

Build Up Your Teen
Treatment IQ

Evidence-based prevention and treatment for youth



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**Substance Use Disorder
& The Adolescent Brain –
Why Do They Go Together?**

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Substance Use Disorder (Addiction)

a disorder of pathologic decision making
i.e., expression of compulsive, destructive behavior
despite extreme, negative consequences

**Drug
Abuse**



**Antisocial
behavior**



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Violence

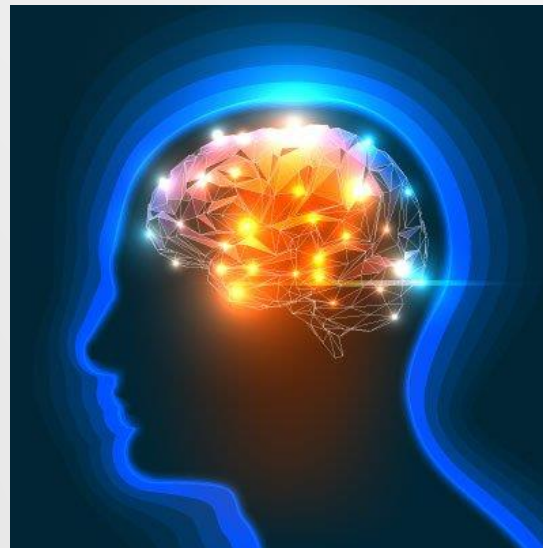


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**Criminal
behavior**



- Extremely complex and very difficult for most people to understand—especially in adolescents



What biology should you know?

We know that despite their many differences, virtually all abused substances enhance CNS Dopamine (neurotransmitter) activity (*particularly related to pleasure, motor, and cognitive function*)

Other brain pathways also involved!



