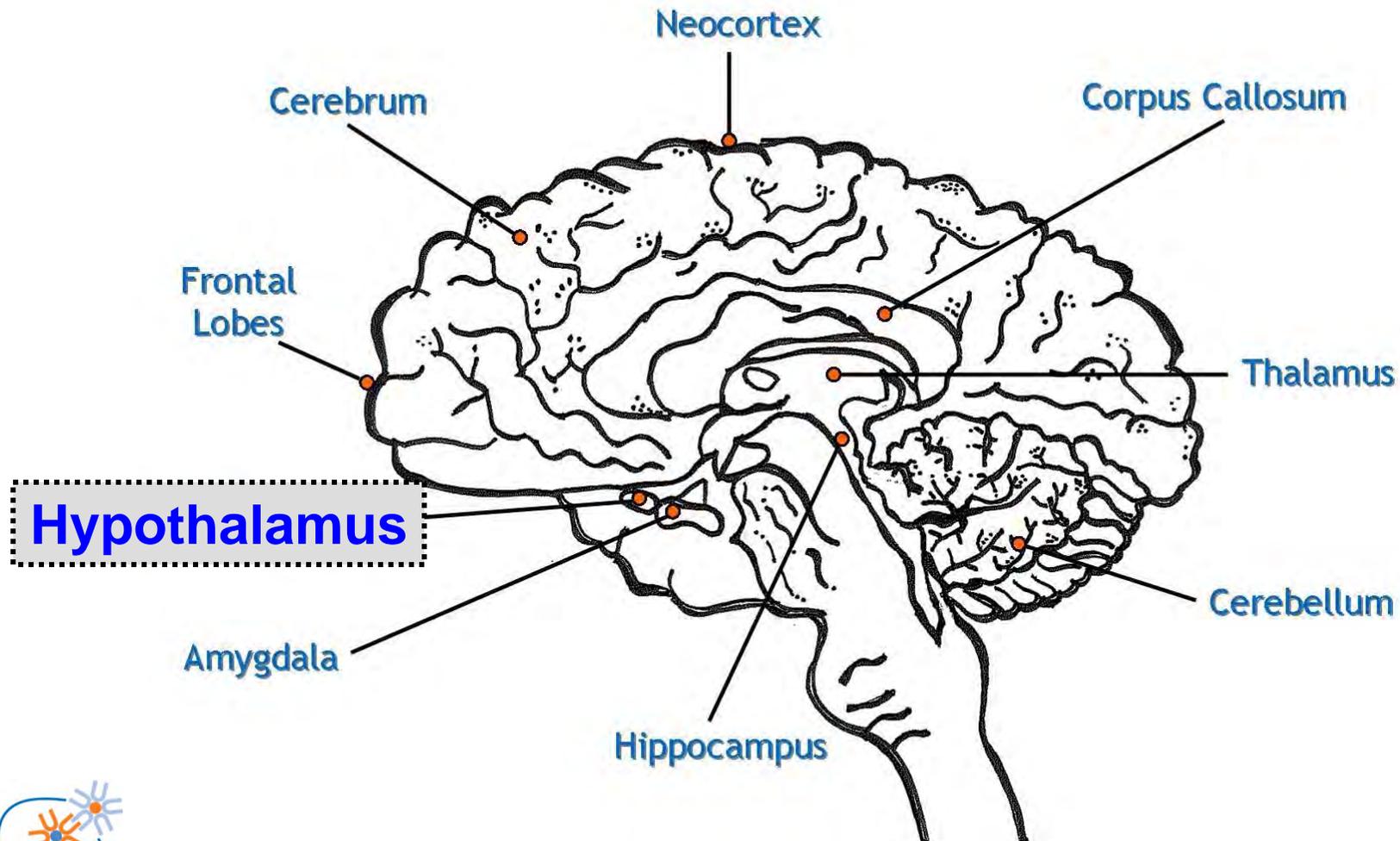


**“What were  
you  
thinking?”**



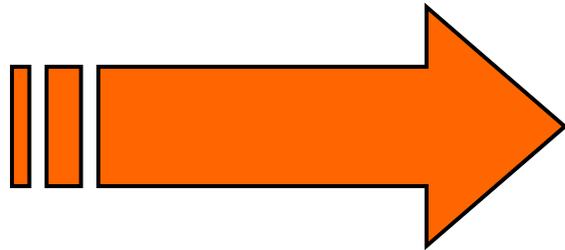
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# Basic Brain Anatomy

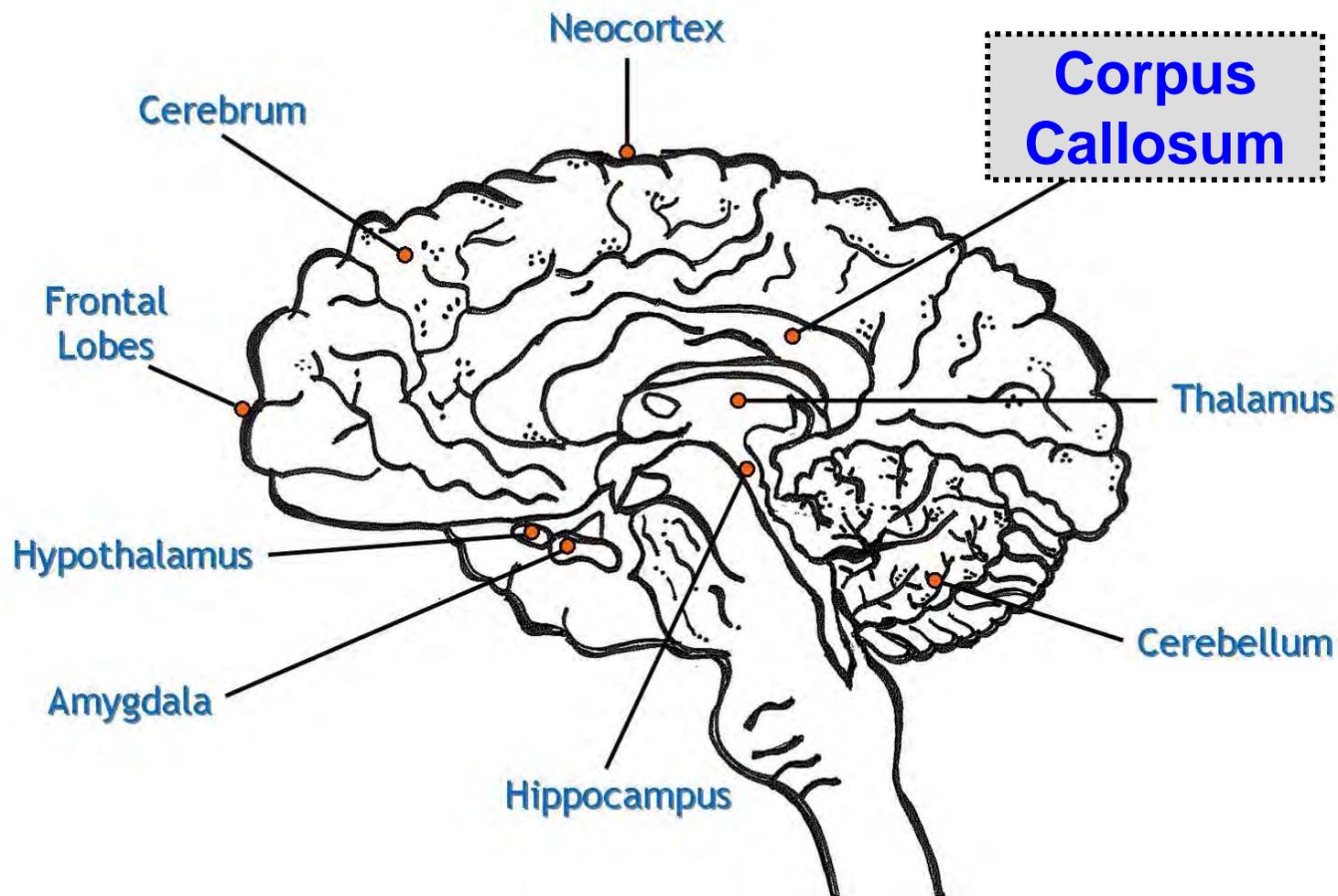


# Brain Anatomy 101

## 3. WIIFM?: HYPOTHALAMUS

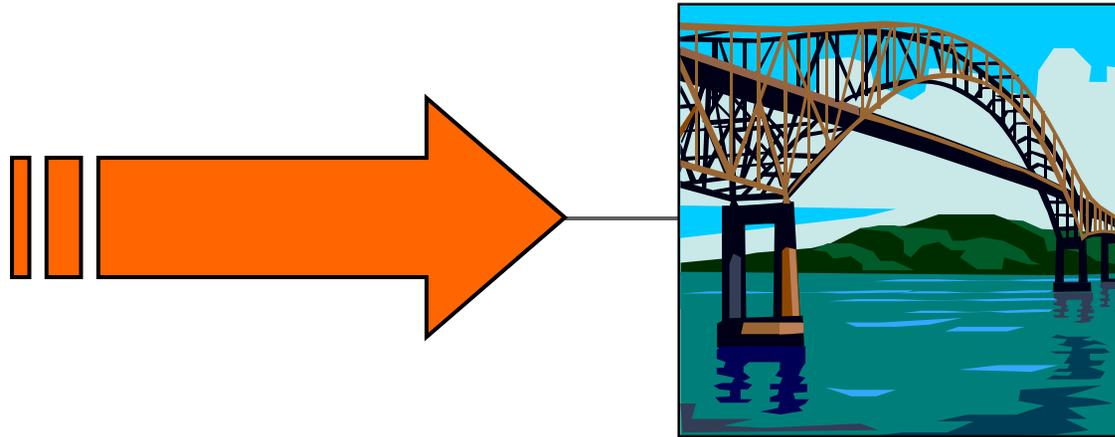


# Basic Brain Anatomy



# Brain Anatomy 101

## 4. Brooklyn Bridge: CORPUS CALLOSUM



# The Bridge in Our Brains

## Corpus Callosum

- The bridge between hemispheres.
- Facilitates the integration of right hemisphere and left hemisphere functions.
- How logic and emotion meet!



## LEFT HEMISPHERE

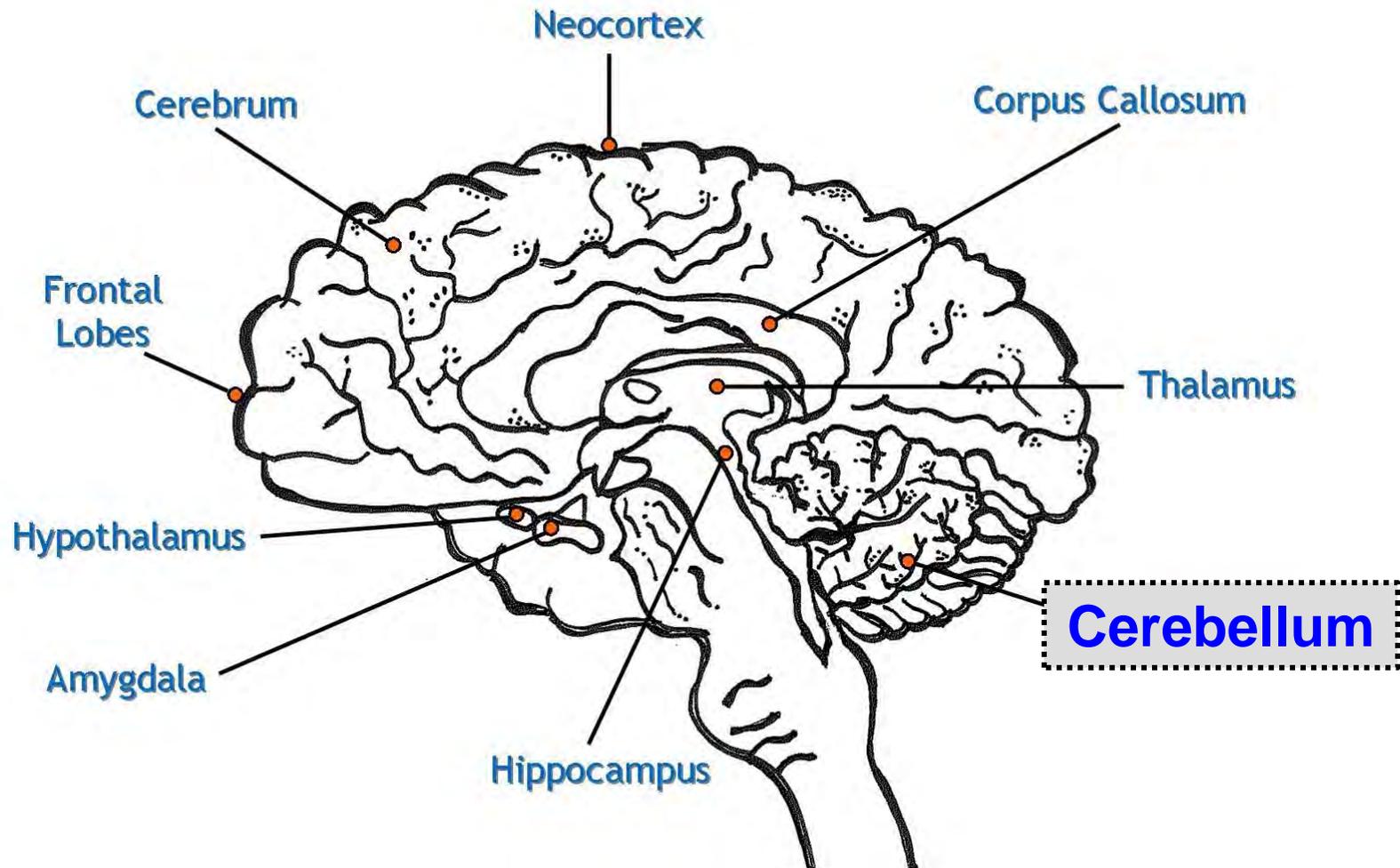
- Motor activity on right side of the body
- Language
  - Detail
  - Sequence
    - *Logical thought based on language*
- Memory creation

## RIGHT HEMISPHERE

- Motor activity on left side of the body
- Spatial manipulations
- Holistic perception (“Gist”)
- Face Recognition
- *Interpersonal and emotional processing*
- Memory retrieval

