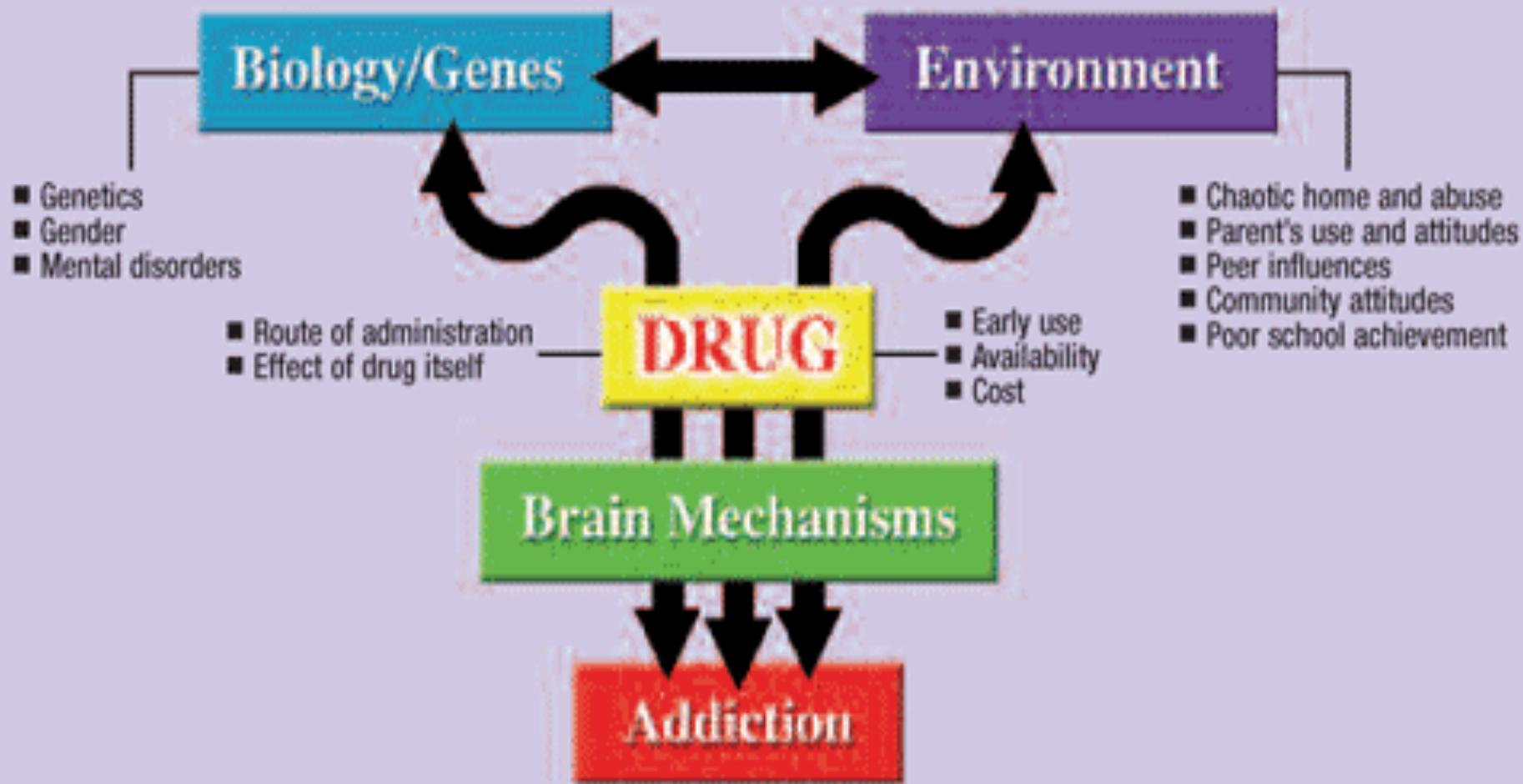


# Marijuana

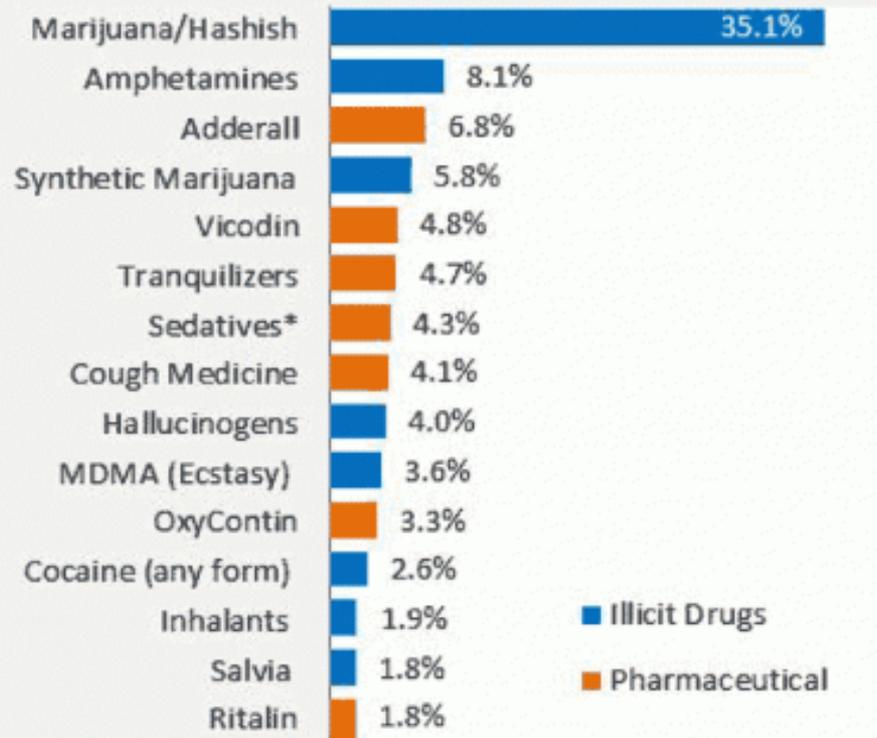


# RISK FACTORS



# Past year Use 2014

## Past-Year Use of Various Drugs by 12th Graders (Percent)



SOURCE: University of Michigan, 2014 Monitoring the Future Study

- ⌘ 2.8% of Population Dependent on Drugs
- ⌘ 7.2% of Population Dependent on Alcohol
- ⌘ **Overlap: The bulk of substance dependent persons are also diagnosable as having APD. While about half of alcoholics who enter treatment also have APD, less than half of all alcoholics have APD. Almost all APDs who enter institutions or programs show some form of chemical abuse.**

## Substance Abuse and APD

Kessler, et. Al. Archives of General Psychiatry. 1994  