Dopamine Pathways

frontal cortex

striatum

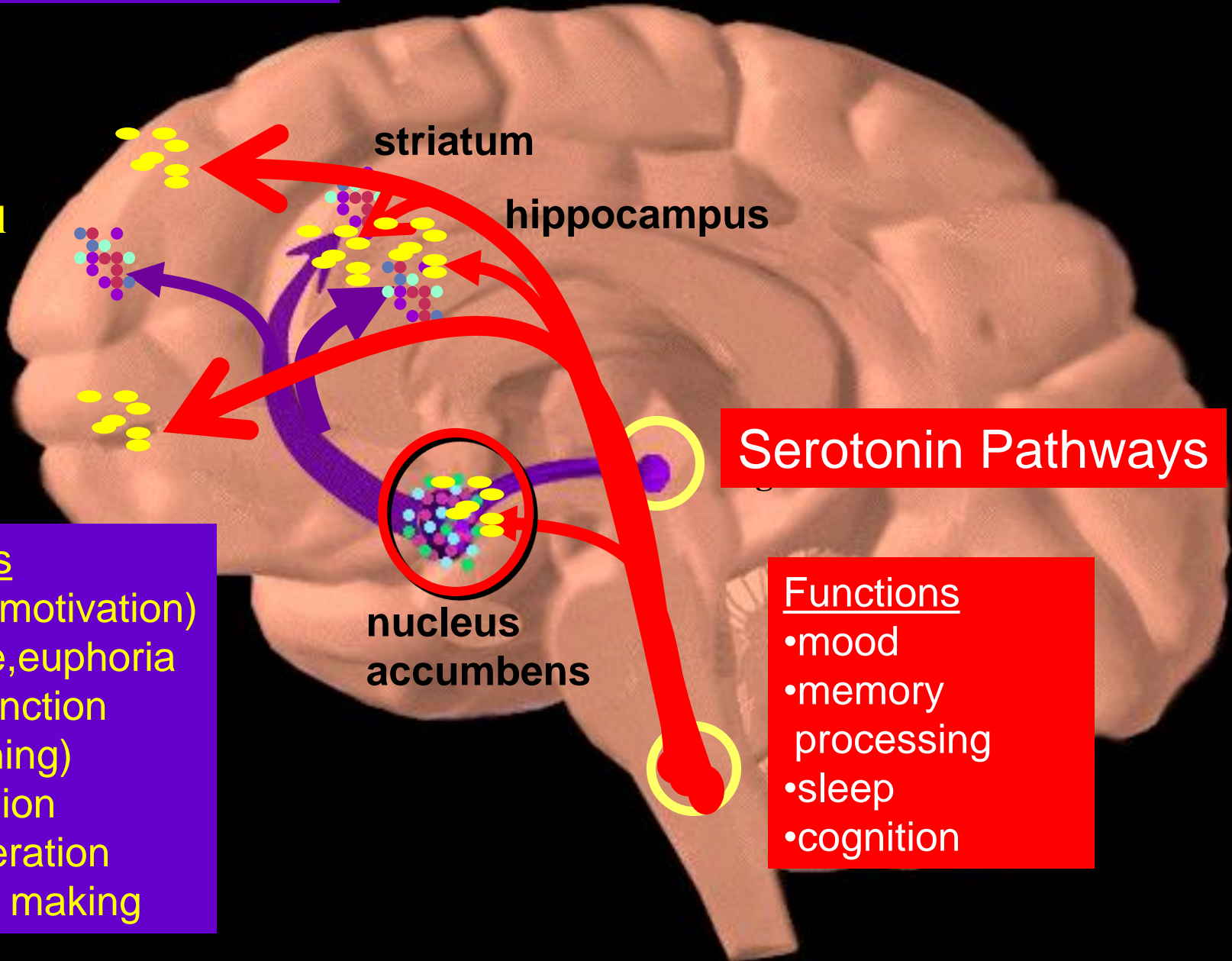
hippocampus

nucleus accumbens

- Functions
- reward (motivation)
 - pleasure, euphoria
 - motor function (fine tuning)
 - compulsion
 - perseveration
 - decision making

Serotonin Pathways

- Functions
- mood
 - memory processing
 - sleep
 - cognition





MONITORING THE FUTURE 2015

TEEN DRUG USE

COCAINE BARRITURATES OXYCONTIN
 PRESCRIPTIONS VICODIN SEDATIVES
 CRACK K2/SPICE e-cigarettes
 RITALIN Steroids HEROIN
 ALCOHOL SALVIA
 SYNTHETICS ADDERALL
 INHALANTS methamphetamine
 CIGARETTES ECSTASY
 HOOKAHS MARIJUANA
 "BATH SALTS" COLD MEDICINES

Monitoring the Future is an annual survey of 8th, 10th, and 12th graders conducted by researchers at the University of Michigan, Ann Arbor, under a grant from the National Institute on Drug Abuse, part of the National Institutes of Health. Since 1975, the survey has measured drug, alcohol, and cigarette use and related attitudes in 12th graders nationwide. Eighth and 10th graders were added to the survey in 1991.

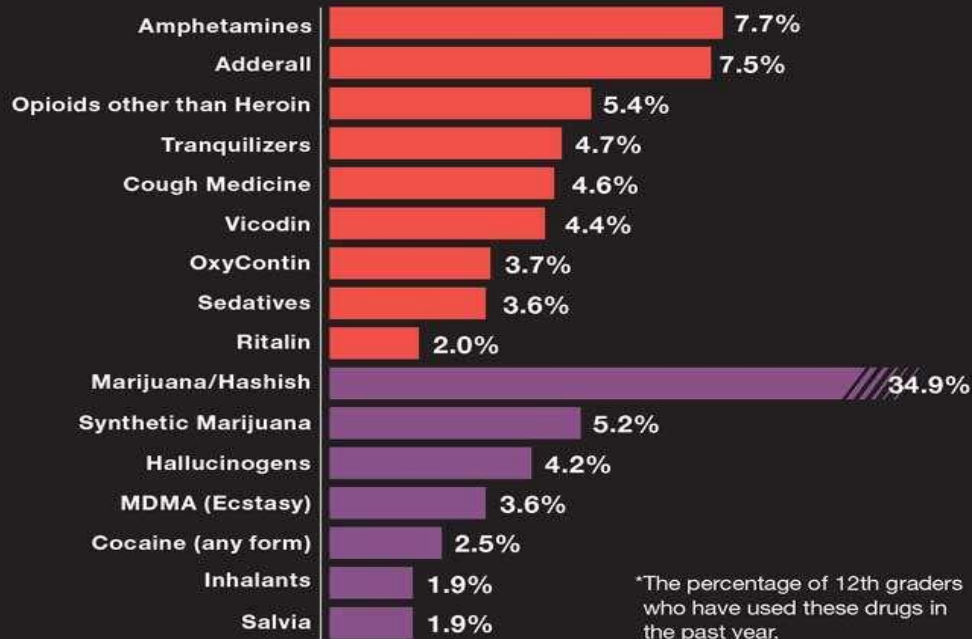
Overall, 44,892 students from 382 public and private schools participated in the 2015 survey.

  WWW.DRUGABUSE.GOV



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PRESCRIPTION/OVER-THE-COUNTER VS. ILLICIT DRUGS*



*The percentage of 12th graders who have used these drugs in the past year.