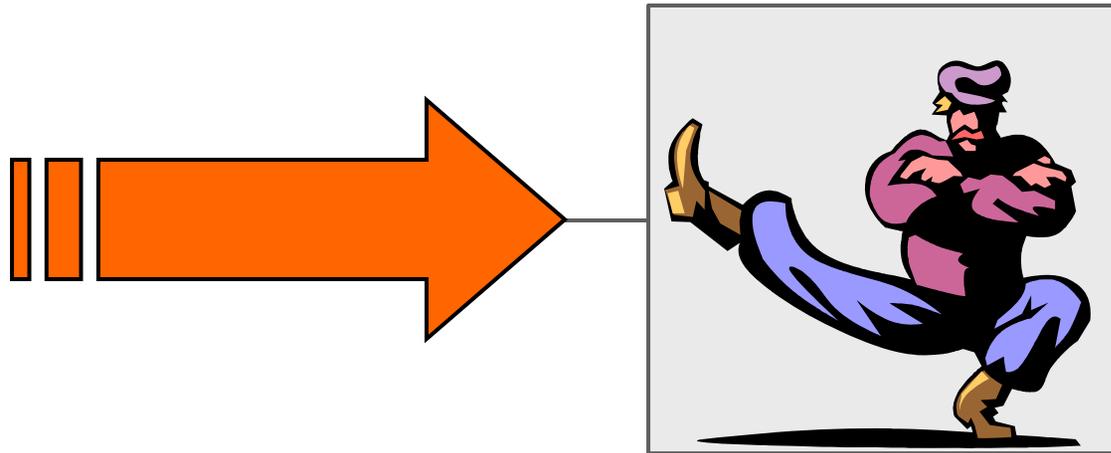


# Basic Brain Anatomy

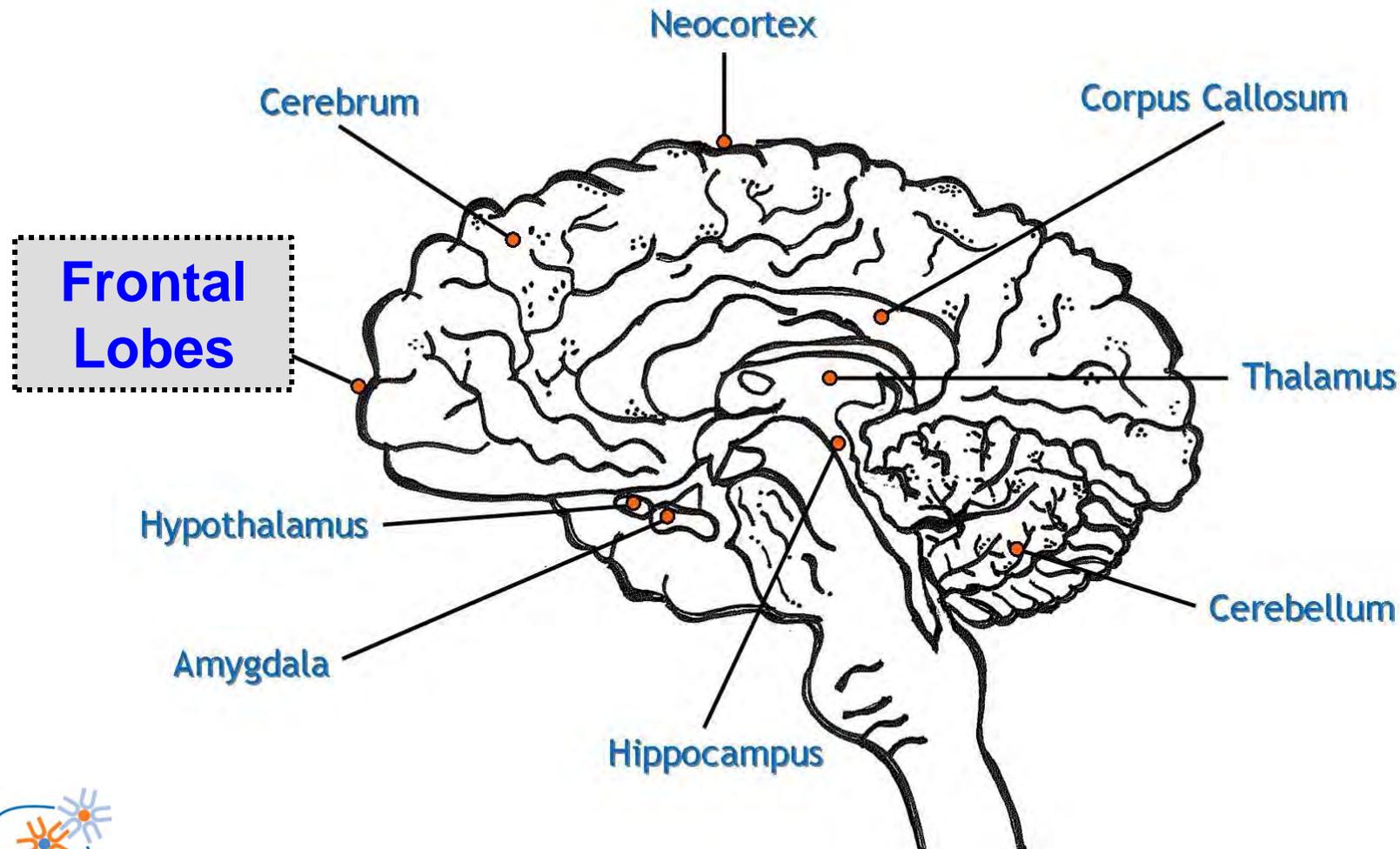


# Brain Anatomy 101

## 5. The Mover & Shaker: CEREBELLUM

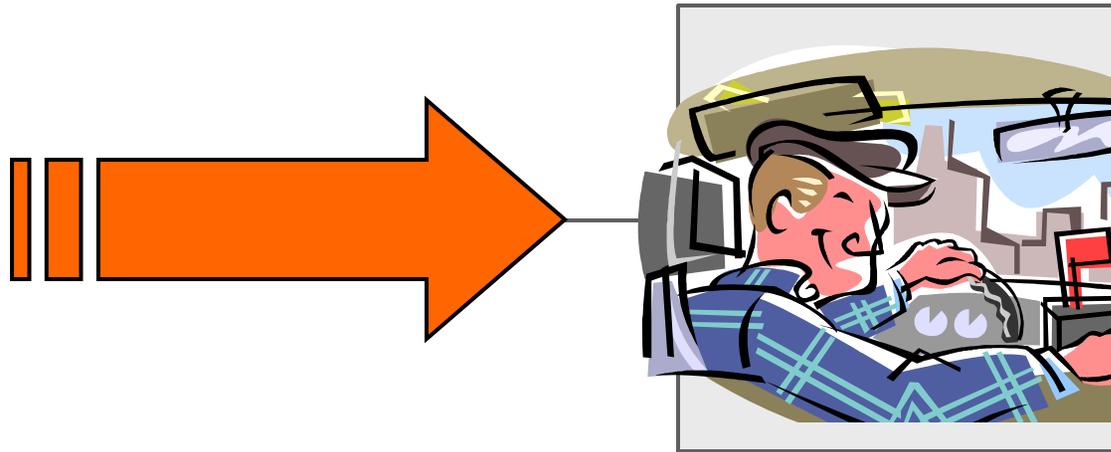


# Basic Brain Anatomy



# Brain Anatomy 101

## 6. Learning to Drive: FRONTAL LOBES



# Frontal Lobe Functions

(Partial List)

- Impulse Control
- Organization (Thought and Action)
- Time Orientation
- Reading Social Cues
- Predicting Behavioral Consequences
- Goal Achievement



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# Why Do the Frontal Lobes Take So Long to Develop?

“It’s like learning to drive!”



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# Brain Chemistry

- Cortisol – “UH-OH”
- Adrenaline - “YIKES!”

VS.

- Serotonin – “AHH..”
- Dopamine – “YAHOO!”

These pairs do not  
play well together...



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# Who Said It?



“Our youth now love luxury. They have bad manners, contempt for authority; they show disrespect for their elders and love chatter in the place of exercise; they no longer rise when elders enter the room; they contradict their parents, chatter before company; gobble up their food and tyrannize their teachers.”

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— *Socrates,*  
*5<sup>th</sup> Century B.C.*

NATIONAL BESTSELLER

"Parents will find the book immensely informative, reassuring, and useful. I highly recommend it!" —Edward Hallowell, M.D.,  
author of *Driven to Distraction* and *The Childhood Roots of Adult Happiness*

# Why Do They Act That Way?

KEEP  
OUT

DO  
NOT  
DISTURB

A Survival Guide  
to the Adolescent Brain  
for You and Your Teen

DAVID WALSH, Ph.D.



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**The best substitute for  
experience is being sixteen.**

— Raymond Duncan

# What is Adolescence?

It's not childhood.  
It's not adulthood.  
It's in between.  
It's getting longer.



**Puberty**  
(10-12 yrs.)



**Adulthood**  
(24-26 yrs.)



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# What Do You Think?

What is the most challenging aspect of being a teenager today?



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# Adolescent Challenges

## Adolescents have to...

- Handle sexually maturing bodies that give rise to strong urges.
- Try to figure-out and manage volatile and powerful emotions.
- Fit into a complex social network.
- Deal with immense peer pressure.
- Deal with wildly changing moods.
- Decide how they are going to respond to the temptation of tobacco, alcohol, and drugs.
- Figure-out what their values are going to be.
- Renegotiate relationships with their parents.
- Get through school.
- Figure-out how to get enough sleep.
- Begin to plan for their future.



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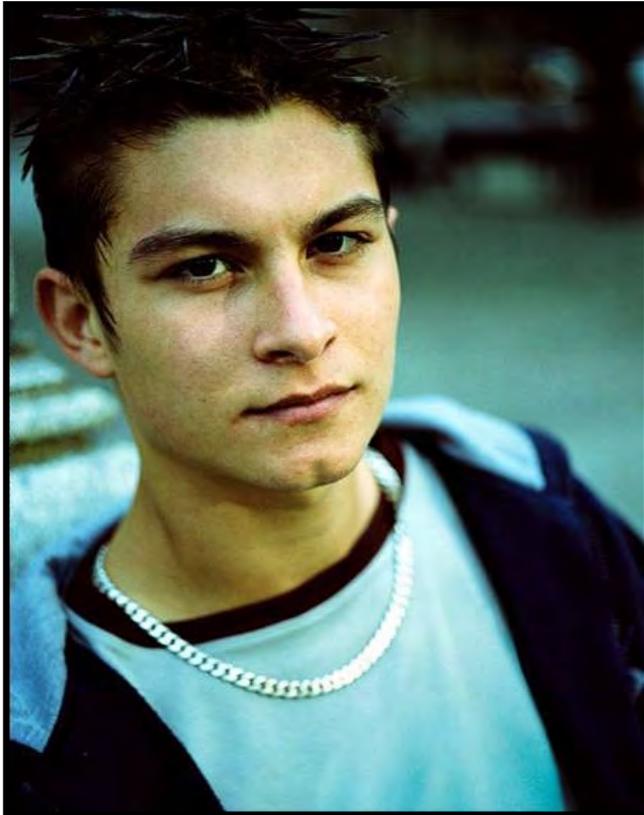


# Technology and Teens



- Are teens “wired” differently in a neurological sense because they have grown-up with technology since the cradle?
- How might lifetime exposure to technology influence how a teen learns?
- Is the modern adolescent brain harder or easier to teach than past generations?

# Technology and Teens



Today's average college grads have spent:

- Less than **5,000** hours of their lives reading (in 1984, this number was 12,000)
- Over **10,000** hours playing video games
- Over **20,000** hours watching television



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# Technology and Teens



## **Kids and Media**

A study released today analyzes how the amount of exposure to television, music, movies and other media content affects the health of children and teenagers.

### **Strength of evidence**

Number of studies that found a statistically significant relationship between increased media exposure and an increase in:

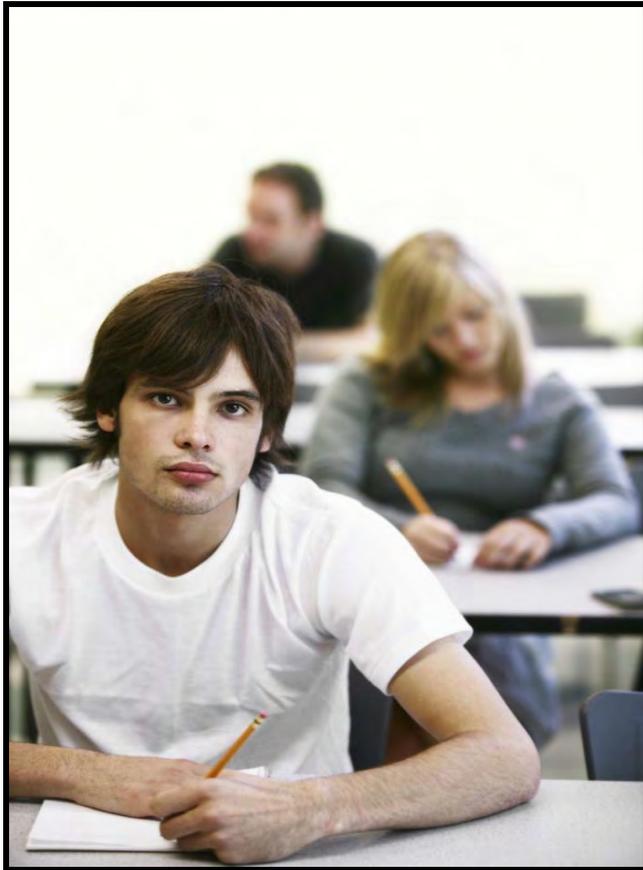
	<i>Number of studies:</i>
<b>Childhood obesity</b>	
86%	73
<b>Tobacco use</b>	
88%	24
<b>Sexual behavior</b>	
93%	14
<b>Drug use</b>	
75%	8
<b>Alcohol use</b>	
80%	10
<b>Low academic achievement</b>	
65%	31
<b>Attention deficit hyperactivity disorder (ADHD)</b>	
69%	13

Note: Conclusions are drawn from 173 studies that examine this link.

Source: Common Sense Media "The Impact of Media on Child and Adolescent Health"

By Tobey — The Washington Post

# Technology and Teens



If the brains of today's students are wired differently than past generations, who needs to change?



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## Brain Rule: New Vulnerable Periods

The discovery that  
there are multiple  
(not just one)  
vulnerable periods  
for the brain.



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# Old Paradigm: Little to Big Brains

New Paradigm: Predictable Periods of High Vulnerability (0-5 and 12-18)



# Overview of Adolescent Brain-Related Changes



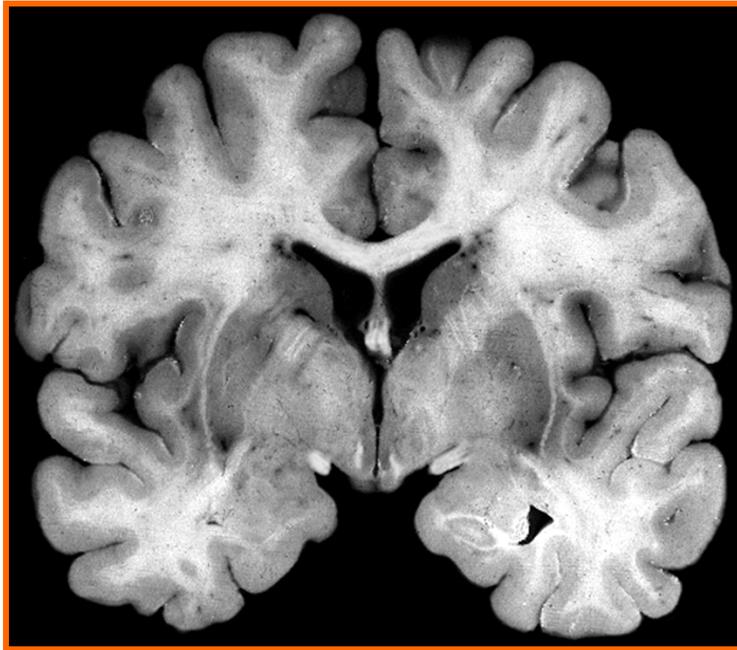
- Vulnerability to stress, rewards and/or risky behavior
- Greater sensitivity to rewards but less awareness
- Lessened ability to read or manage emotions
- Weak at spontaneous problem-solving skills (“Fuzzy Brain”)
- Poor at future orientation





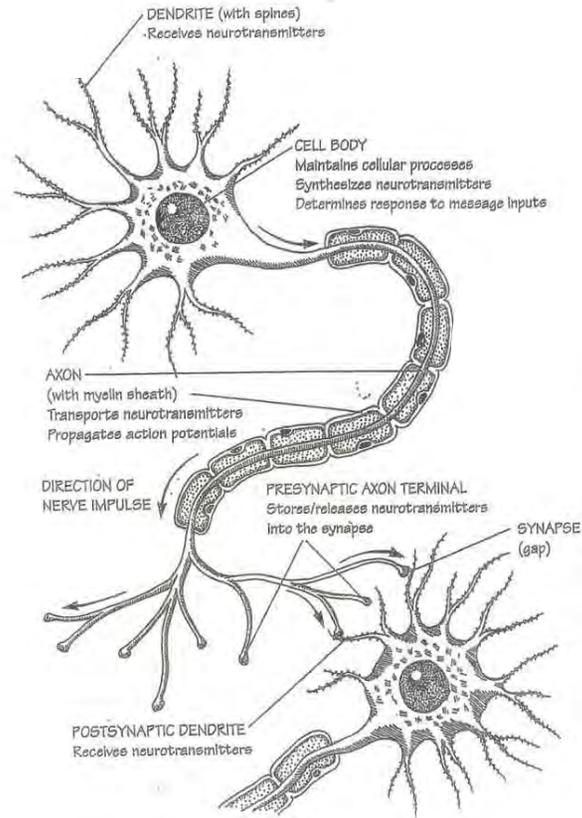
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# Four Fundamentals of the Teenage Brain