Rates of Alcoholism and Substance Dependence  
Over Previous 12 Months

- ⌘ A study published in The Journal of Clinical Psychiatry April 2016 found that marijuana was more addictive than alcohol but less so than tobacco.
- ⌘ Among weekly users, the study found a 25 percent risk of dependence for marijuana compared with 16 percent for alcohol and 67 percent for tobacco.

# Marijuana

- ⌘ Children under 21 25% of Alcohol 27 billion 5 million or 31% binge 1 x month
- ⌘ Drinking 80%
- ⌘ Smoking 70%
- ⌘ Marijuana 47%
- ⌘ Other Drugs 29%
- ⌘ Huffing 2 million age 12- 17 tried

## Frequency of use by High School Seniors – CSAT 2002

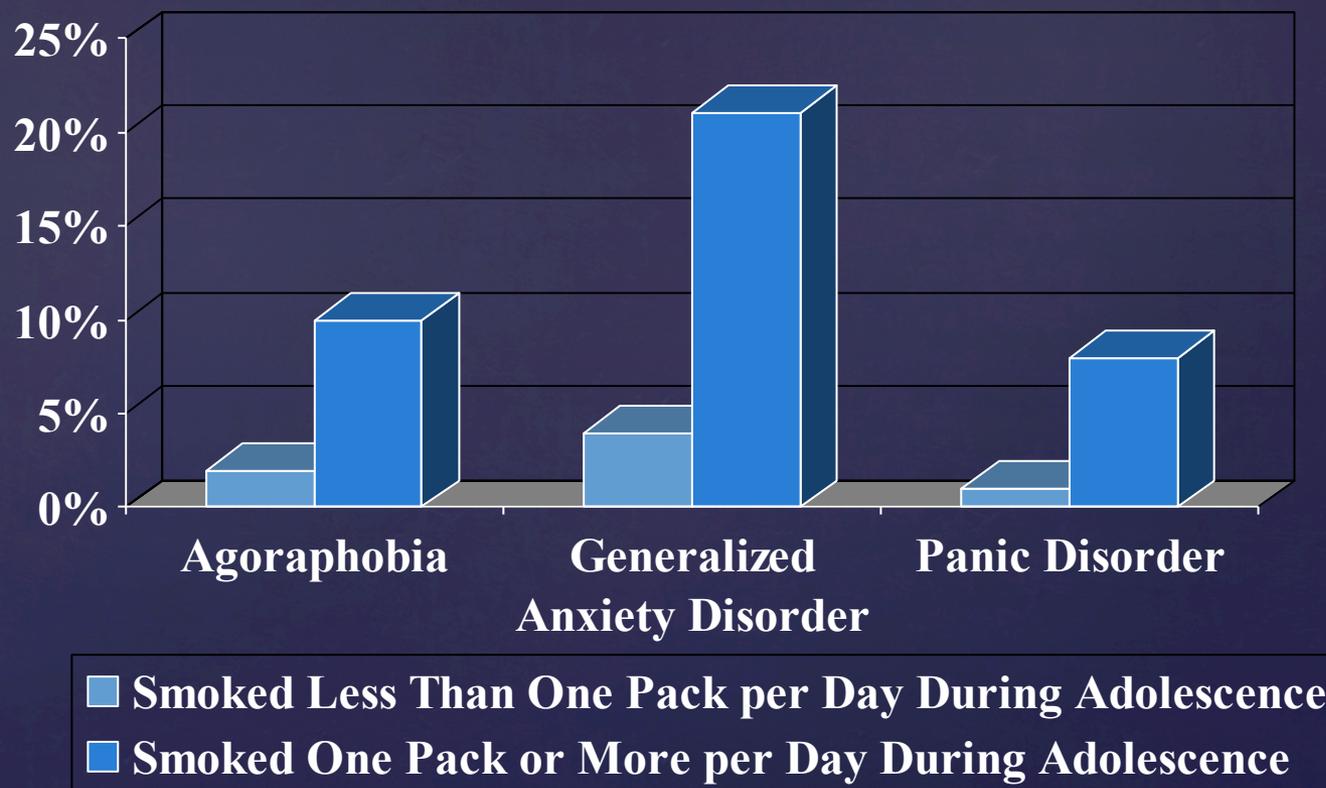
↳ 1965	44%
↳ 1990	25.5%
↳ 1997	24.7%
↳ 1998	24.1%
↳ 2011	19%