PRESCRIPTION/OTC



ILLICIT DRUGS

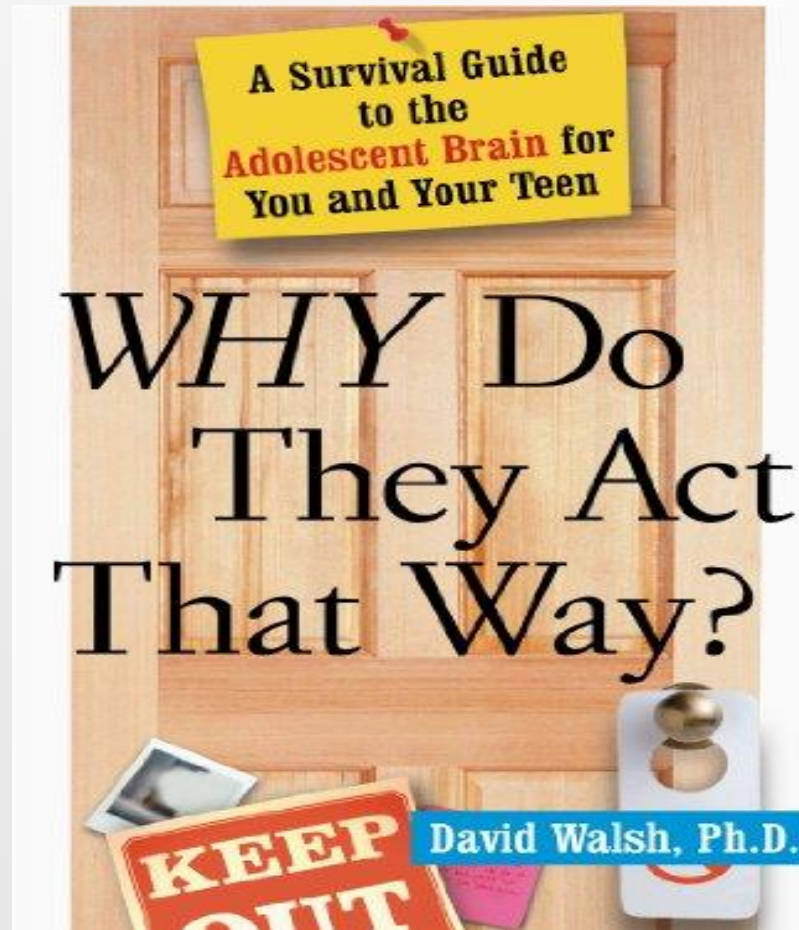


National Institute
on Drug Abuse

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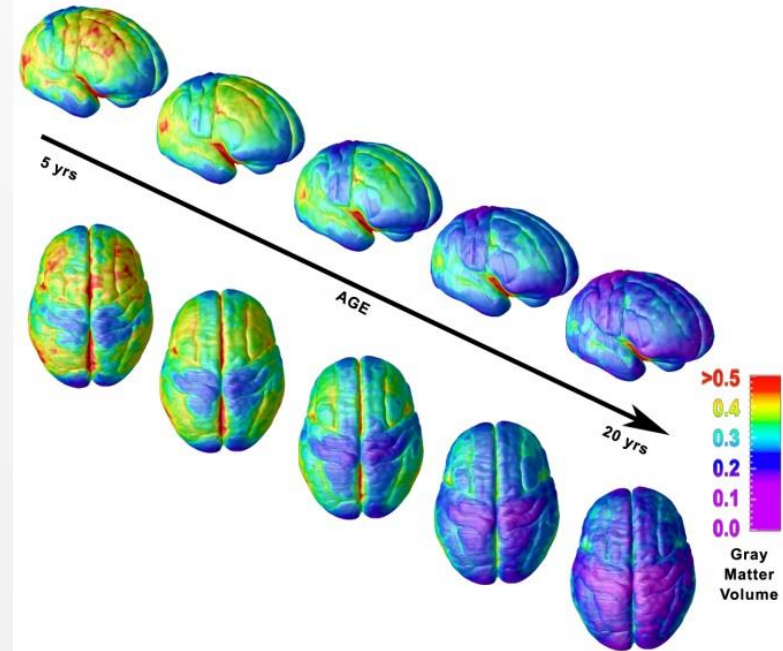


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Adolescent Brain Development and SUD is Dynamic

- Brain morphology
- Fiber architecture & connectivity
- Biochemical and endocrine changes