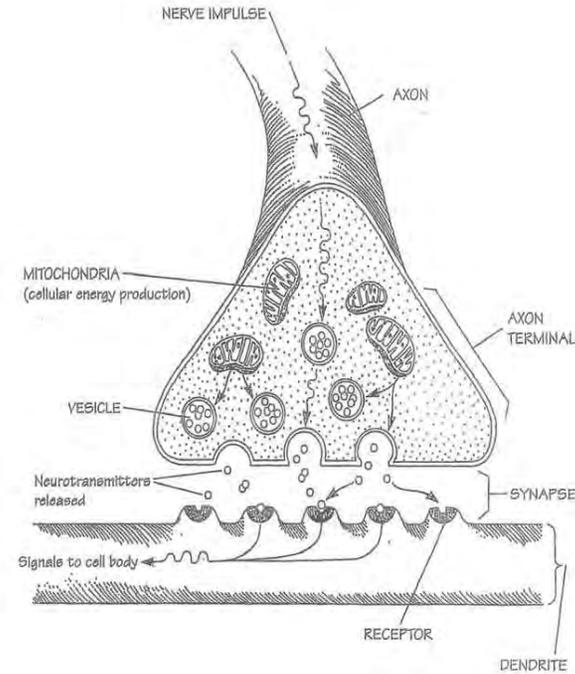


- Blossoming
  - Pruning
- Myelination
- Hormones

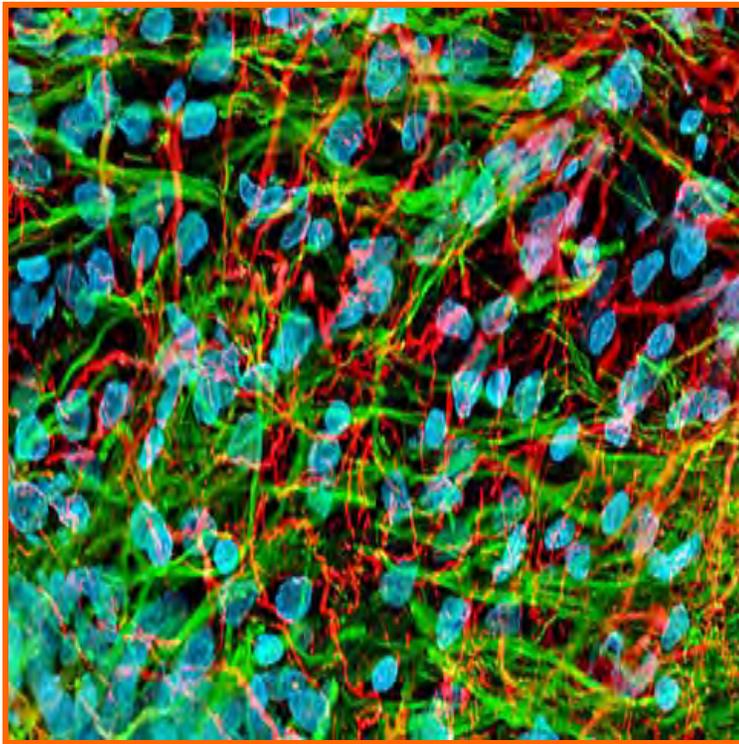
## Functional Model of a Neuron



## Synaptic Area



# Four Fundamentals of the Teenage Brain



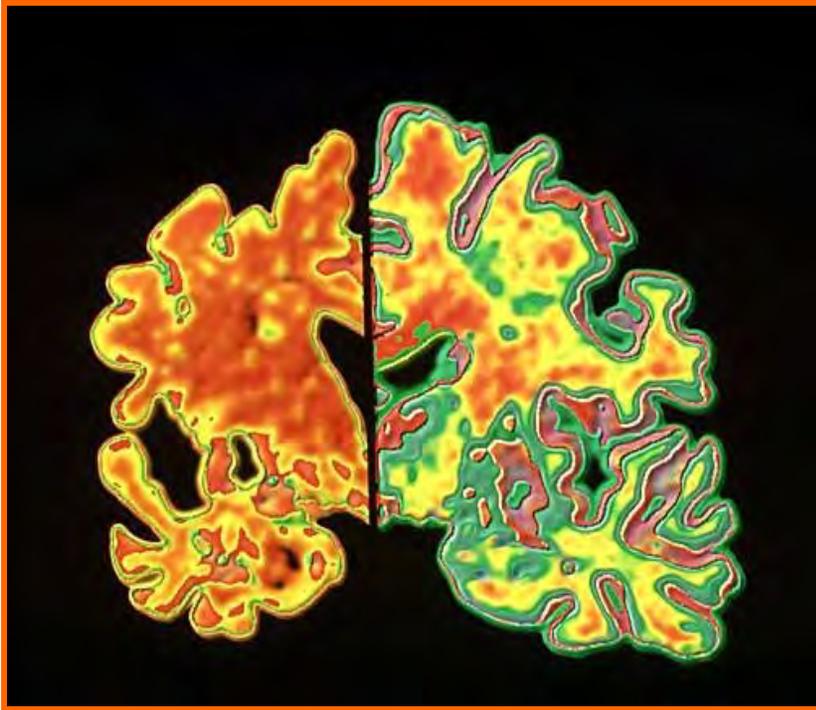
## Blossoming

- Twice in a Lifetime
- The Million Way Map
- What Were You Thinking?



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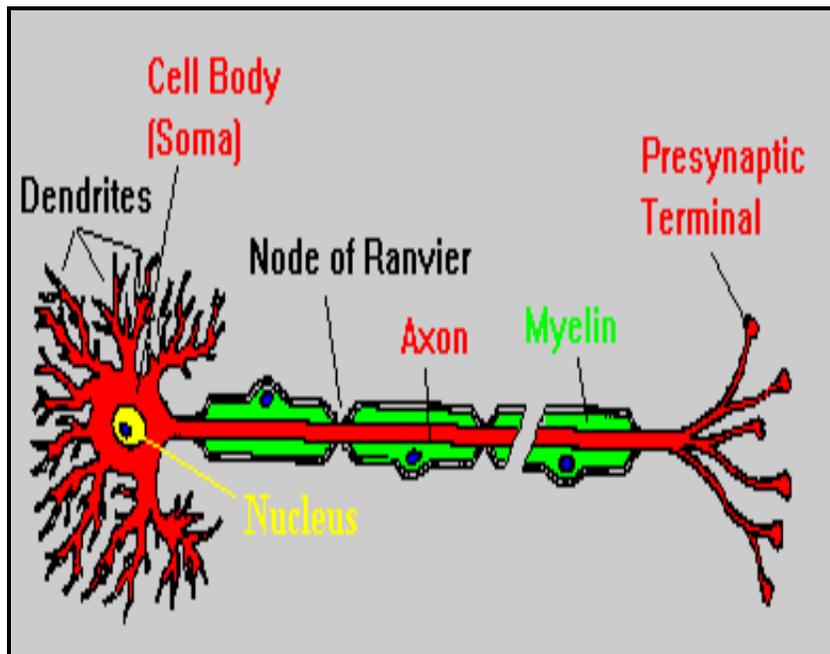
# Four Fundamentals of the Teenage Brain



## Pruning

- “Use it or lose it.”
- Windows of Opportunity
- Windows of Sensitivity

# Four Fundamentals of the Teenage Brain



## Myelination

- The neurons that fire together, wire together.”
- Windows of Sensitivity and Addiction Risks

# Four Fundamentals of the Teenage Brain

Isn't it all about the  
hormones?



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**Males and  
Hormones**

Testosterone

Over-stimulates the Amygdala

Changes  
Neurotransmitter Levels

Aggression

Territoriality, Dominance, Poor  
Impulse Control

Increased Sex Drive

**Females and  
Hormones**

Estrogen

Progesterone

Destabilizes the  
Amygdala

Changes  
Neurotransmitter Levels

Amplification of  
Emotions

Increased Stress and  
Appetite

Increased Sex Drive



# What Can We Do?

## Seven Essential Strategies

1. Teach Teens About Their Unique Brains
2. It's Not Personal — It's Adolescence
3. Sense and Meaning
4. Say It With Brain Language
5. Empathy and Communication
6. Make It Real: The Survival Game
7. Don't Forget the Fundamentals

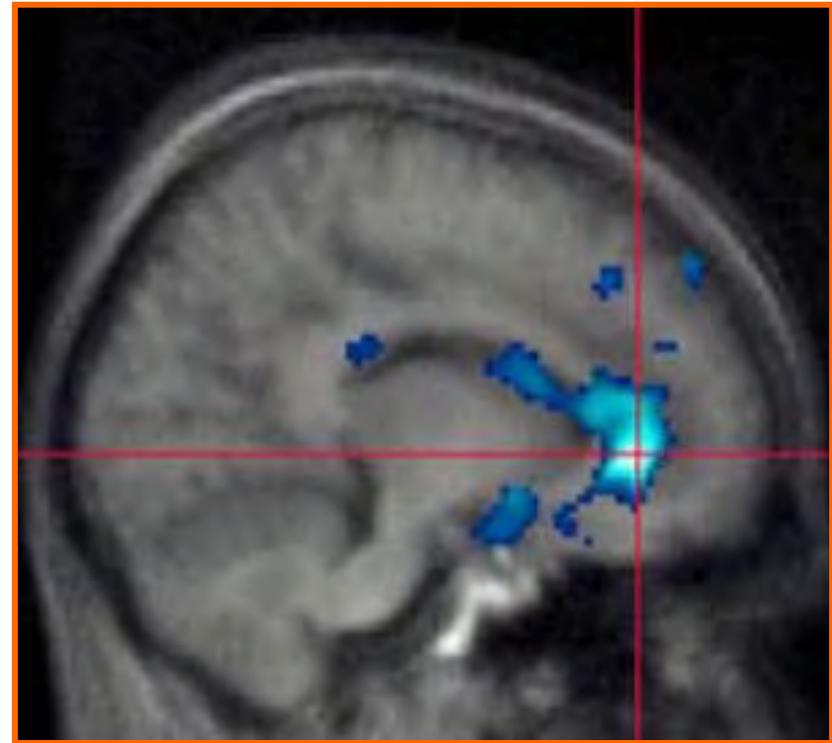


# What Can We Do?

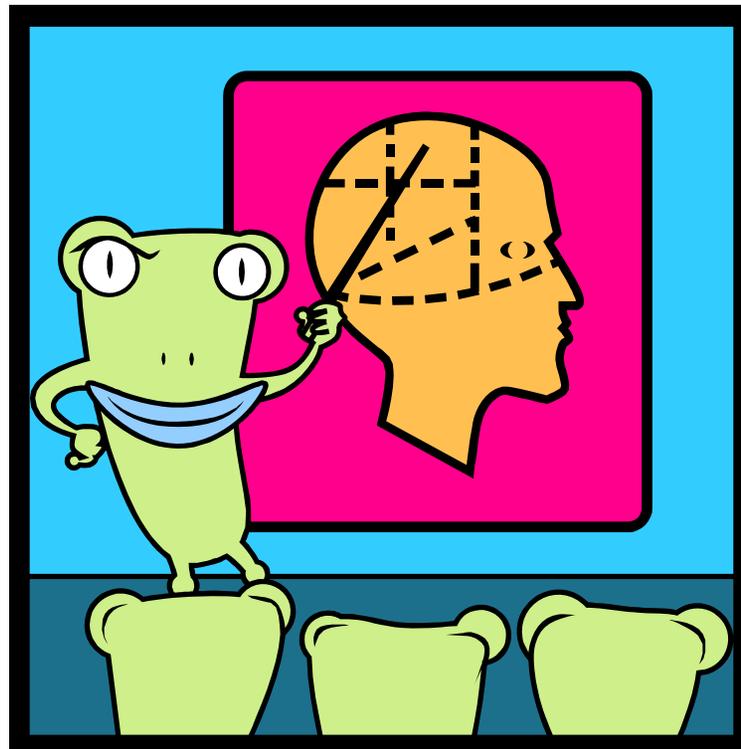
## Seven Essential Strategies

### 1. Teach Teens About Their Unique Brains:

- How They Work (i.e., the influence of emotion on learning)
- Strengths
- Vulnerabilities
- How to Care For the Brain
- How to Think Better



# My Awesome Brain!



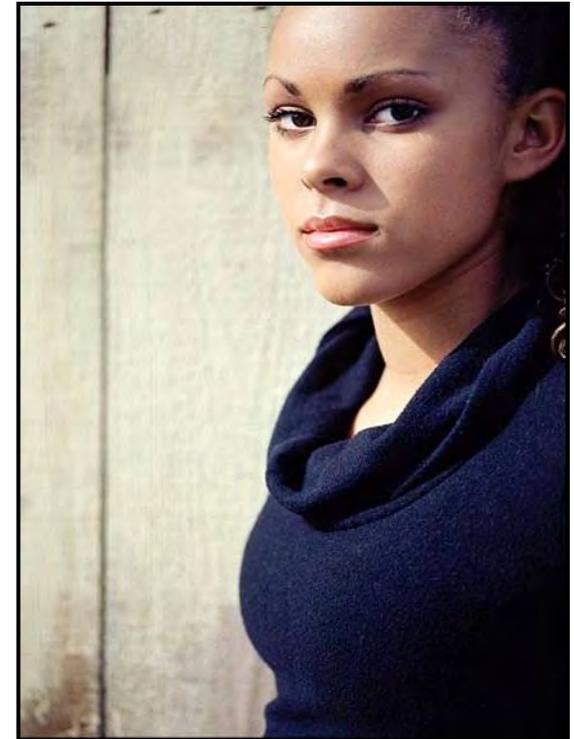
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# What Can We Do?

## Seven Essential Strategies

### 2. It's Not Personal, It's Just Adolescence

- Teen brain reacts emotionally instead of logically
- Teens experience new, powerful emotions before they can even articulate them
- Teen brain is highly vulnerable to stress
- Teen brain has trouble anticipating consequences



# What Can We Do?

## Seven Essential Strategies

### 2. It's Not Personal, It's Just Adolescence

- Blossomed brains overcomplicate problems
- Bigger doesn't mean better!
- Adolescent brains don't read faces very well, recognize body language or always understand tone of voice



# What Can We Do?

## Seven Essential Strategies

### 3. Sense and Meaning

Try this strategy for three weeks and determine if your teens are remembering more of what you want them to...



# What Gets Remembered?

*Incorporate These Two Essential Questions into Every Teaching Moment:*

1. How does this **relate** to what teens already know?
2. How might teens **use** this in the future?

# What Can We Do?

## Seven Essential Strategies

### 4. Adopt the Language of the Brain!

Research continues to reveal that what we say to teens and how we say it has a powerful impact on their developing brains.

Just two examples...



# Brain Language

“Don’t tell your [teens] they are smart. More than three decades of research shows that a focus on effort – not on intelligence or ability – is the key to success in school and in life.”



Carol Dweck, PhD.

# Fixed Mindset

- Intelligence is a fixed trait — you only have a certain amount and that's that.
- Mistakes are attributed to a lack of ability.

*“If I struggle or have to work hard, I am dumb.”*



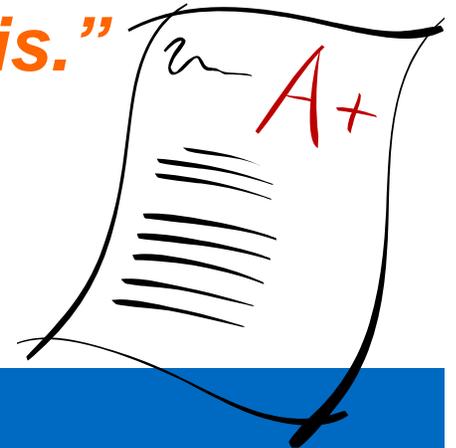
# Growth Mindset

- Intelligence is malleable and can be developed through education and hard work.
- Mistakes are attributed to a lack of effort.