↳ Center for Disease Control & Prevention  
↳ December 2012

# Number of Adult Smokers in U.S.

- ‡ **IN 1999 35% OF US HIGH SCHOOL STUDENTS SMOKED**
- ‡ **27% OF GIRLS & 28% BOYS IN 1991.**
- ‡ **20% OF ADOLESCENCE.**
- ‡ **SMOKERS 4 TIMES MORE LIKELY TO DEVELOP DEPRESSION WITHIN A YEAR. BOTH MAY HAVE COMMON PATHWAY.**
- ‡ **October 2000  
Journal of Pediatrics**

# Percentage of Young Adults With Anxiety Disorders, by Amount of Cigarettes Smoked During Adolescence



Source: Adapted by CESAR from Johnson J.G., Cohen P., Pine D.S., Klein D.F., Kasen S., Brook J.S., "Association Between Cigarette Smoking and Anxiety Disorders During Adolescence and Early Adulthood," *Journal of the American Medical Association* 284(18):2348-2351, 2000.

- An epidemiological analysis suggested that most people who initiate cocaine use do so as current cigarette smokers, and therefore incur this increased risk.

- National Epidemiological Study of Alcohol Related Consequences (NESARC), shows that the prevalence of cocaine dependence was 20 percent among respondents who were current smokers when they initiated cocaine use, and 6 percent among respondents who had never smoked or had stopped smoking before they first took cocaine.

(NIDA 2013)

## **Nicotine Increases Risk of Cocaine Dependence in People**

# Addiction

**A state in which an organism engages in a compulsive behavior**

- **behavior is reinforcing (rewarding or pleasurable)**
- **loss of control in limiting intake**