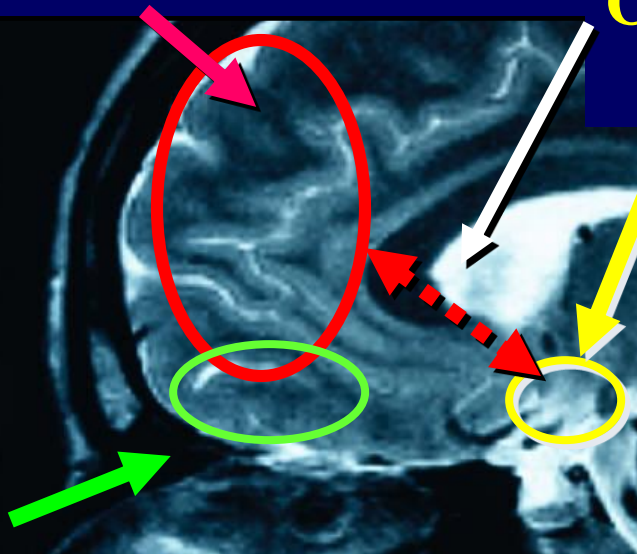


Adolescent Vulnerability

Prefrontal Cortex (PFC) integrates CNS information to make complex decisions behaviors (Go-No Go)

Inefficient control

Connecting pathway: allows PFC control over impulsivity



Amygdala/nucleus accumbens:

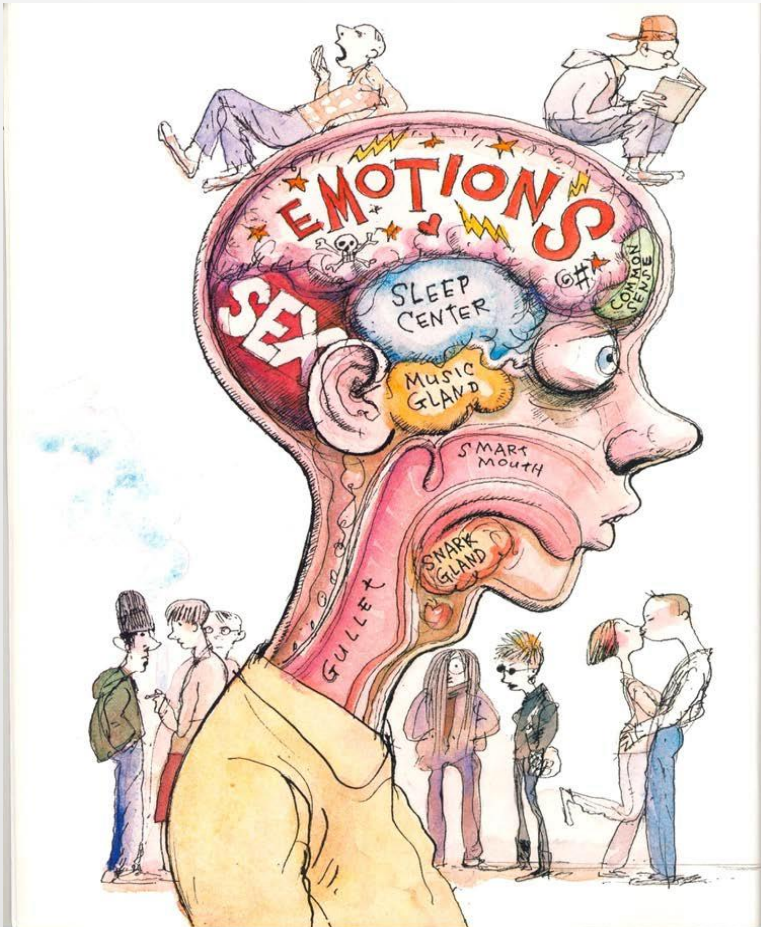
in... dominance, mediate emotional needs

- strong, dominant reward system

Orbitofrontal cortex: establishes priorities and

mo... decision making

- fouled up saliency



Source: US News & World Report, 2005

Why does the adolescent brain develop in this manner?



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Experimentation

Adolescents are particularly vulnerable to engage in "thrilling" and "daring" behaviors- to try new things.



➤ This is true in all mammalian species—
WHY?? (Dr. Linda Spears)

- Phylogenetically preserved: every mammal experiences during adolescence

- Humans: -13-26 years



Theory: High-risk attitude necessary for development and separation from family



- Encourages starting own family



- Try new things (such as a job)

High-risk mind set increases the likelihood of turning to drugs



- Take risks to get ahead

Other risk factors for addiction?

Early Use - The earlier a person begins to use drugs the more likely they are to progress to more serious abuse. Why?

- Drugs alter the developing brain
- Influences genetic susceptibility (epigenetics)
- Aggravates mental illness
- Intensifies the impact of unstable family relationships, and exposure to physical or sexual abuse.



Addiction as a “developmental disease”

Prefrontal cortex –

- Drug use may slow or prevent proper development
 - a stress-like effect (role of cortisol?)