*“If I work hard enough, I can learn this.”*

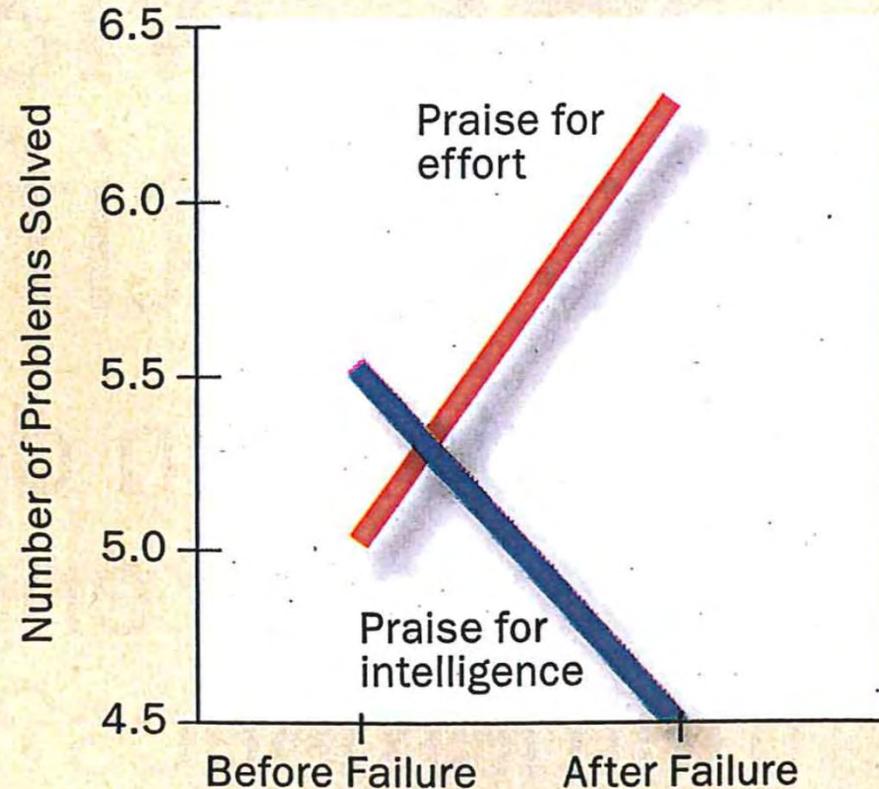


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# The Effects of Praise

Children praised for their intelligence solved significantly fewer problems after a failure than they had before encountering difficulty. In contrast, children praised for their effort solved *more* problems after their brush with adversity than they had before it.



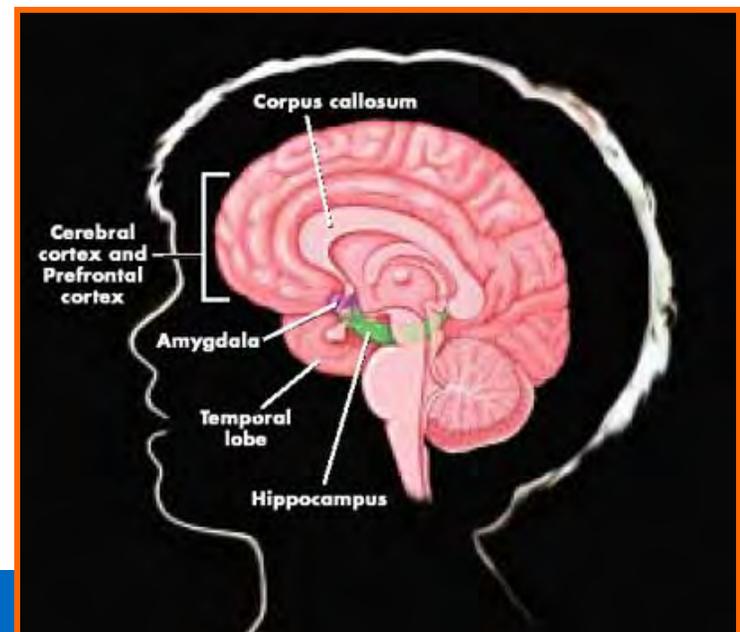
# My First F



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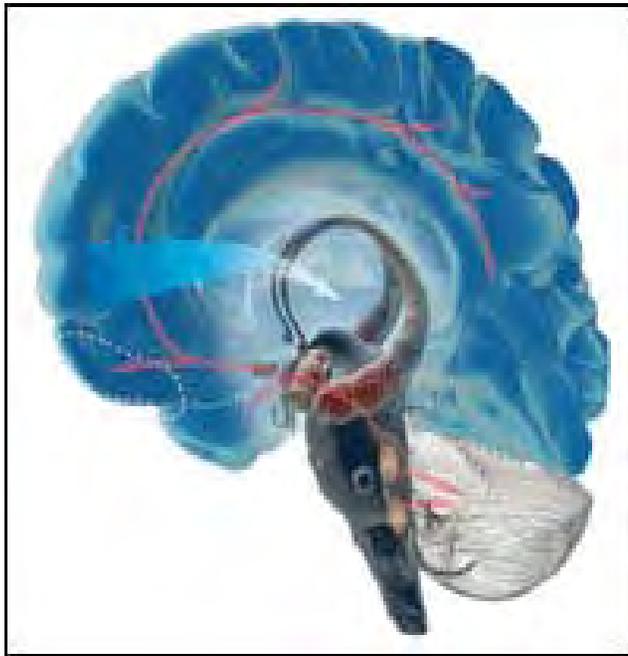
# Brain Rule: What We Say Matters...

Not only to the development of the mindset our students have about intelligence, but to how fast and how deep the executive system of the brain develops (those all important frontal lobes!)



# Executive Function Teacher Prompts\*

**“Self Regulation Executive Function Descriptions With Examples of Teacher Prompts,”  
George McCloskey, PhD, Philadelphia College of Osteopathic Medicine.**



## Forsee/Plan (Short Term)

Cues the anticipation of conditions or events in the very near future, such as the consequences of one's actions.



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# Self-Regulation Executive Function Definitions with Examples of Teacher Prompts

George McCloskey, Ph.D., Bob R. Van Divner, M.S. & Lisa Perkins, M.S.

Use this list to prepare for observing and noting Teacher Prompts provided during classroom instruction.

Self-Regulation Executive Function	Examples of Teacher Prompts: (P=Perceiving F=Feeling T=Thinking A=Action)
<p><b><u>Perceive</u></b> Cues the use of sensory and perception processes to take information in from the external environment or “inner awareness” to tune into perceptions, emotions, thoughts, or actions as they are occurring</p>	<p><b><u>Positive and specific:</u></b> P: “Everyone look at the board.” P: “What do you see when you look in the box?” P: “Listen to this.” P: “You’ll need to listen carefully to this next part.” P: “Feel how rough that edge is?” P: “Feel how heavy this is.” F: “How are you feeling right now?” T: “What are you thinking about right now?” A: “Try to notice how you bend your legs when you do that.”</p> <p><b><u>Negative, vague and/or poorly timed:</u></b> P: “Why aren’t you looking up here now?” P: “Why do I always have to tell you to listen?” P: “You have hands don’t you?” (i.e., use them and touch it) P: “You’re not watching what you’re doing are you?” F: “You don’t even know what you’re feeling, do you?” T: “Do you have any idea what you are thinking about now?” A: “Watch what you’re doing.”</p>
<p><b><u>Initiate</u></b> Cues the initial engagement of perceiving, feeling, thinking, or acting</p>	<p><b><u>Positive and specific:</u></b> P: “Everyone should be looking at the board now.” F: “Now would be a good time to express any feelings you have about it.” T: “Start thinking about it now.” A: “Start walking now.” A: “Read the first question now.”</p> <p><b><u>Negative, vague and/or poorly timed:</u></b> P: “Why aren’t you listening yet?” F: “Don’t you feel anything when you see something like that?” T: “Don’t wait to get started thinking about it.” A: “Why haven’t you started yet?” A: “What will it take to get you moving?”</p>



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# Executive Function Prompts

## Positive and Specific (Frontal Lobes)

- “Mia, you should be looking at the board right now.”

## Negative and Vague (Amygdala)

- “Mia, why aren’t you looking at the board? Does Jayden look like the board to you?”



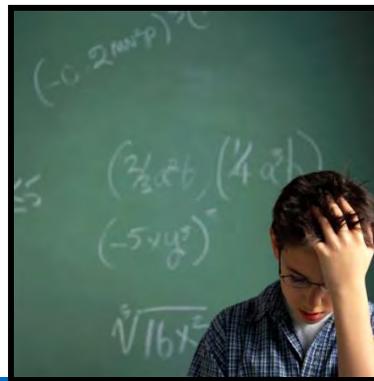
# Executive Function Prompts

## Positive and Specific (Frontal Lobes)

“It’s time to put your  
game away.”

## Negative and Vague (Amygdala)

“ Why isn’t your  
game away yet? I  
told you had 15  
minutes to play!”



# What Can We Do?

## Seven Essential Strategies

### 5. Teach Empathy and Build Strong Communication Skills

Empathy is a learned skill. Help teens develop empathy and strong communication skills.



# Brain Rule: Social Factors Can Be Supreme

The discovery that social conditions have a much greater impact than previously believed.



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# Our Brain is Designed to Be Influenced by Other Humans



Our Mirror Neurons are Responsible for Imitation



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# Social Instability

Study had 3 groups of mice:

- 1) remained in home cage
- 2) 12h daily of restraint stress
- 3) social reorganization

All infected with respiratory virus

Match the 3 groups above  
with their mortality rates below:

a) 8%    b) 15%    c) 70%

(Padgett and Sheridan, 1999)



# Price of Social Instability

## Study Results:

- 1) Remained in home cage
  - a) 8% mortality
- 2) 12hr. daily of restraint stress
  - b) 15% mortality
- 3) Social reorganization
  - c) 70% mortality!



# Social Solutions...

- Make pro-social climate a school-wide priority
- Insist on mentoring, clubs, teams and social skill-building
  - Nobody goes unnoticed!



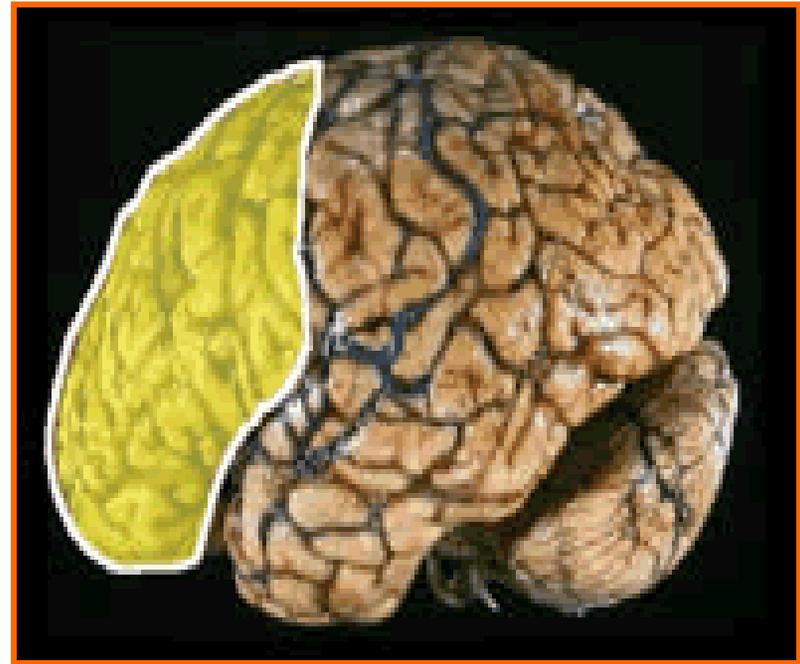
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# What Can We Do?

## Seven Essential Strategies

### 6. Make It Real: The Survival Game

Teens need preparation and practice in making good decisions under stress — help them out by providing a safe place to discover how to stay safe!



# What Can We Do? Role Play the Risks

## The Survival Game

- Write vignettes about common challenges and risks experienced by teens in your school/community.
- Transcribe each vignette onto an index card.
- Offer a teen the index cards “upside down” and have them select one.

# The Survival Game

- The teen reads the card out loud.
- The teen then brainstorms healthy ways to respond to the vignette.
- The adult(s) offers additional suggestions for healthy responses.
- The teen and the adult(s) role play the vignette.

# The Survival Game

## Example #1 - Bullying

Your two best friends tell you that a kid in your math class, Louis, told the teacher that the three of you copied off each other's papers on a recent math test. "Now the principal wants to see us in her office" they explain. One of your friends then says: "We need to teach Louis a lesson. When he gets off the bus today, the three of us are going to pound him."



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# The Survival Game

## Example #2 - Marijuana

You were asked to play drums for “New Town Wave,” the most popular rock band in your high school. As a sophomore, you are thrilled to get this opportunity. During your first rehearsal with the band, the lead guitarist breaks out a joint. Everyone takes a toké and then it comes to you.



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# The Survival Game

## Example #3 – Sex (Male)

Your best friend has been bragging about having sex with his girlfriend, Tracy. Tracy tells your girlfriend, Beth, about the sex. Beth tells you she's willing to “go all the way” if you want to so that the two of you won't have to feel bad about your friends having sex when you haven't.



# The Survival Game

## Example #3 – Sex (Female)

You are totally in love with your boyfriend, Pat. You are interested in sex, but terrified of pregnancy. Pat says that oral sex will show him you love him and there is no risk of pregnancy.



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# The Survival Game

## Example #4 - Alcohol

You are spending the night at Sam's house. So is your friend Tracy. When Sam's mom leaves to pick up Sam's brother, Sam brings out a bottle of Boones Farm Strawberry wine. Sam exclaims, "This stuff is awesome! It tastes like Kool-Aid, but makes you feel sooo good! Let's party!"



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# The Survival Game

## Example #5 – Driving and Alcohol

You ride to the party in a nearby town with a number of your friends. The driver, Mark, is a friend of yours and also knows the people throwing the party. At the end of the night, you meet back at Mark's car. When you arrive, Mark's already behind the wheel. He's slurring his words and yelling for you to get in.



# What Can We Do?

## Seven Essential Strategies

### 7. Don't Forget the Fundamentals!

- Exercise
- Nutrition
- Sleep
- Coping Skills



# Exercise

Exercise is critical to healthy brain development. Adolescents should engage in some physical activity at least 30 minutes a day.



# Physical Activity

“Exercise turns on the attention system,...it causes kids to be **less impulsive**, which makes them more primed to learn.”

--John Ratey, MD (*Spark*)



Exercise: A Med Without Side Effects!



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# Exercise is AWESOME for the Brain!

1. Neurogenesis: Exercise sparks the growth of new brain cells.
2. Connectivity: Stimulates older neurons to form dense interconnected webs that make the brain run faster and more efficiently.
3. BDNF: “Miracle Grow for the Brain” stimulated by exercise.
4. Bigger Frontal Lobes: Prediction, judgment, planning and organization are improved.
5. Good Neurotransmitters: Dopamine, serotonin and norepinephrine are elevated after exercise.



# The Power of Play!

Play is an essential nutrient of brain development — we NEED it.



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# Born to Play!



*Google:  
Dog, Polar  
Bear, Play*

# Nutrition

Fast foods and processed foods (“junk food”) harm the brain. Growing brains need:

- Lean protein
- Vitamins
- Minerals
- Fruits and Vegetables



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# Great Brain Foods

**Blueberries**

**Swiss Chard**

**Collard Greens**

**Salmon**

**Spinach**

**Concord Grape  
Juice**

**Brown Rice**

**Hot Cocoa**

**Almonds &  
Walnuts**



**Olive Oil**

**Garlic**

**Orange Juice  
w/ Zinc**

**Turkey**

**Milk**

**Bananas**

**Fruits**

**Vegetables**

**Whole Grains**



# Six Teen Nutrition Tips

1. Have a healthy, quick breakfast with protein (peanut butter, cheese, yogurt, turkey sausage, nuts, eggs, milk, ham, turkey, smoothie).
2. Switch to whole grain waffles, breads, cereals and rolls (B-vitamins, Omega-3's).
3. Limit soft drinks.
4. integrate dark green lettuce.
5. Eat the colors of the rainbow.
6. Add rinsed, canned beans to salads, soups and casseroles.