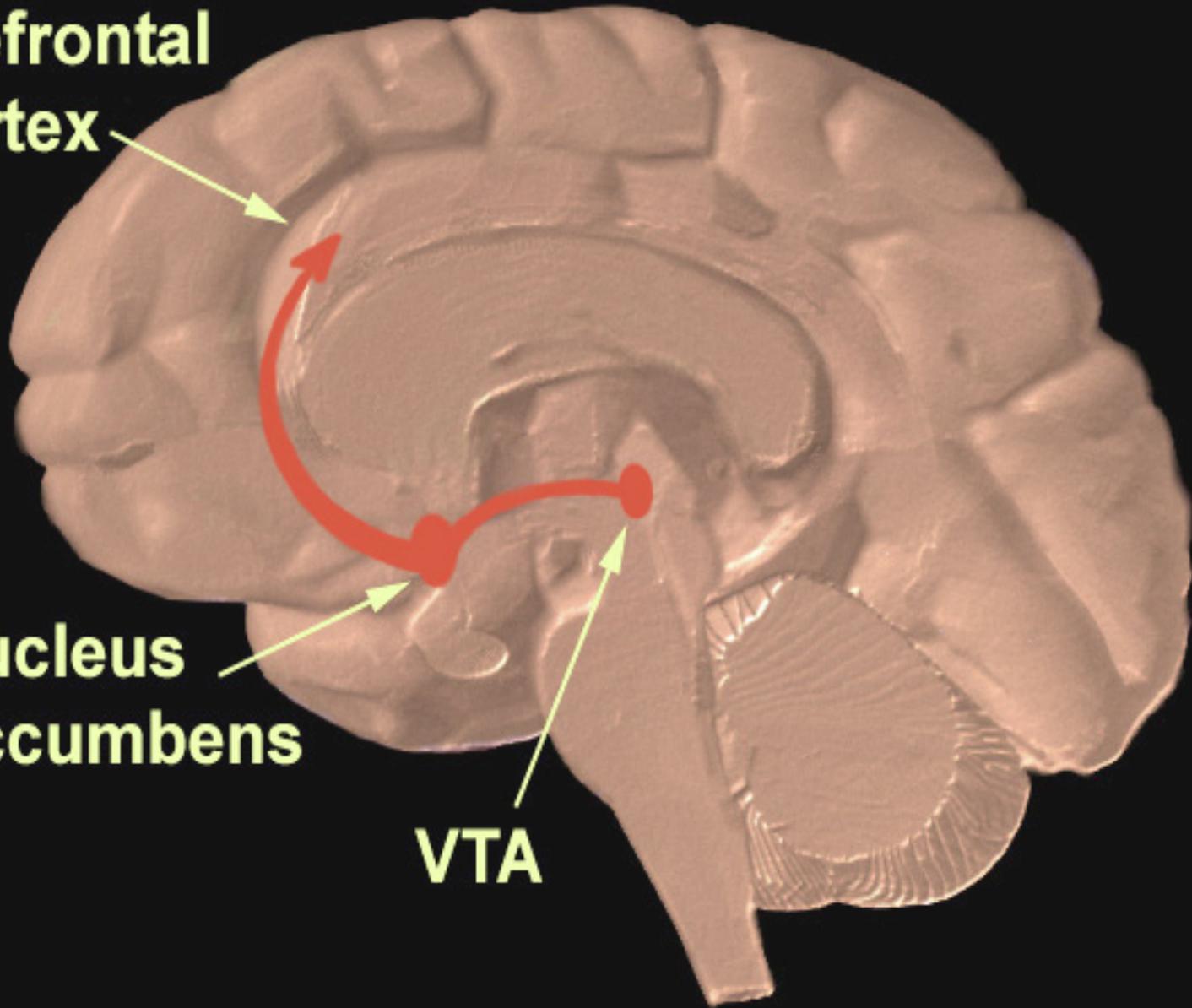
# Natural Rewards

Food  
Water  
Sex  
Nurturing

**prefrontal  
cortex**

**nucleus  
accumbens**

**VTA**

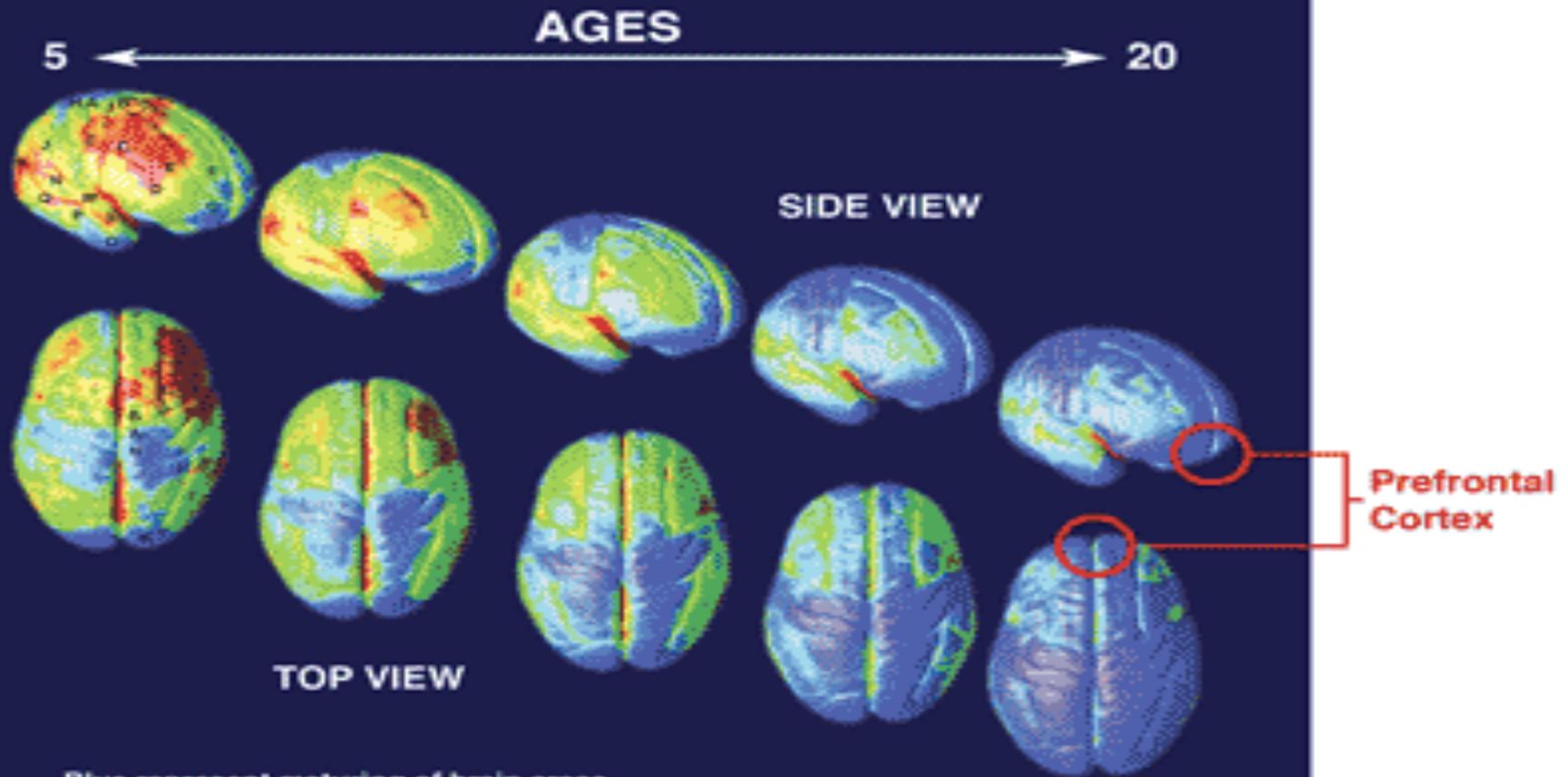


# Addiction: a developmental disease - typically beginning in childhood or adolescence.

- ⌘ One of the brain areas still maturing during adolescence is the prefrontal cortex - the part of the brain that enables us to assess situations, make sound decisions, and keep our emotions and desires under control.
- ⌘ The fact that this critical part of an adolescent's brain is still a work-in-progress puts them at increased risk for poor decisions (such as trying drugs or continued abuse.)