Peers and School

- Friends and acquaintances ***have the greatest influence during adolescence***
- Drug-abusing peers ***can sway even those with little risk factors to try drugs for the first time.***



Home and Family

The influence of the home environment is usually most important in childhood. ***Parents or older family members*** who abuse alcohol or drugs, ***or who engage in*** criminal behavior, ***can*** increase ***children's risks of developing their own drug problems.***



For relief

- People who suffer from **anxiety, stress, and depression** use drugs to lessen these feelings. **Stress** plays a major role in initiation, persistence and relapse.



Improve performance

- athletic (competitive sports)
- cognitive (test taking, qualifying exams)
- becomes a 'way of life'



Typical Pattern

- Initially perceived positive; able to control
- Brain changes occur- some permanent, others temporary
- Pleasure replaced by compulsion—need drug to ‘feel normal’
- Tolerance causes drug escalation
- Negative withdrawal makes quitting difficult, painful, and even dangerous

The Marijuana Model



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Is it possible for teens to become addicted to marijuana? (NIDA Question- 2016)



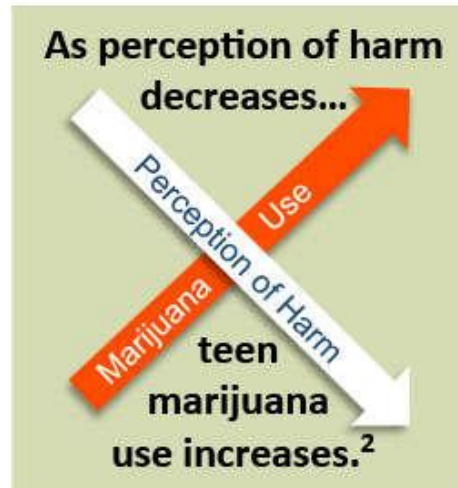
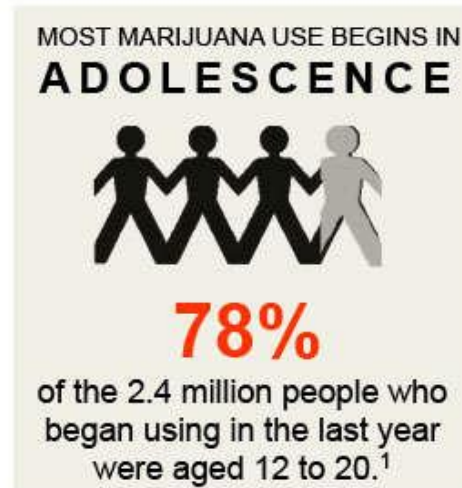
Yes! Contrary to common belief, marijuana is addictive. Estimates from research suggest that about **9% of users become addicted to marijuana**; this number increases among those who start young (to about 17%, or 1 in 6) and among daily users (to 25–50%).

Thus, many of the **nearly 7% of high-school seniors** who (according to annual survey data) report smoking marijuana, daily, are to become addicted, and may be functioning at a sub-optimal level in their schoolwork and in other areas of their lives.

MARIJUANA USE & COGNITIVE OUTCOMES



Studies show that marijuana interferes with attention, motivation, memory, and learning. Students who use marijuana regularly tend to get lower grades and are more likely to drop out of high school than those who don't use. Those who use it regularly may be functioning at a reduced intellectual level most or all of the time.



- Reduces connectivity in brain regions responsible for learning/memory (loss of 8 IQ points)

(www.drugabuse.gov/publications/drugfacts/marijuana)

NIDA Drug Facts, 2016

Forms of Consumption:

- Hand-rolled cigarettes (joints)
- Pipes/water pipes (bongs)
- Empty cigars filled with marijuana (blunts)
- Vaporizing
- Edibles (high concentrations of THC extract resins in food, such as brownies)



Brain Effects:

short-term -

- Altered senses and mood
- Compromised movement
- Diminished thinking/problem-solving
- Impaired memory

Pregnancy

- Altered development of fetal brain

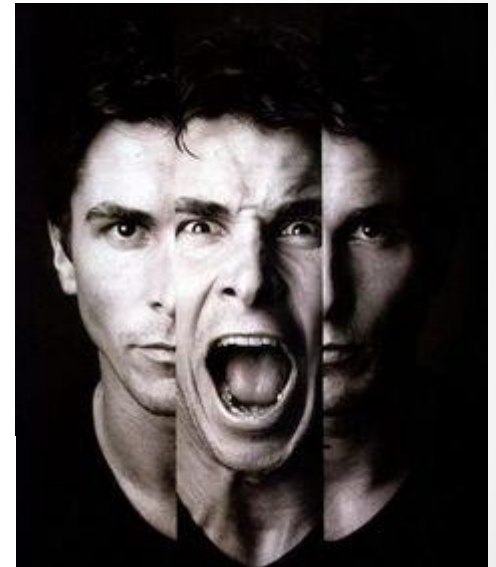
Mental Effects

- Temporary: hallucinations & paranoia
- Worsens schizophrenia and depression



Addiction (SUD)