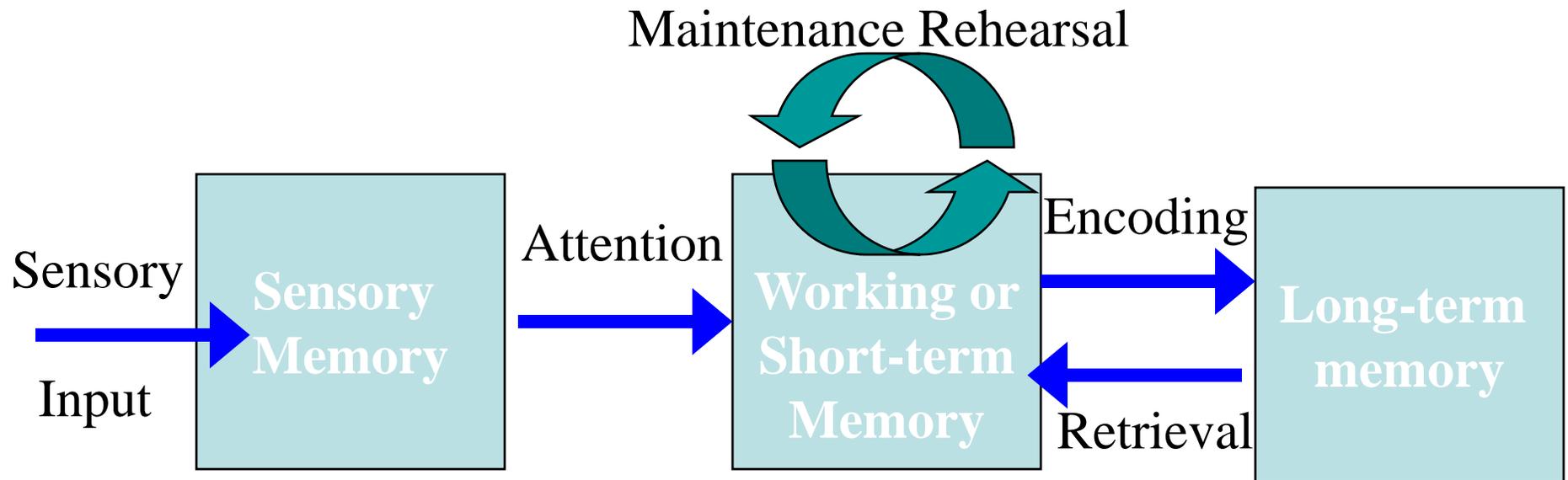


# Sleep

- Sleep is enormously important to healthy brain development and learning.
- Adolescents need 9.25 hours of sleep per night.



# The Atkinson-Shiffrin Model

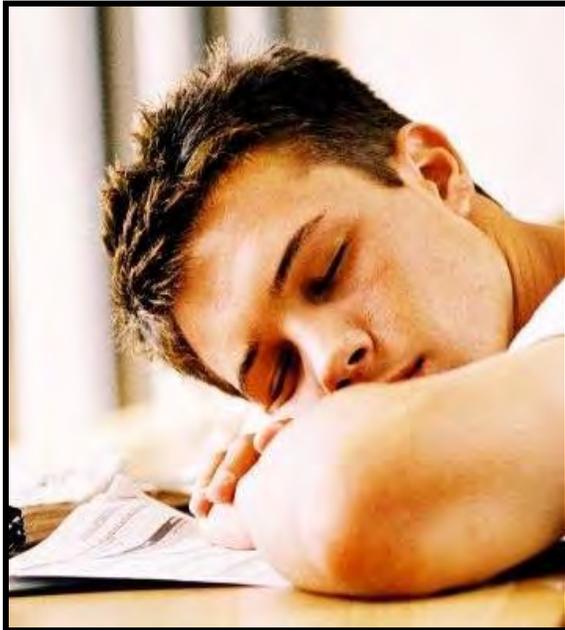


# Sleep



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# Sleep Deprivation in Adolescence



- Typically, teens have significant sleep deprivation and daytime sleepiness. (Carskadon et al. 1998)
- The result is typically drowsy teens in class and academic underperformance. (Maquet, 2001)
- Less sleep contributes to poor emotional regulation. (Dahl, 1999)

# Why So Little Sleep?



- The neurological changes in adolescence are dramatic and teens need more sleep time to learn, organize, and store new learning.  
(Wolfson & Carskadon, 1998)
- But the teen brain releases melatonin (a sleep inducer) later at night. This means teens will naturally want to stay up later and sleep in later.

# Sleep

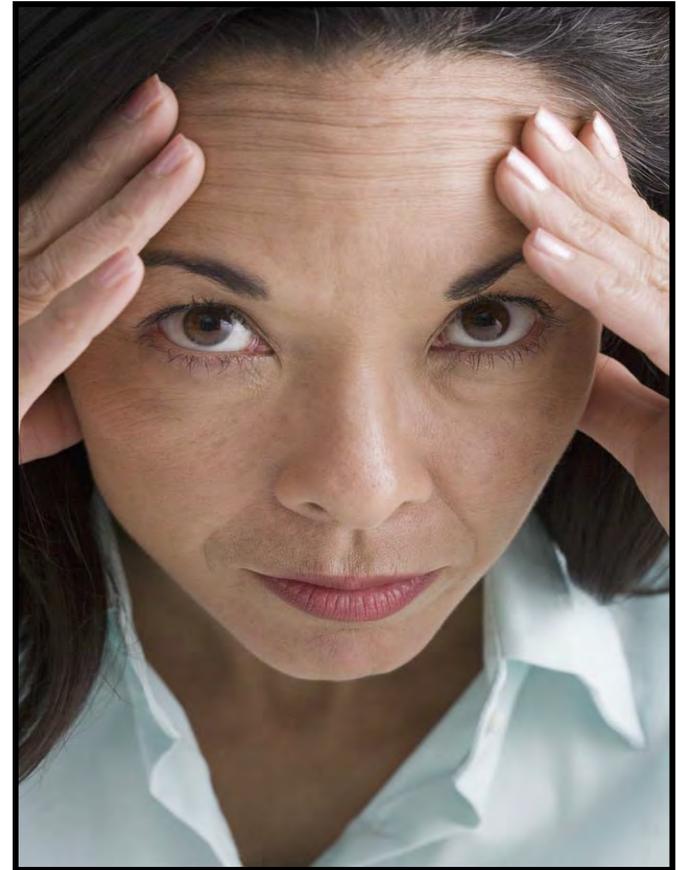
- Youth who sleep less weigh more – if a young person sleeps 9 hours or less per night, 3x more likely to be obese.
- Also, less sleep correlates with higher emotional volatility.

TIME: “A Good Night’s Sleep,” December 17, 2007

Video: Inside the Teen Brain (PBS)

# Explore Stress Management Outlets

Use your intimate knowledge of your teen to help them discover what stress-release strategies work for them. In particular, incorporate adequate, low-stress “down time” into your teen’s stress management toolbox.



# Explore Stress Management Outlets

**Note:** Many times, what may contribute significantly to stress is a lack of organizational skills, time management skills, communication skills or unclear expectations.

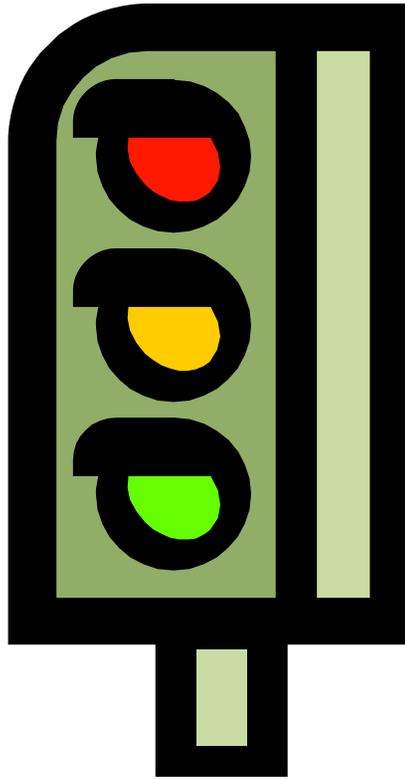


# Bonus Strategy: Promote Acts of Encouragement

Challenge your teens to consistently practice acts of encouragement (volunteering, service learning) to and for others. Benefit to the brain is huge!



# Now What?



Coming Next...  
Addictions and the  
Teen Brain.



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# But First...A Little Review



# 10,000 Pyramid



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# 10,000 Pyramid

\$1:	Brain
\$10:	Hippocampus
\$100:	Dopamine
\$1,000:	Frontal Lobes
\$10,000:	Cortisol



# The Big Idea

All intoxicating  
agents impact  
DOPAMINE



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# How's Your Drug Knowledge?



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# What Am I?

- I am known as the “drug of the 80’s.”
- Some people call me “candy,” “mojo” or “blow.”
- I have been being abused for 100’s of years.
- I can be smoked, snorted, or injected.



# COCAINE



# What Am I?

- I am the most commonly abused illicit drug in the US.
- I am usually smoked in a cigarette or pipe.
- I increase your heart rate.
- About 50% of 12th graders have tried me.
- California allows me to be used as a prescription medication.
- Some people think you can't become addicted to me — but you can.



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# MARIJUANA

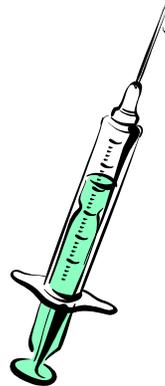


# What Am I?

- I am a depressant.
- Baltimore is the Capital for my use.
- In my purest form I am a white powder.  
On the West Coast, I am often brown and tar-like.
- I am most often injected.
- Some people call me “smack” or “junk.”



# HEROIN



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# What Am I?

- I was developed as a prescription drug.
- I am most often abused by teens and college students.
- I am most often swallowed in pill form, but can be snorted.
- Some people call me “Kiddy Cocaine” or “West Coast.”



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# RITALIN

# Drugs 101



## Heroin

Street names: smack, H, Ska, junk, skag

Appearance: usually white powder, less pure is more brown

How it's used: injected\*, smoked, snorted

# Drugs 101

## Cocaine

Street names: coke, dust, line, nose candy, rock, crack\*

Appearance: white crystalline powder \*crack cocaine looks like small rock

How it's used: snorted\*, sniffed, smoked, injected \*crack cocaine is usually smoked



# Drugs 101

## Methamphetamine

Street names: speed, meth, crank, crystal meth, glass

Appearance: crystals that look like pieces of ice, powder, capsules

How it's used: smoked\*, swallowed, snorted, injected



# Drugs 101



## Ecstasy

### (methylenedioxymethamphetamine)

Street names: E, X, MDMA, XTC, disco biscuits, ADAM

Appearance: usually a flat, round, white tablet

How it's used: swallowed\*, snorted

# What's in your medicine cabinet?



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**In 2012, 15% of High School Seniors used a Prescription Drug Non-Medically.**



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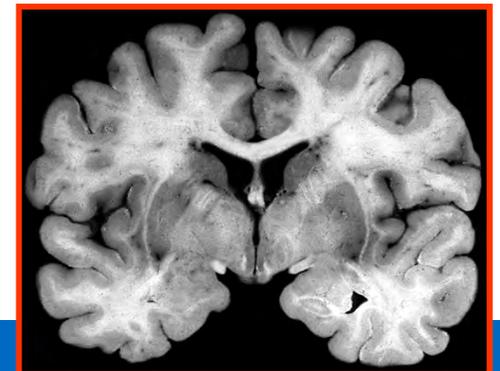
# The Five “Whys?”

## 1. Why the Brain?



# Why the Brain?

- It is where addiction works its potent power.
- If you know what happens in the brain, then you will understand why addiction makes you/them feel and behave the way you/they do.
- You can judge whether you/they are in control or whether the addiction is in control.
- If you know the physiological actions of addiction, you can strategize how to fight back when your/their brain craves more, even when you/they want less.



# Addictions & The Teen Brain



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## Some Statistics...

- More than 60% of teens said that drugs were sold or used at their schools
- 16% of 8<sup>th</sup> graders report having tried marijuana
- 23% of teens report that buying marijuana is easier than buying beer
- 50% of teens have tried an illicit drug before finishing high school

(National Institute of Health)

# Teens and Alcohol

In 2012...

- 3.6% of 8<sup>th</sup> graders
- 14.5 % of 10<sup>th</sup> graders
- 28.1% of 12<sup>th</sup> graders



Reported Getting DRUNK in the past month  
*(this is a downward trend!)*

(National Institute on Drug Abuse)



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# Teens and Drugs in Maryland

(Health & Human Services, Office of Adolescent Health, 2011)

Percent of high school students who  
drank alcohol for the first time before age  
13 years (other than a few sips)...

**23%**



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# Teens and Drugs in Maryland

(Health & Human Services, Office of Adolescent Health, 2011)

Percent of high school students who had at least one drink of alcohol on at least one day (during the 30 days before the survey)

**35%**



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# **Teens and Drugs in Maryland**

**(Health & Human Services, Office of Adolescent Health, 2011)**

Percent of high school students who had five or more drinks of alcohol in a row within a couple of hours on at least

**18%**



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# **Teens and Drugs in Maryland**

**(Health & Human Services, Office of Adolescent Health, 2011)**

Percent of high school students who  
ever used marijuana one or more times  
(during their life).