# Brain Development

IMAGES OF BRAIN DEVELOPMENT IN HEALTHY CHILDREN AND TEENS (AGES 5-20)



Blue represent maturing of brain areas

# “The Feel-Good Gene”

The New York Times March 2015

- ⌘ Neuroscientists have recently found that a genetic variation on the brain makes some people inherently less anxious, and more able to forget fearful & unpleasant experiences.
- ⌘ This genetic mutation produces higher levels of anandamide-the bliss molecule (our own natural marijuana)
- ⌘ Those with this genetic mutation (about 20% of adult population) are less likely to become addicted to marijuana and other drugs

- ⌘ The market for both recreational and medicinal marijuana is projected to grow to \$22 billion in four years from \$7 billion this year if California says yes according to projections by the ArcView Group, a company that links investors with cannabis companies.
- ⌘ The five states that will vote on the ballot for recreational use are: CA, NV, AZ, ME, and MA.
- ⌘ In addition there are already 25 states that permit medical marijuana.

# Marijuana

⌘ More college students are getting high on marijuana, and those who do smoke are getting stoned more frequently, according to the national Monitoring the Future study.

⌘ The number of students who say they have used marijuana in the past 12 months jumped from 30 percent in 2006 to 38 percent in 2015, while other drug use is on the decline, say researchers who have been tracking college students since 1980.

# Marijuana on College Campuses

- ⌘ College students in the United States are using more marijuana than in previous years, according to a new study. Last year 38 percent of college students said they used marijuana in the past year, up from 30 percent in 2006.
- ⌘ Use of other drugs, including opioids and amphetamines, declined among college students, Health Day reports. The findings come from the Monitoring the Future study, conducted by the University of Michigan Institute for Social Research.

# Increase in Marijuana Use

⌘ More students may be using marijuana because of a decrease in perceived risk, the researchers say. “This increase in use and decrease in perceived risk of harm regarding marijuana use should be taken seriously by college administrators, parents and students themselves,” study co-lead researcher John Schulenberg said in a news release.

Source: <http://www.drugfree.org/news-service/increase-marijuana-use-seen-college-students-use-opioids-declines/>

# Increase in Marijuana Use

- ⌘ The most startling trend is the number who smoke daily: One in every 22 college students surveyed said they smoke at least 20 times in a month.
- ⌘ And two-thirds say they believe a little weed every now and then is safe.
- ⌘ "Something has changed dramatically," said principal investigator Lloyd Johnston, a distinguished senior research scientist at University of Michigan. "We've been asking the same question for years, and their answers are changing."

# Marijuana on College Campuses

# “Facts About Marijuana”

By Marlowe, D.B., 2010

- ⌘ One out of 10 who use will become dependent on the drug
  - Individuals who have used 5 times have a 20 to 30% chance
  - Those who have used it regularly have a 40% chance
- ⌘ Marijuana also effects memory, learning, and motor functions.
  - These impairments may last up to 30 days and therefore people may make poor judgments, or have motor impairment long after the high is gone. Therefore could effect a wide range of tasks.
- ⌘ Very few offenders incarcerated due to marijuana
  - Marijuana offense only 1.6% state
  - Marijuana possession only - .7% state .8% federal

# Recent Findings

⌘ Marijuana is the most commonly abused illegal drug among adults and youths in the United States .

SAMHSA (2012) Results from the 2011 National Survey on Drug Use and Health: Summary of National Findings; SAMHSA, Center for Behavioral Health Statistics and Quality (2010)

⌘ Two recent meta-analyses have concluded that marijuana use during adolescence or young adulthood significantly predicts later involvement in criminal activity and criminal arrests

Bennet et al.,2008; Pedersen & Skardhamar, 2010.

# Recent Findings cont'd.

⌘ The psychoactive ingredient in marijuana-THC-has increased almost six-fold in average potency during the past 30 years

Mehmedic, Z., Pharm, M., Suman, C., Slade, D., Denham, H. Foster, S., et al.(2010) *Journal of Forensic Sciences*