- 30% regular users develop problems that can lead to dependence/addiction
- If start use <18 yrs, ~5X more likely to have problems as adult

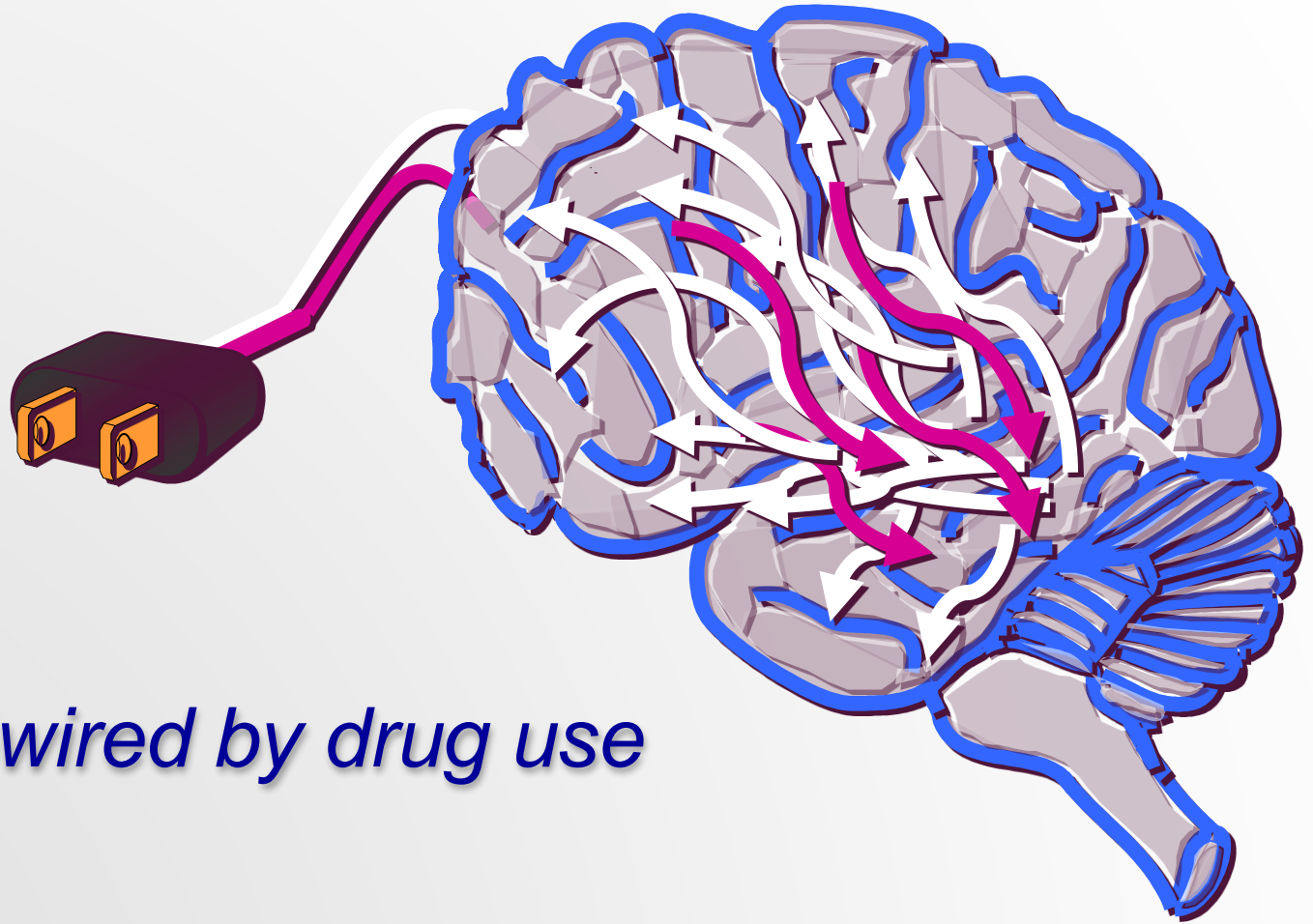


Withdrawal

- Irritable
- Sleep problems
- Anxiety
- craving



Their Brain.....