**37%**



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# Teens and Drugs in Maryland

(Health & Human Services, Office of Adolescent Health, 2011)

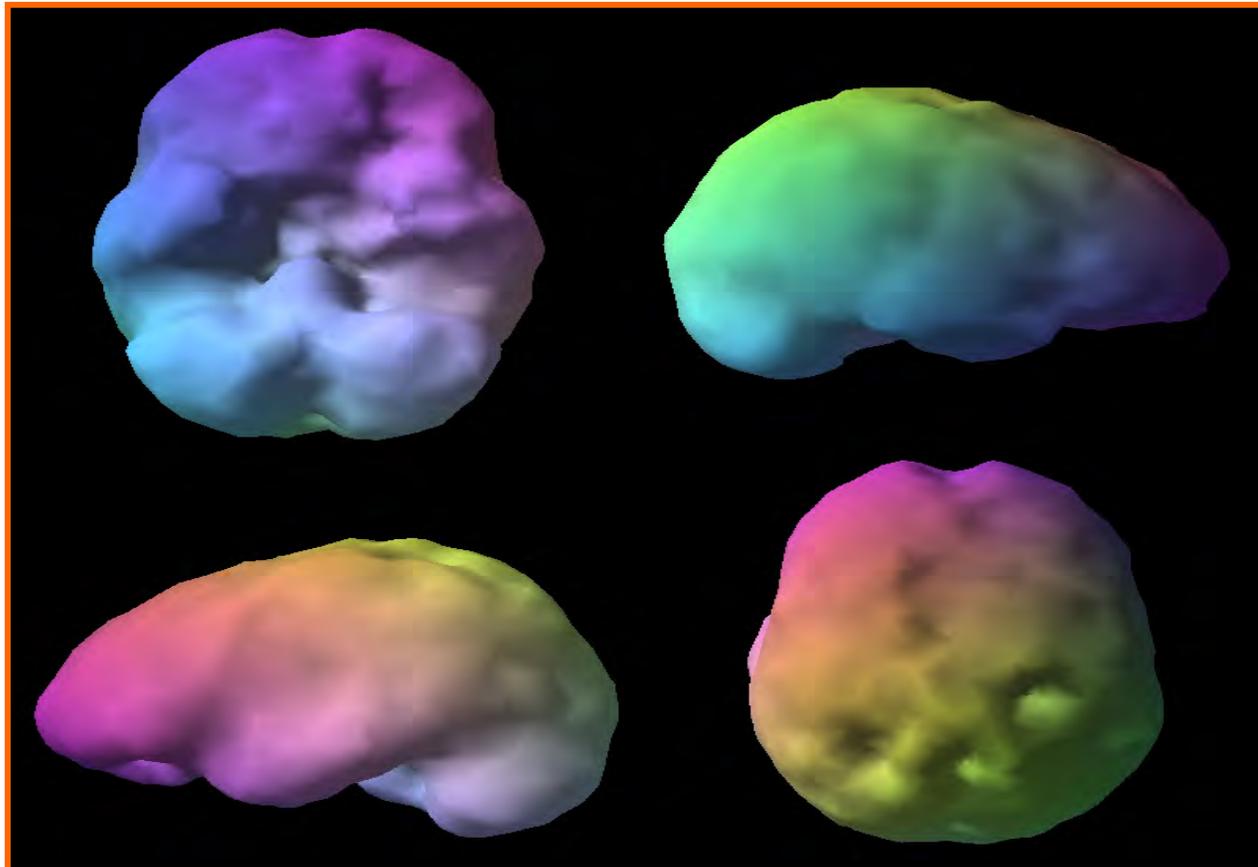
Percent of high school students who used any form of cocaine one or more times (for example, powder, crack, or freebase, during the 30 days before the survey)

**3%**



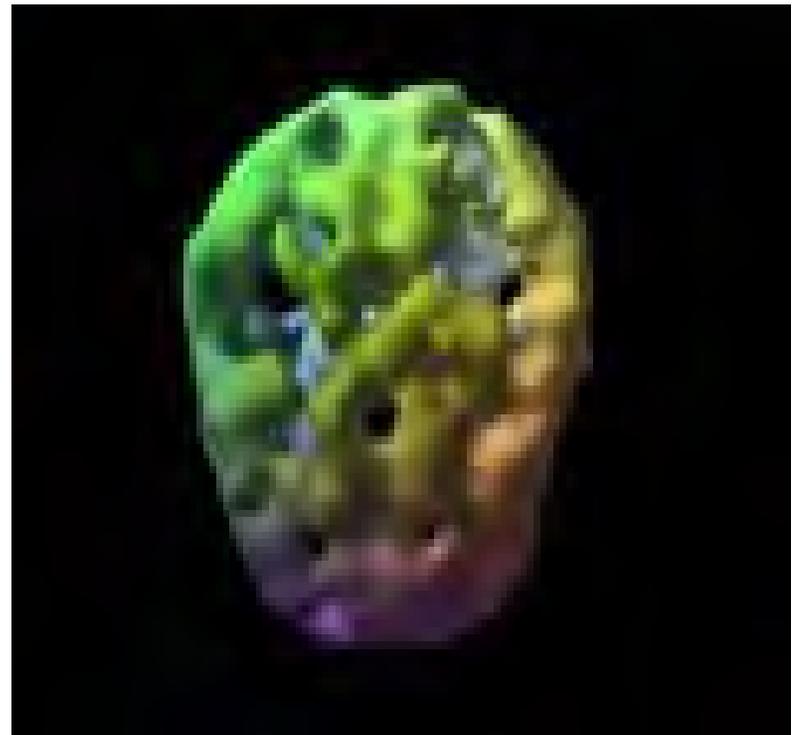
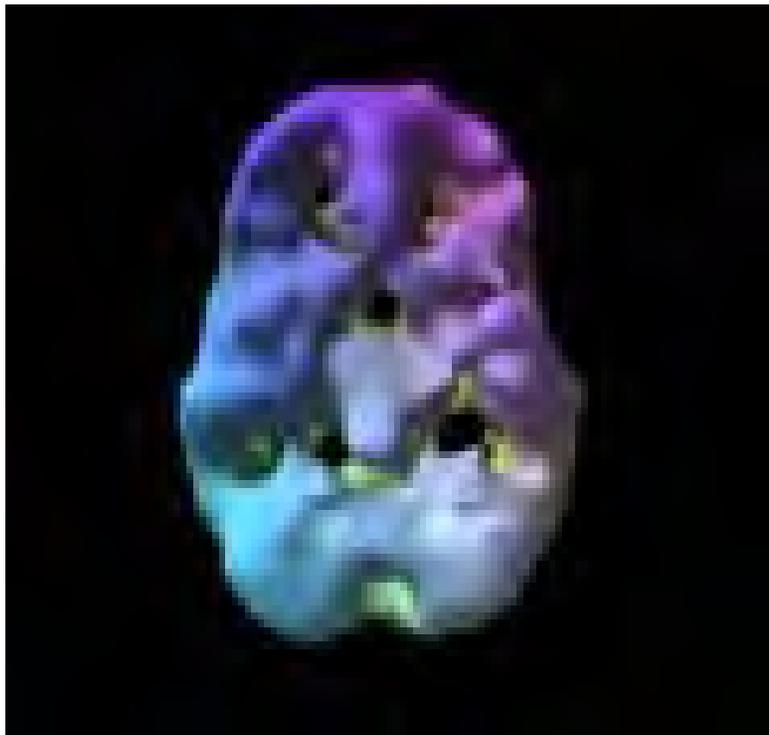
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# Healthy Brains: SPECT Scans



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**38 Year Old Male**  
**Heavy weekend use beginning at**  
**age 21**



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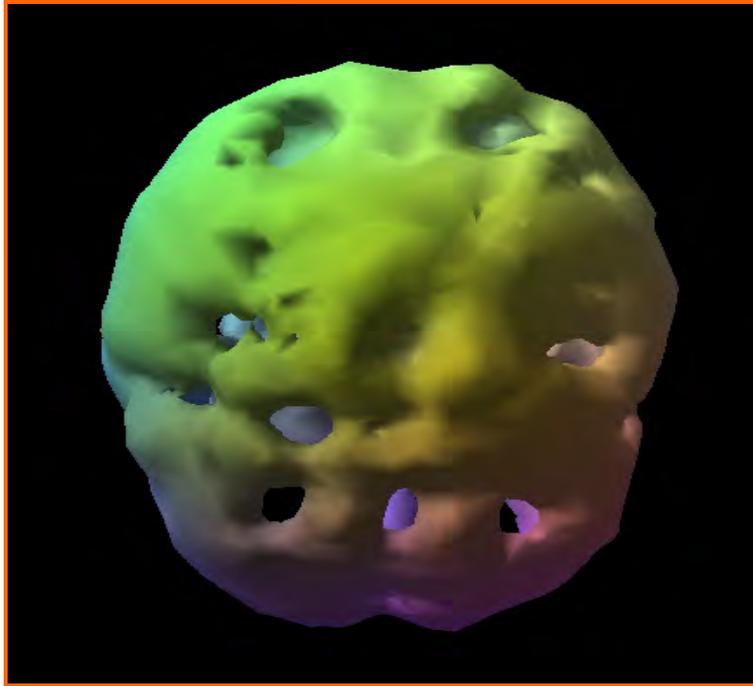
# 38 Year Old Male

Heavy weekend use beginning at  
age 21

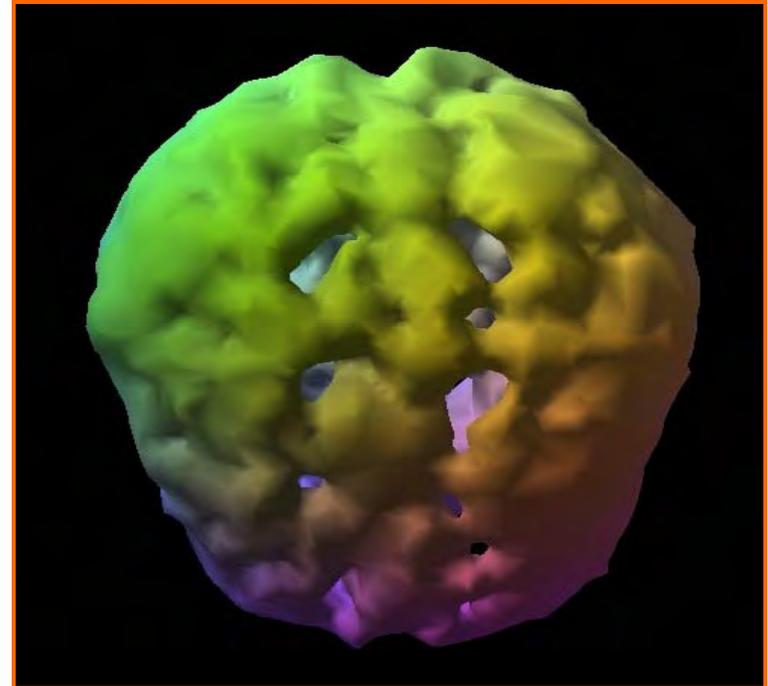


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# Drug Abuse

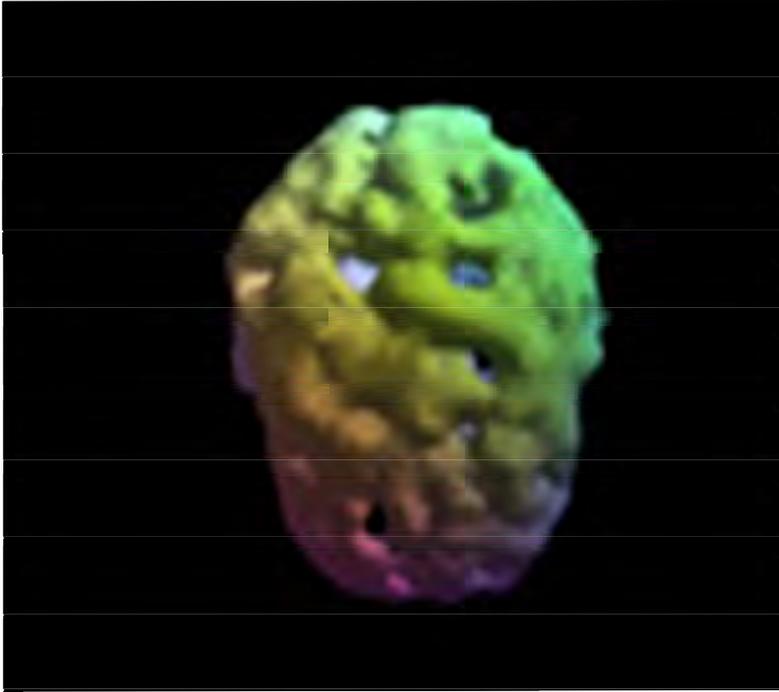


Cocaine



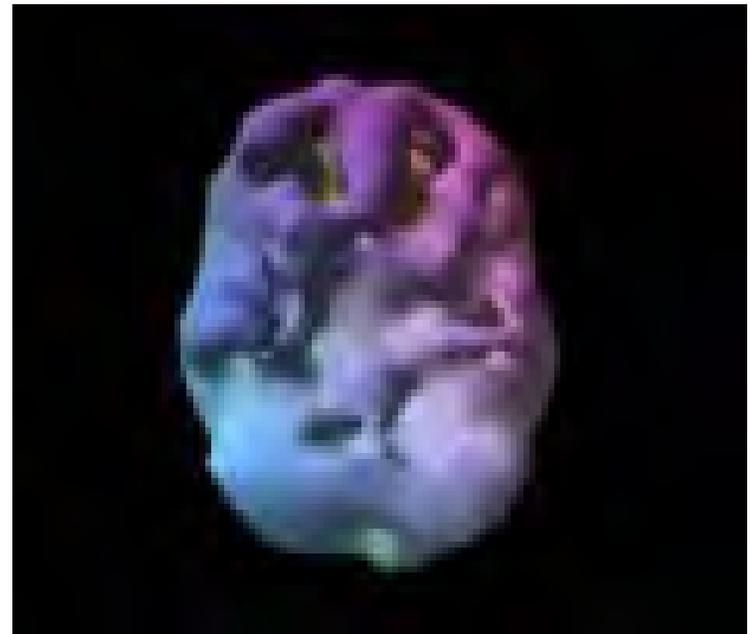
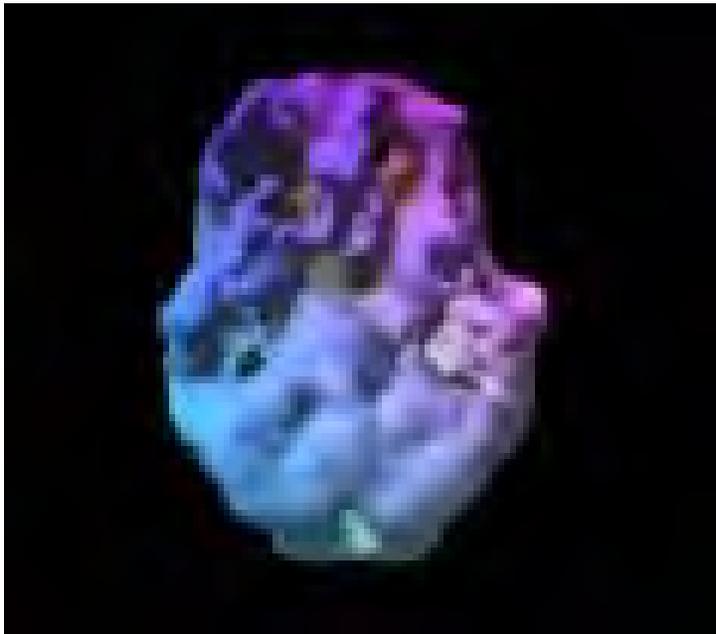
Methamphetamine

# Hope for Healing: 1 year abstinence



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# Hope for Healing: 1 year abstinence



**In sum, if you abuse drugs or alcohol frequently and heavily, you can expect:**

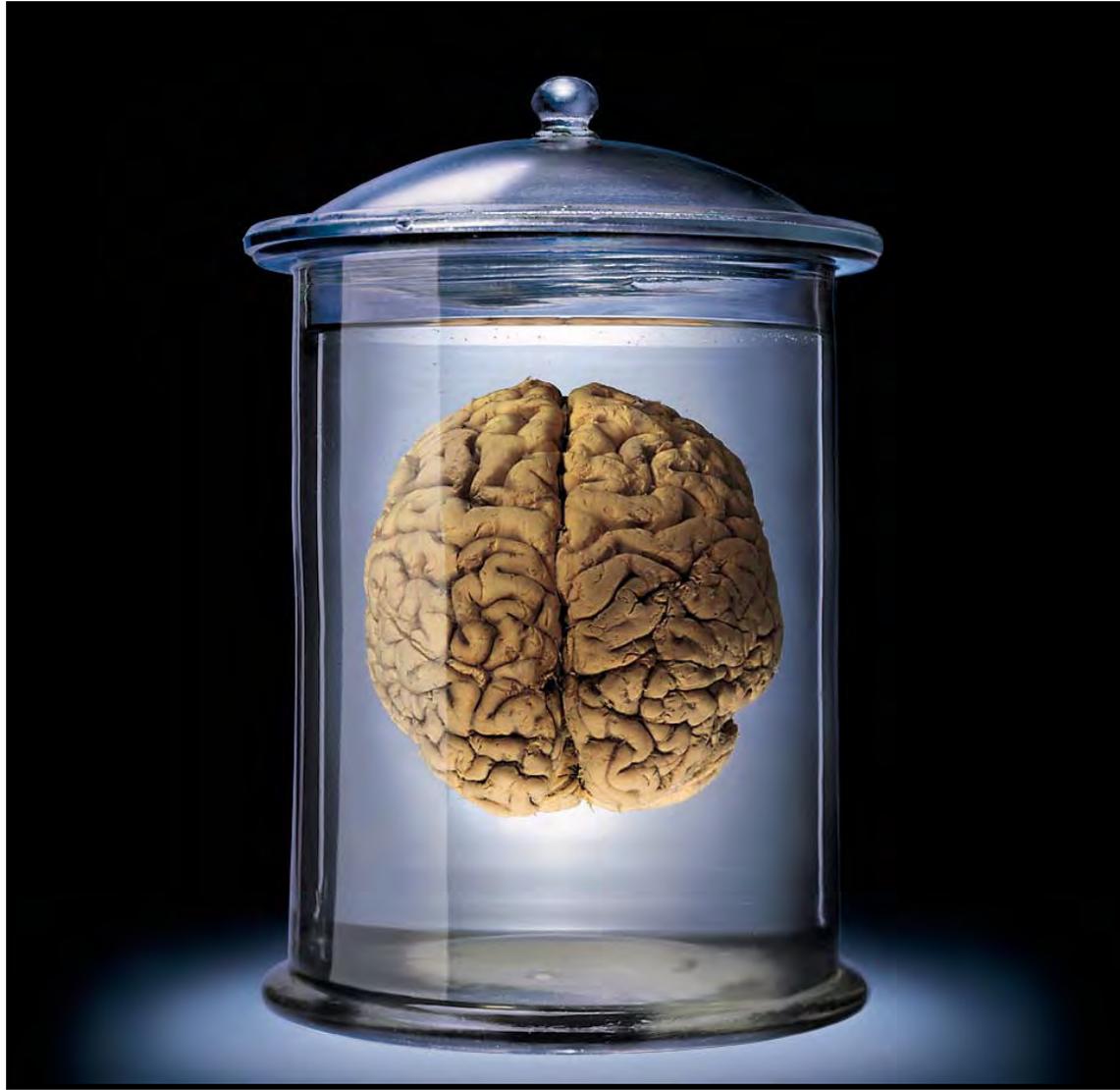
- Poor physical coordination
- Consistently bad decision making
- Increased likelihood of addiction

# Let's Check Our Memory...

All Learning =  
Making a Memory

- Slumber
- Siesta
- Doze
- Nap
- Deep
- Nightlight
- Snooze
- Wake
- Rest
- Night
- Sound
- Tired
- Snore
- Dream
- Yawn
- Bed





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- Slumber
- Siesta
- Doze
- Nap
- Deep
- Nightlight
- Snooze
- Wake
- Rest
- Night
- Sound
- Tired
- Snore
- Dream
- Yawn
- Bed

**“SLEEP” IS NOT ON THE LIST**



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# The Five “Whys?”