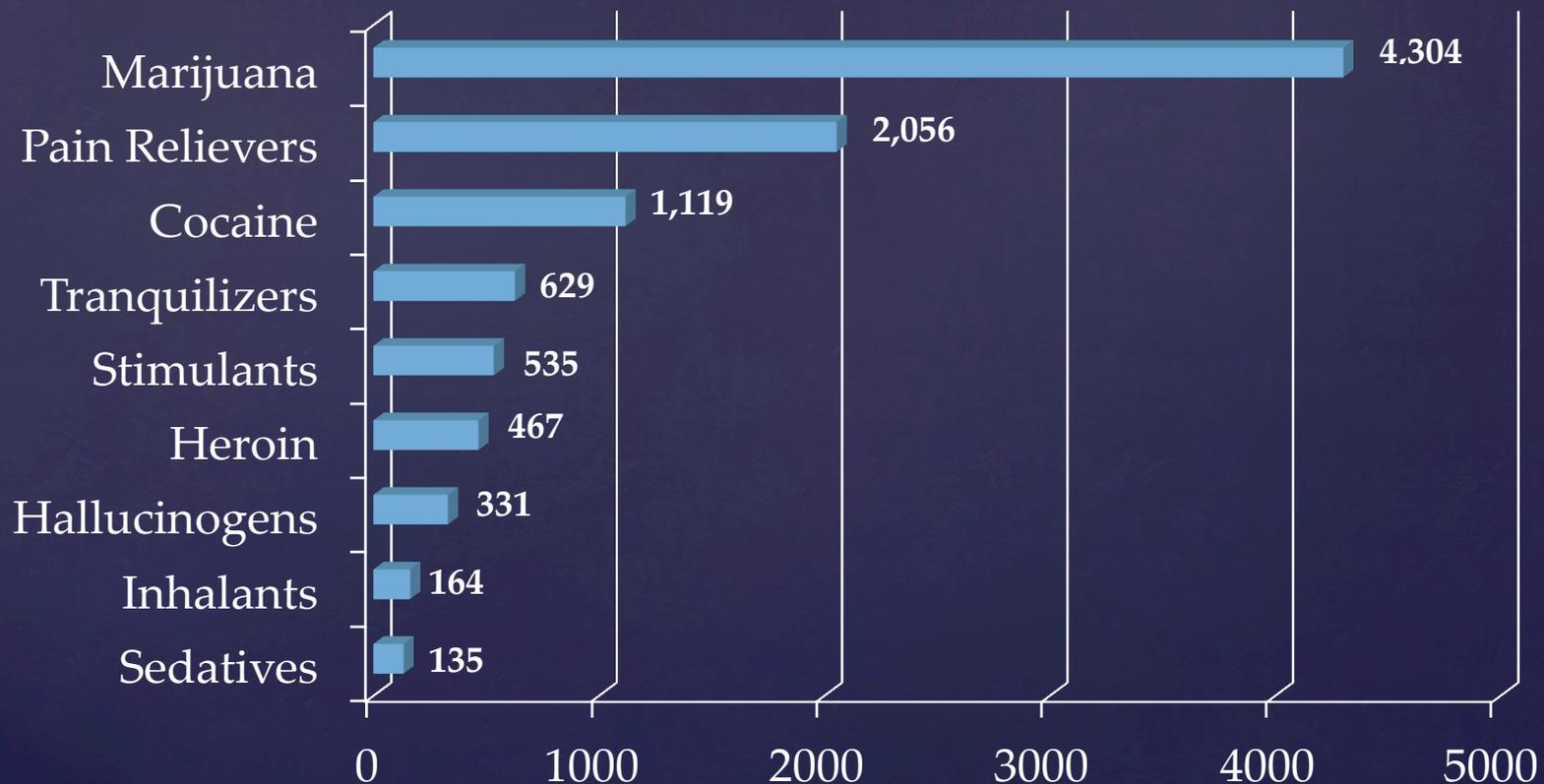
⌘ Marijuana use during adolescence is directly linked to the onset of major mental illness, including psychosis, schizophrenia, depression and anxiety.

Room, R. Fischer, B., Hall, W., Lenton, S. & Reuter, P. (2010) *Cannabis Policy: Moving Beyond Stalemate.*

## Specific Illicit Drug Dependence or Abuse in the Past Year among Persons Aged 12 or Older: 2012

- ⌘ Marijuana was the illicit drug with the largest number of persons with past year dependence or abuse in 2012, followed by pain relievers, then by cocaine.
- ⌘ Of the 7.3 million persons aged 12 or older classified with illicit drug dependence or abuse in 2012, 4.3 million persons had marijuana dependence or abuse
- ⌘ 2.1 million persons had pain reliever dependence or abuse, and 1.1 million persons had cocaine dependence or abuse

## Specific Illicit Drug Dependence or Abuse in the Past Year among Persons Aged 12 or Older: 2012

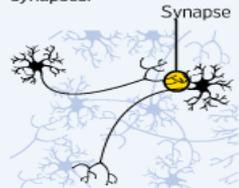


# How Marijuana Affects the Brain

THC, a key ingredient in marijuana, attaches to cannabinoid receptors throughout the body. Several areas of the brain have high densities of these receptors, which helps explain the different effects of the drug.