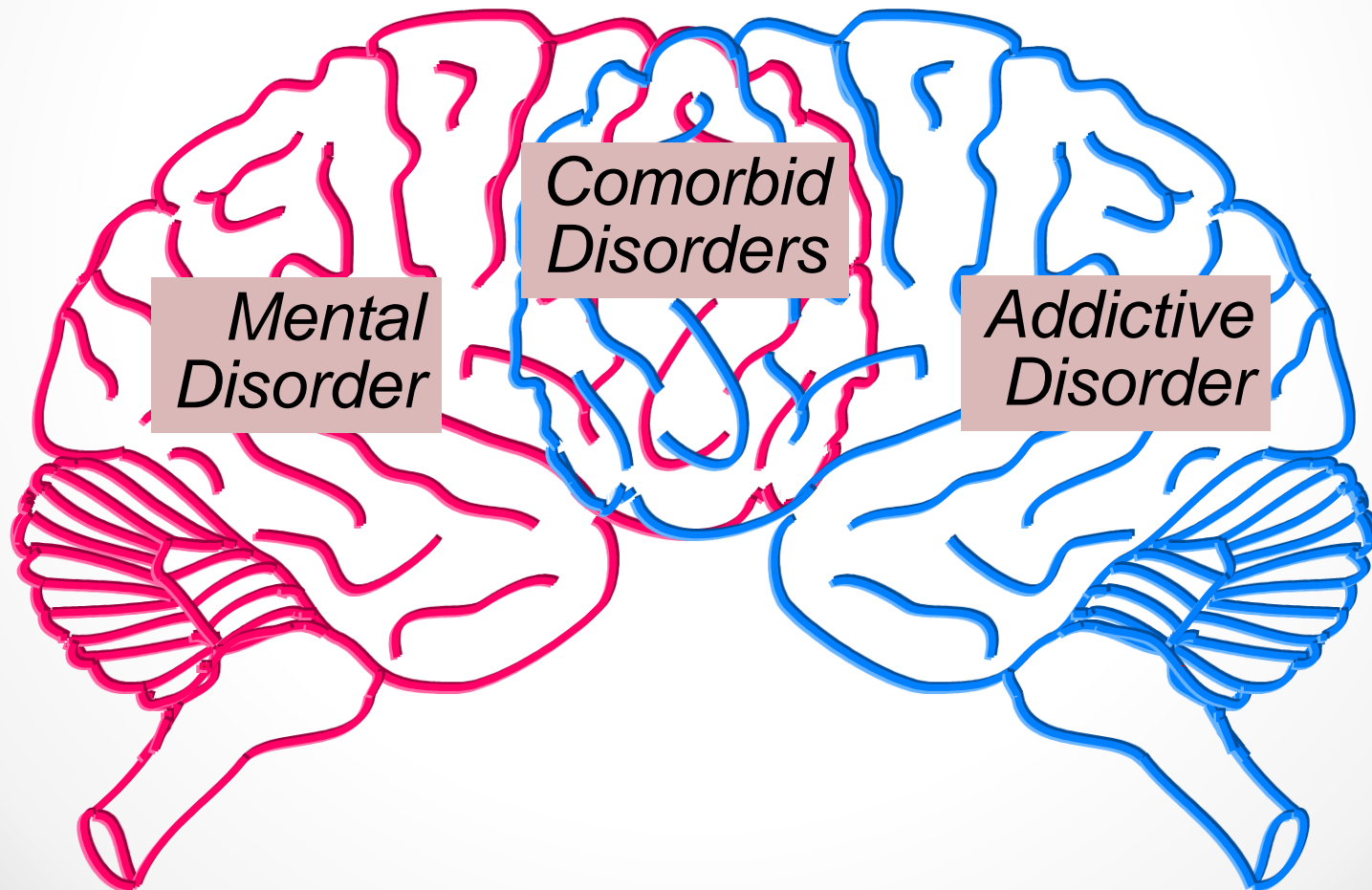
gets re-wired by drug use



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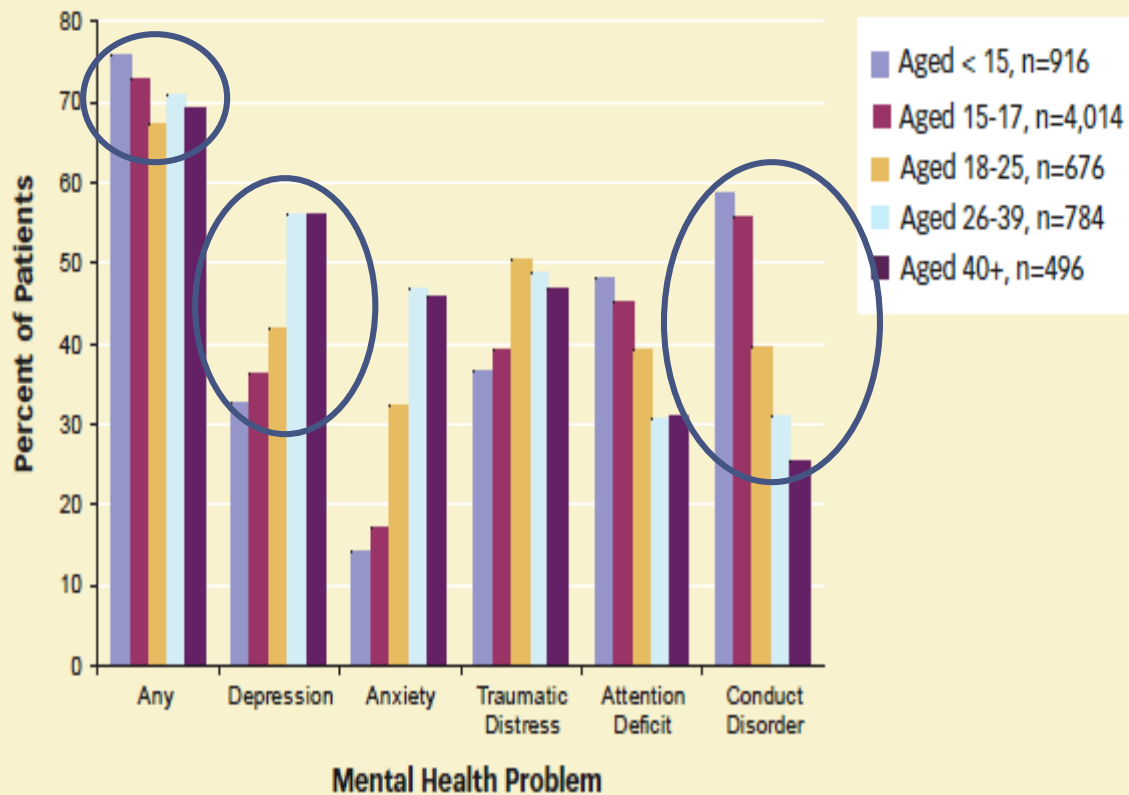
Comorbidity Common

Mental and Addictive Disorders
Have a **Double** Brain Disease



WHAT THE NUMBERS SAY

Most People Entering Drug Treatment Have Additional Mental Health Problems



In 77 studies that included 4,930 adolescents and 1,956 adults, two-thirds of patients entering substance abuse treatment programs reported at least one co-occurring mental health problem during the previous year. Attention deficit and conduct disorders were most common in young patients, anxiety and depression in older patients.

Source: Chan, Y.F., Dennis, M.L., and Funk, R.L. Prevalence and comorbidity of major internalizing and externalizing problems among adolescents and adults presenting to substance abuse treatment. *Journal of Substance Abuse Treatment* 34(1):14-24, 2008.

Prevention problematic in Adolescents

- Drinking is very popular (peer pressure)
- Substance use seldom viewed as a negative
- Lack motivation to change

New 12-Step Program for Adolescents?

12-Steps of Self-Regulation

1. impulse control
2. “second thought” processes
3. social decision making
4. dealing with risk situations
5. taking healthy risks