## 2. Why the High?



# Voluntary behavior in animals is motivated by the avoidance of pain and the pursuit of pleasure.

Higgins, E. and George, M., The Neuroscience of Clinical Psychiatry (2007) Lippincott, Williams & Wilkins, Philadelphia

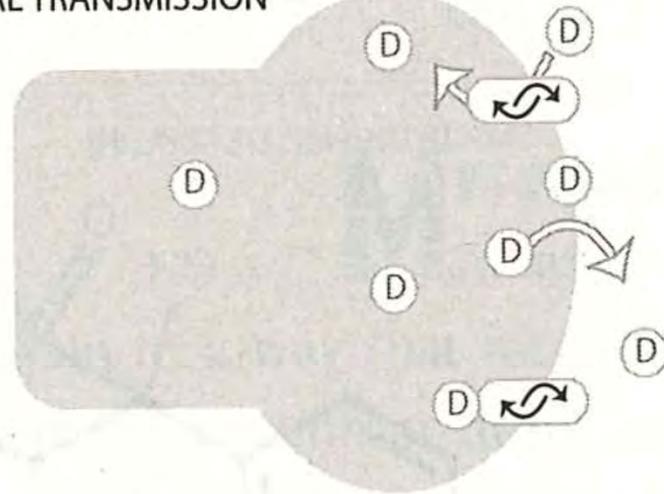
# The Pursuit of Pleasure



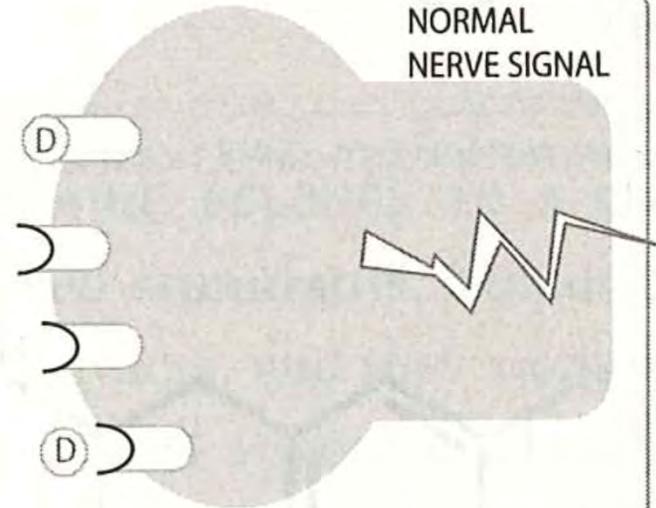
The motivation to pursue a beneficial act to enhance survival is driven in part by giving the brain a brief squirt of **euphoria** — the reward system.



NORMAL SIGNAL TRANSMISSION



NORMAL NERVE SIGNAL



D DOPAMINE

POSTSYNAPTIC  
DOPAMINE RECEPTOR  
DOPAMINE REUPTAKE  
TRANSPORTER



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# The Pursuit of Pleasure



This reward system has evolved over millions of years to enable an individual to sort through the variety of stimuli that bombard the senses and choose the ones that enhance survival (i.e., eating, sex, social interaction).



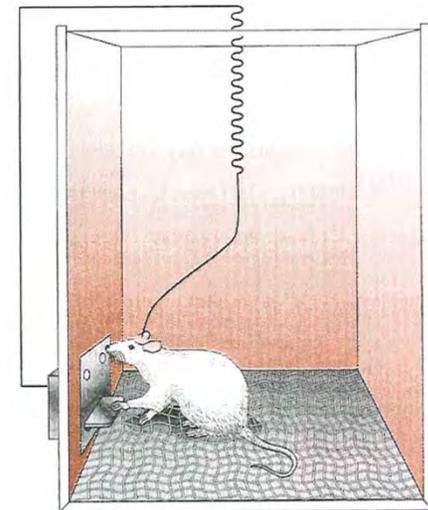
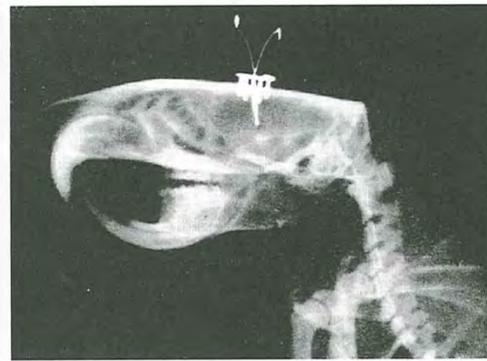
# The Pursuit of Pleasure

Our reward system was built for acquiring rewards that were historically in short supply. Now we are exposed to abundance beyond what our wiring has evolved to handle.



# The Anatomy of Reward

- The first clues about the power of pleasure
- Electrode placed in rat's brain provided pleasurable stimulus when rat pressed a lever.



# The Anatomy of Reward

## Results –

Rat would:

- Press the lever up to 5,000 an hour.
- Choose stimulation over food even when starving.
- Cross an electrified grid for a chance to press the lever.

Olds, J. Pleasure Centers in the Brain. Sci Am. 1956; 195: 105-112.

# The Anatomy of Reward

## The Mesolimbic Dopamine System

Enhanced dopamine at the Nucleus Accumbens (NAc) is the biological basis of pleasure (reward).



**What activities result in**  
**enhanced dopamine**  
**levels at the NAc?**



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# What activities result in enhanced dopamine levels at the NAc?

- Romantic Love
- Music
- Humor
- Expectation of \$
- Inflicting punishment
- Looking at beautiful faces
- Social cooperation
- Chocolate



# What activities result in enhanced dopamine levels at the NAc?

- Cocaine
- Alcohol
- Amphetamines
- Nicotine



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# Social Rank and the Anatomy of Reward



- Monkeys housed individually and dopamine levels measured.
- All monkeys initially had similar dopamine levels.
- Monkeys then housed in groups of 4. After three months, dominant and subordinate monkeys were identified and reassessed.

What do you think?

Which monkeys had higher dopamine levels?

# Social Rank and the Anatomy of Reward

The monkeys were then allowed to self-administer different doses of cocaine.

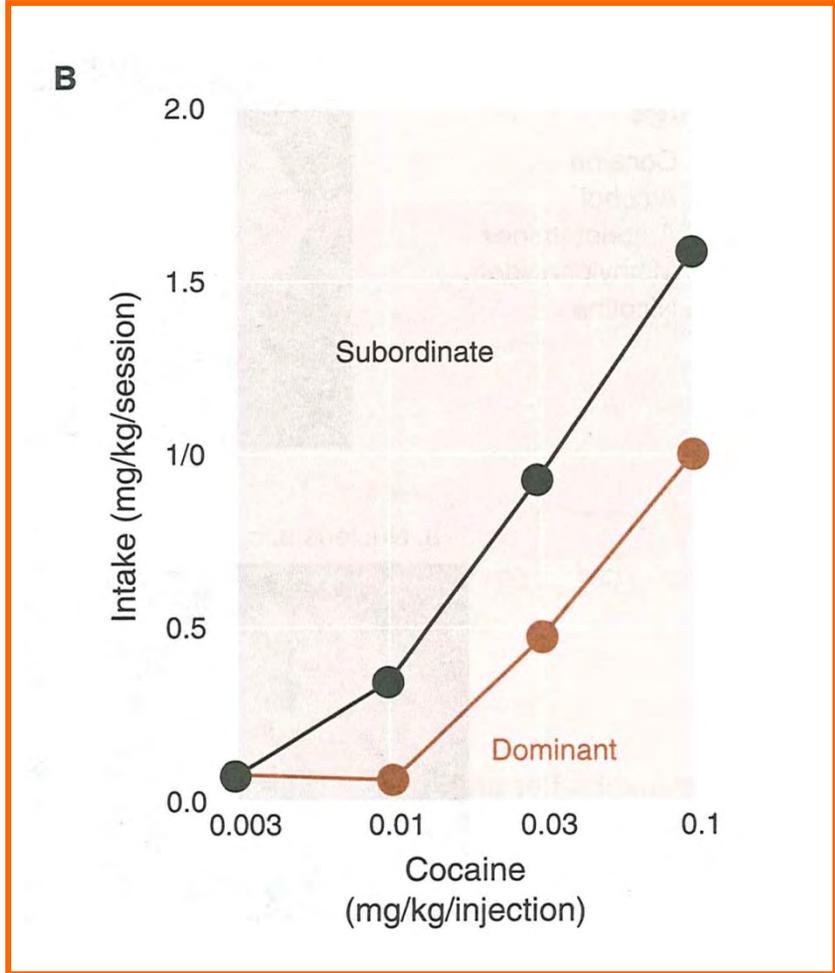
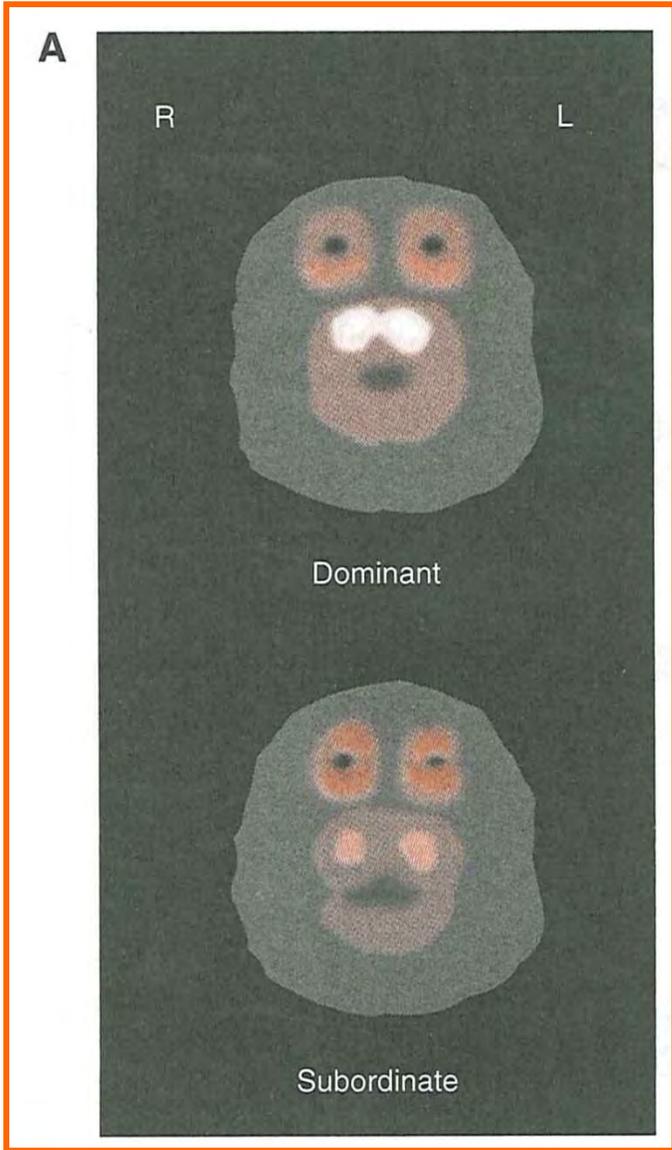
**What do you think?**

**Who used more?**

Morgan, D., Grant, K.A. and Gage, H.D. et al. Social Dominance in Monkeys: Dopamine Dz Receptors and Cocaine Self-Administration.  
Nat Neurosci. 2002; 5[2]: 169-174.



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# Social Rank and the Anatomy of Reward

IMPLICATION: the “good feelings” (i.e., enhanced dopamine) that come from being an alpha monkey buffer against seeking external sources of pleasure.



# Social Rank and the Anatomy of Reward

What are the implications of this study on the relationship between substance abuse and the socioeconomic status?



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# Addictions Change the Brain

Most of the pleasurable activities that we are wired to pursue occur in nature in limited supply, making it hard to overindulge.



# Addictions Change the Brain

But modern life provides a smorgasbord of temptations that activate the reward system.



# Addictions Change the Brain

Drugs of abuse, in particular, overwhelm and fundamentally alter the neurons that were never intended to experience such supra-physiological levels of neurotransmitters.