## How the receptors work

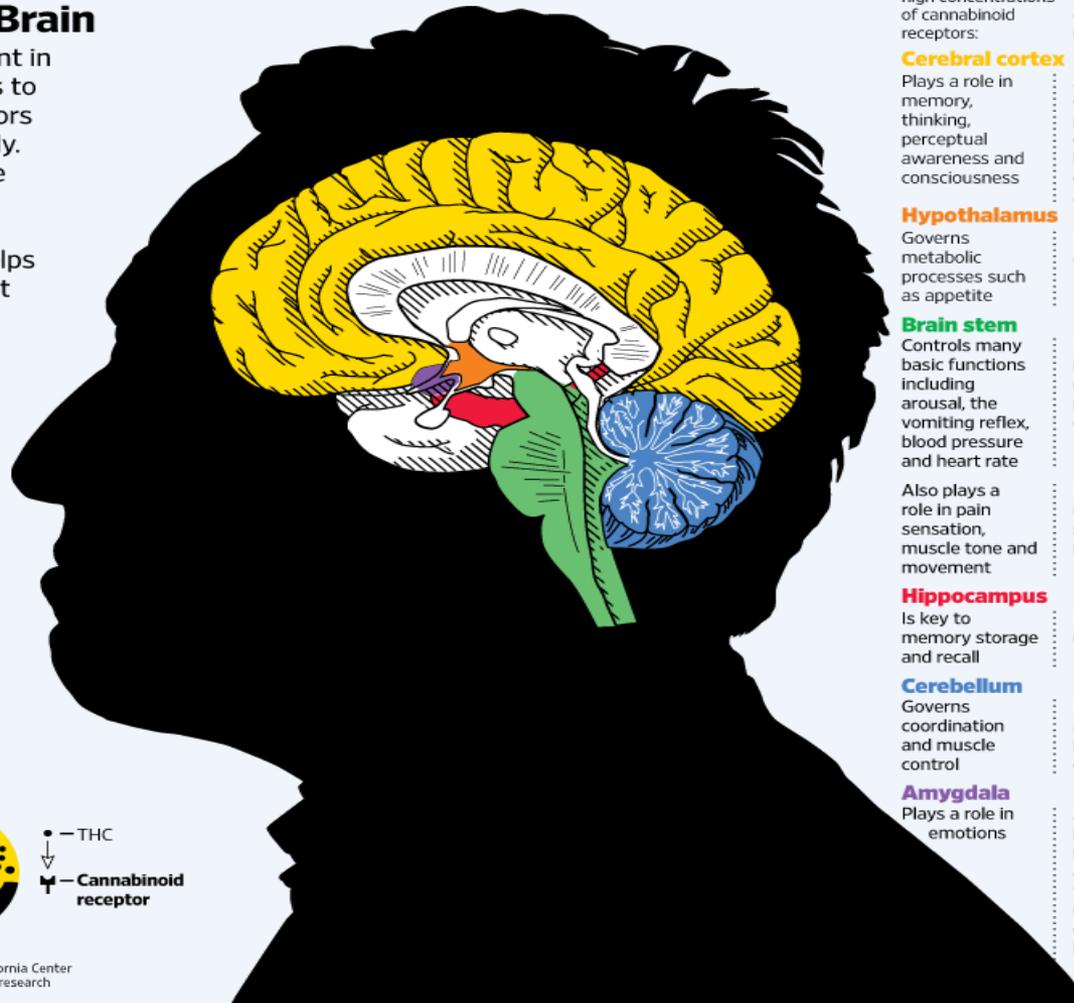
Nerve cells communicate by passing chemical messages across contact points called synapses.



The most active ingredient in marijuana, THC, attaches to cannabinoid receptors and modifies nerve action.



Sources: Igor Grant, University of California Center for Medicinal Cannabis Research; WSJ research



Some areas with high concentrations of cannabinoid receptors:

### Cerebral cortex

Plays a role in memory, thinking, perceptual awareness and consciousness

**Corresponding effects of marijuana:**

**Altered consciousness; perceptual distortions; memory impairment; occasional delusions and hallucinations**

### Hypothalamus

Governs metabolic processes such as appetite

**Increased appetite**

### Brain stem

Controls many basic functions including arousal, the vomiting reflex, blood pressure and heart rate

**Nausea relief; rapid heart rate; reduced blood pressure; drowsiness**

Also plays a role in pain sensation, muscle tone and movement

**Pain reduction; reduced spasticity; reduced tremor**

### Hippocampus

Is key to memory storage and recall

**Impairment in memory**

### Cerebellum

Governs coordination and muscle control

**Reduced spasticity; impaired coordination**

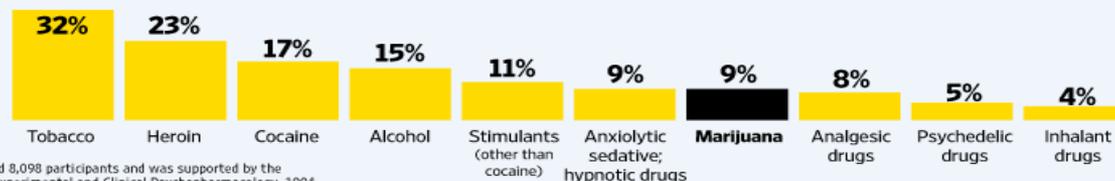
### Amygdala

Plays a role in emotions

**Anxiety and panic in some cases; reduced anxiety and blocking of traumatic memories in other cases; reduced hostility**

Maryanne Murray/WSJ

Estimated percentage of people in a national survey who used a substance at least once and became dependent



Source: The National Comorbidity Survey, which included 8,098 participants and was supported by the National Institute on Drug Abuse; results published in Experimental and Clinical Psychopharmacology, 1994

# Marijuana

## ⌘ Areas of the brain involved

- ⌘ Affects hippocampus leading to impairment of short-term memory
- ⌘ Affects cerebellum thus affecting movement
- ⌘ Affects hypothalamus thus affecting eating