6. attention regulation
7. anger control
8. modulating reward incentives
9. choosing options
10. considering consequences
11. minimizing arousal
12. dealing with peer influences

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Advantages of Motivational Interviewing

- *De-emphasize* labels
- *Emphasis* on personal choice and responsibility
- Therapist focuses on *eliciting the client's own concerns*
- Resistance is met with *reflection and non-argumentation*
- Treatment goals are *negotiated*; client's *involvement* is seen as vital



Parent Take Home Summary

P = Promote activities *that capitalize on* the strengths of the developing brain.

A = Assist children with challenges that require planning..

R = Reinforce *their seeking* advice from adults; *teach decision making*..

E = *Encourage* lifestyle *that promotes* good brain development; *taking responsibilities*.

N = *Never underestimate the impact of a parent being a good role model*.

T = Tolerate *the “oops” behaviors due to an immature brain*.



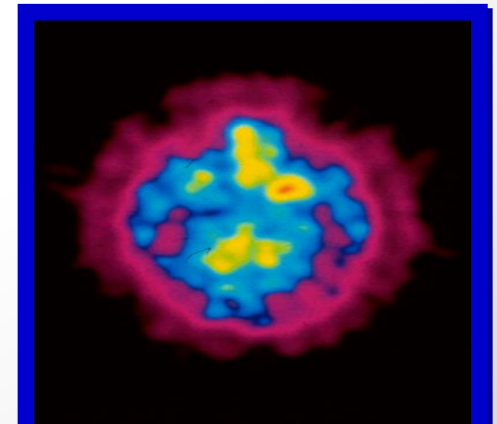
Consequence: There is no
“cure” ...



To be successful, treatment
includes behavior and sometimes
medication



Research is helping to improve
our strategies and successes





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