# Addictions Change the Brain

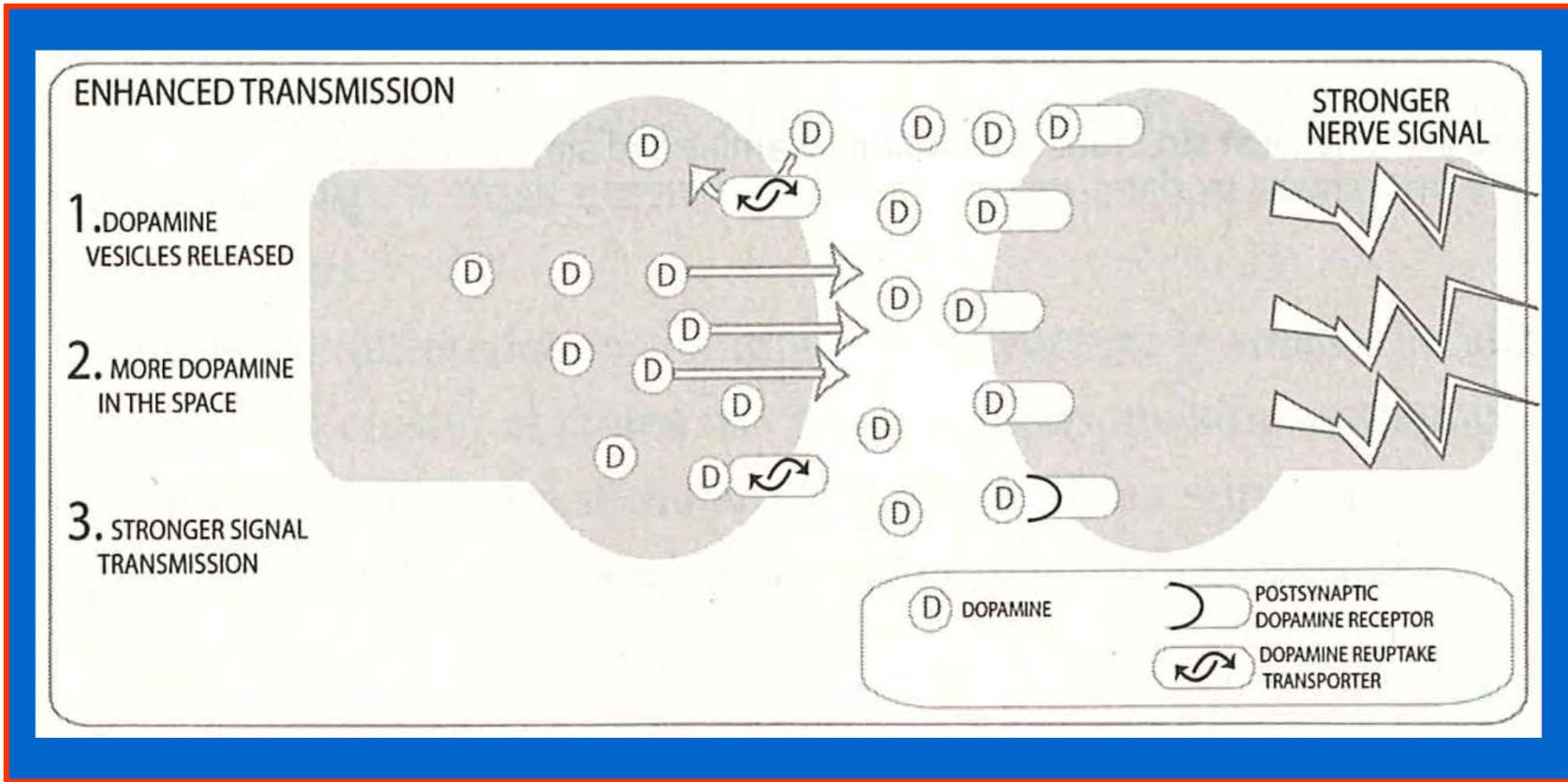
Some drugs have direct effects on the mesolimbic pathway while others work indirectly.



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# Addictions Change the Brain

**Stimulants and Nicotine and METH  
increase NAc dopamine levels —  
DIRECT IMPACT!**



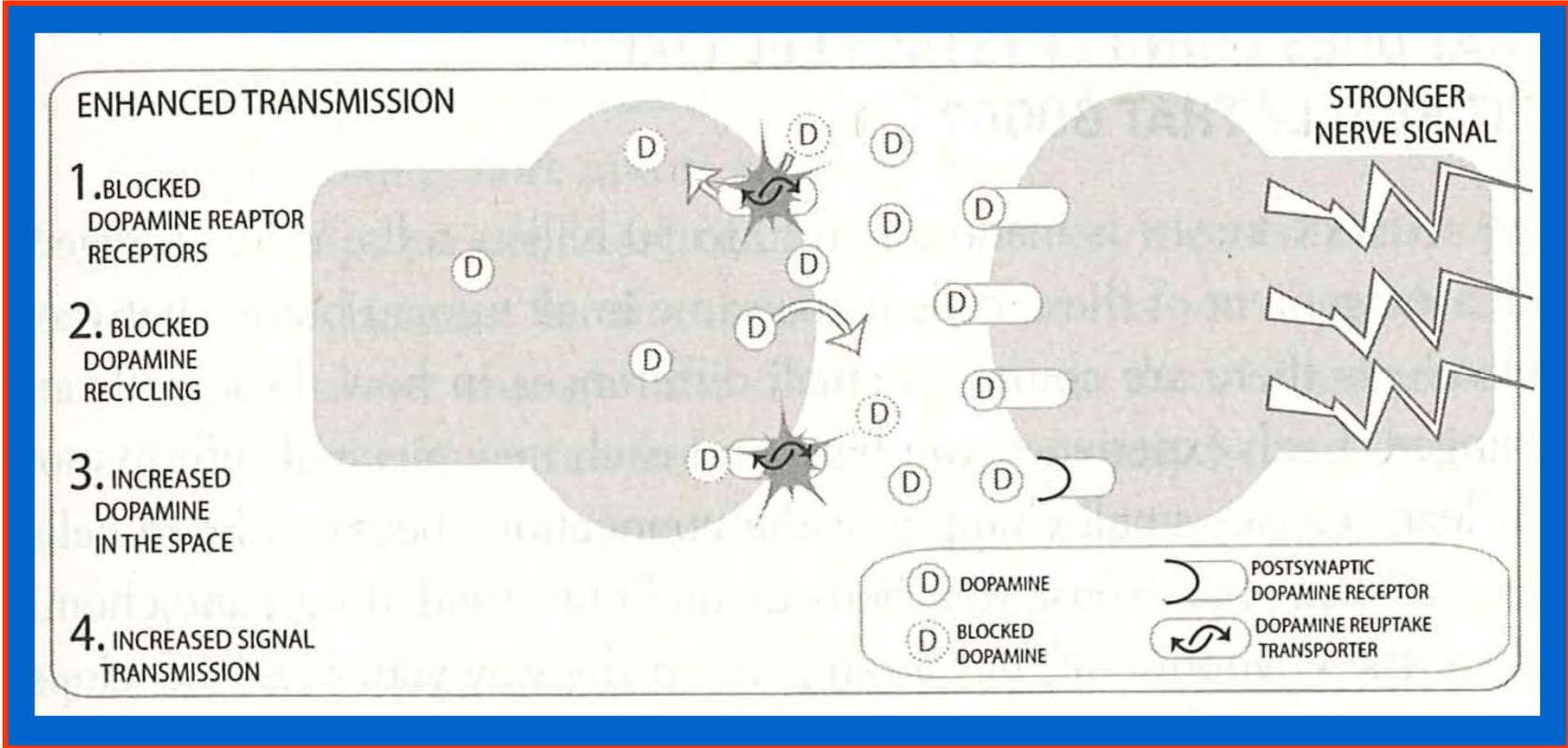
# Addictions Change the Brain

## Opiods, Alcohol and METH

suppress the inhibitory neurons that modulate dopamine in the NAc. With less inhibition, more dopamine is available — **INDIRECT IMPACT!**



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# Addictions Change the Brain

METH presents a “double-whammy” to the natural reward system. Think of a sponge...



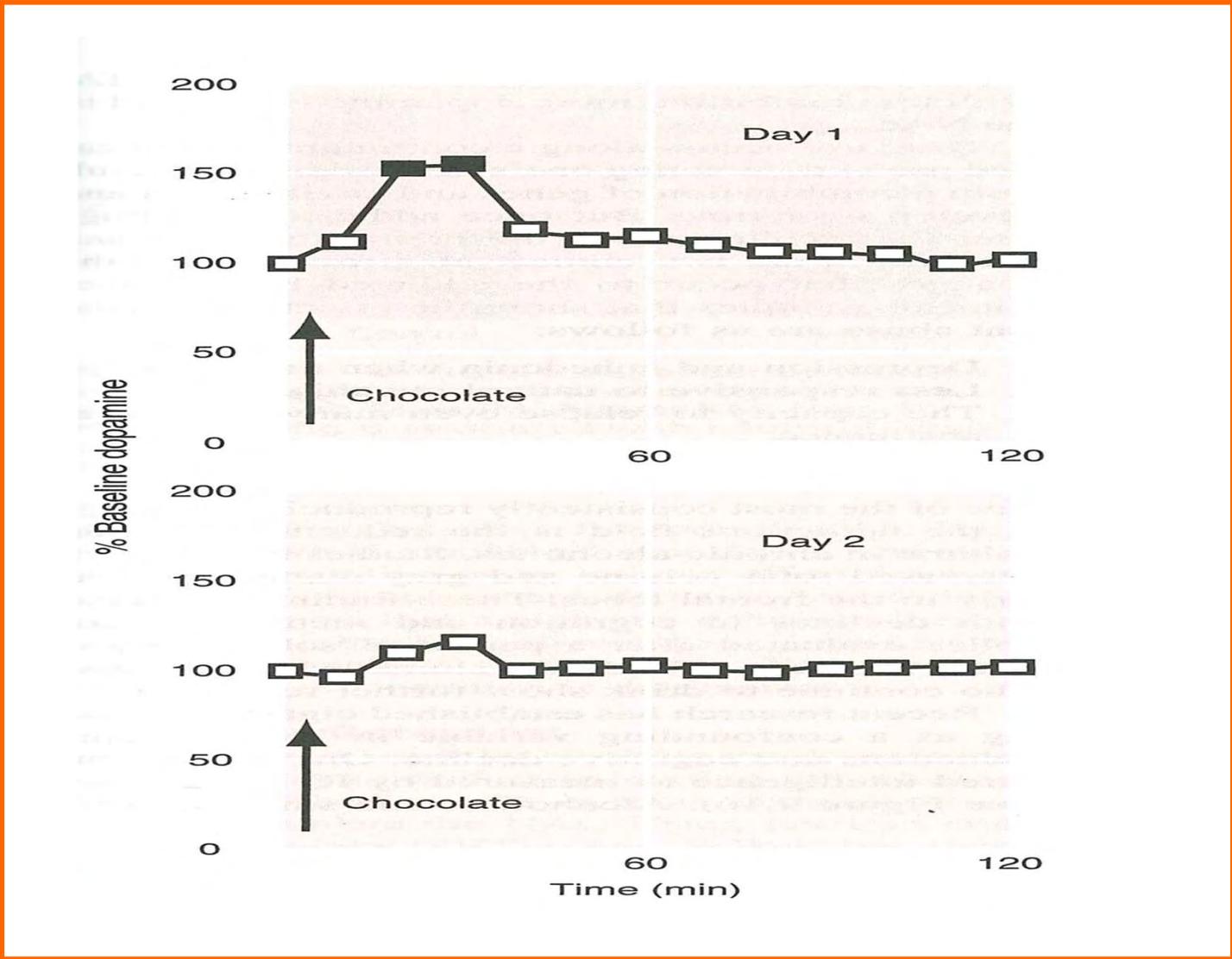
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## Boosting the Messenger

- Chocolate
  - 150% boost in dopamine levels at MAc over baseline of first administration.
  - On second administration, boost in dopamine level is no longer significant.





# Boosting the Messenger

- Cocaine
  - 400% boost in dopamine levels at NAc over baseline at first administration.

# Boosting the Messenger

- METH
  - 1500% boost in dopamine levels at NAc over baseline at first administration.

# Boosting the Messenger

Biologically speaking, is METH  
more addictive than cocaine? Than  
*chocolate?!!!*



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## The Five “Whys?”

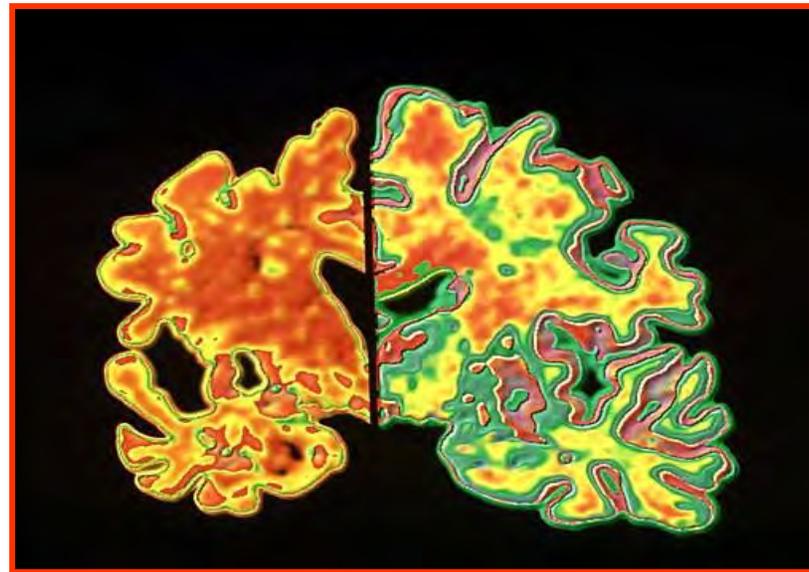
### 3. Why the Need for More, More, More? (Tolerance)



# Addiction Changes the Brain

## Damage to Dopamine Receptors

Excessive use of hedonic substances results in a decrease of dopamine receptors.



# Addiction Changes the Brain

## Damage to Dopamine Receptors

With fewer dopamine receptors, the addicted brain:

1. Will develop **tolerance** and the need to take more;
2. Will have difficulty experiencing **pleasure** with natural reinforcers.



# Addiction Changes the Brain

## Dampening of Reward Circuit

Genetic expression is altered producing substances that dampen the reward circuitry and induce tolerance. Drug addiction changes genes!



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# The Five “Whys?”

## 4. Why the Craving?



# The Five “Whys?”

Craving can be thought of as a “Glutamate Headache.”

- Glutamate helps you “think.” But, too much can result in compulsive, obsessive thoughts. Too little can slow thinking.
- Interferes with PFC activity that might otherwise help you resist the craving while heightening sensitivity to drug cues.
- Fewer resources to fight the “urge.” The PFC “rewires” for glutamate use.



# The Five “Whys?”

## 5. Why the Slide? (Relapse)



# Addictions Change the Brain

Three well-known causes of relapse:

- Use of drug or similar drug
- Exposure to cues associated with drug use.
- Stress



Dopamine at NAc



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# Addictions Change the Brain

## Neuronal Architecture Altered

- The structure of the neurons themselves is altered by drug use, particularly the dendrites.
- The molecular function of neurons is altered by the increasing exposure to dopamine. These molecular changes contribute to tolerance and susceptibility to relapse.



# The Five “Whys?”

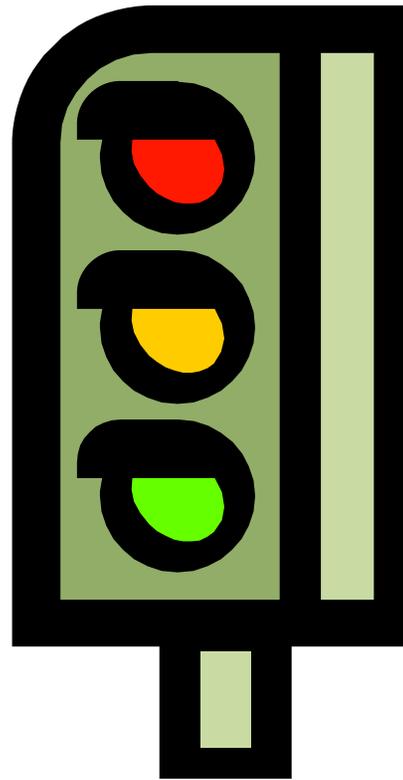
## So What?

# Addiction Treatment Implications for Teens

1. Delayed Experimentation (Montana Meth Project)
2. Early Intervention
3. Abstinence (w/motivation)
4. Medication
5. Identify and reinforce healthy activities that stimulate the reward system.



# Now What?



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***“Every child  
needs at least  
one adult who  
is irrationally  
crazy about  
him.”***

— U. Bronfenbrenner



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# Resources



## Some Excellent Books:

- [Secrets of the Teenage Brain](#) by *Sheryl Feinstein*
- [How the Brain Learns](#) by *David Sousa*
- [Why Do They Act That Way?](#) by *David Walsh*
- [The Childhood Roots of Adult Happiness](#) by *Edward M. Hallowell*
- [Different Brains, Different Learners](#) by *Eric Jensen*
- [The Primal Teen](#) by *Barbara Strauch*
- [The Adolescent Brain](#) by *Robert Sylwester*

# Website Resources



## Websites:

[www.sciencedaily.com](http://www.sciencedaily.com)

[www.brainplace.com](http://www.brainplace.com)

[www.jensenlearning.com](http://www.jensenlearning.com)

[www.brainconnection.com](http://www.brainconnection.com)

[www.ninds.nih.gov](http://www.ninds.nih.gov)

[www.eurakalert..org](http://www.eurakalert..org)

[www.dana.org](http://www.dana.org)

[www.ajcn.org](http://www.ajcn.org)

*These are just a few good sites to get started on for learning about the brain. Dive in!*



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# Thank You!

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