# Short Term Effects (Low Doses of Marijuana)

- & Poor memory and ability to learn
- & Dangerous driving behavior
- & Difficulty on thinking and solving problems
- & Altered sense of time and space
- & Poor muscle coordination and judgment
- & Food cravings
- & Short attention span

Source: CA AOC 2014

# Short Effects

## Large Doses of Marijuana

& Hallucinations

& Delusions

& Poor memory

& Not knowing where one is

& Anxiety attacks or feelings of paranoia

& Depression

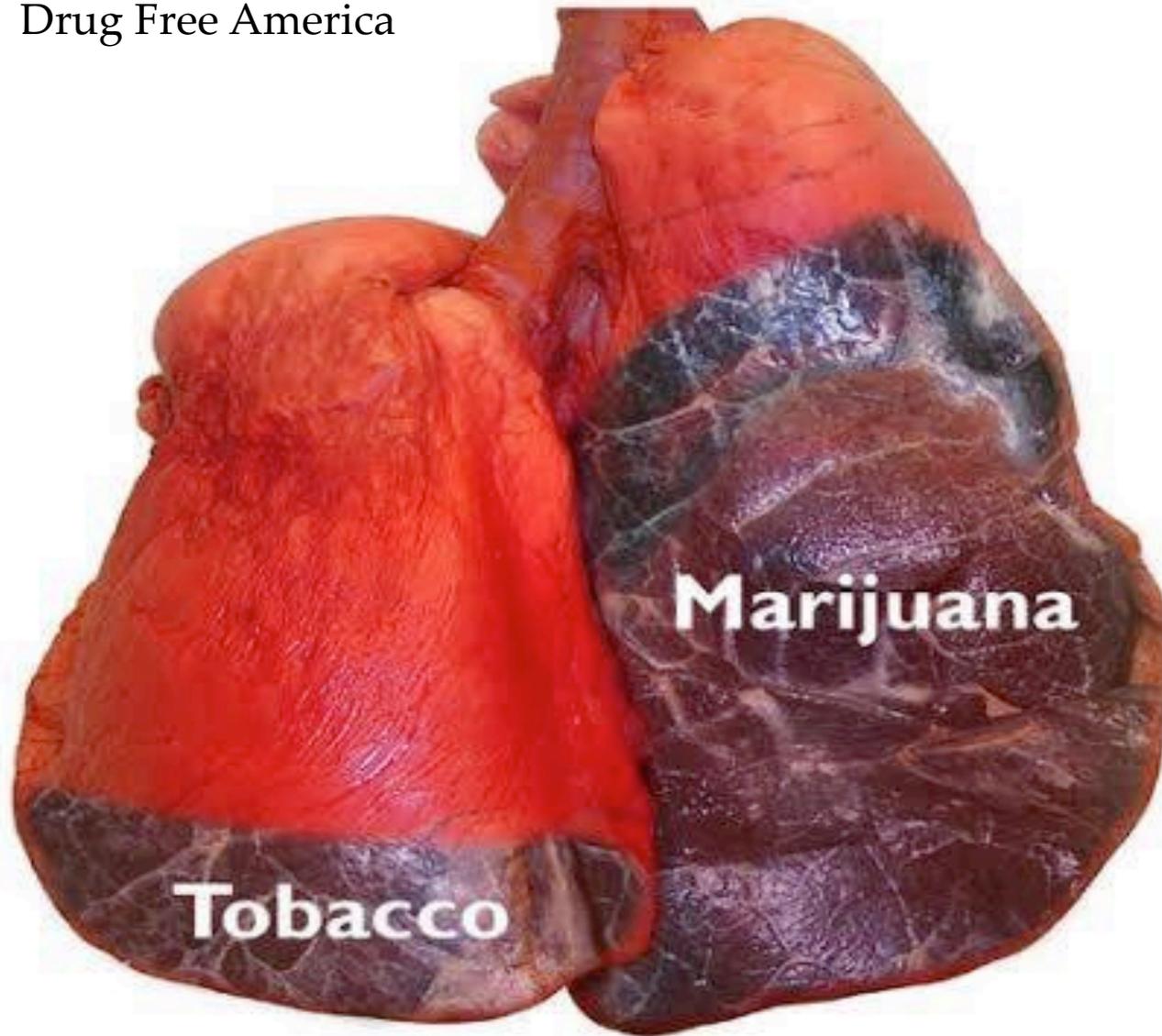
# Long Term Effects of Marijuana Use

- ⌘ Cancer. Marijuana contains the same cancer-causing chemicals found in tobacco smoke.
- ⌘ Breathing problems.
- ⌘ Immune System: The THC in marijuana can damage the cells and tissues in the body that help protect against disease.

# Long Term Effects Cont'd

- ⌘ Memory, learning, and energy are impaired.
- ⌘ Fertility: Reproductive hormones are decreased.
- ⌘ Men: less testosterone, causing decreased sperm counts and possible erectile dysfunction.
- ⌘ Women: irregular periods, decreased ability to conceive.
- ⌘ Birth defects in unborn children.

Drug Free America



**Marijuana deposits four times more tar in the lungs than tobacco**

# Effects of Marijuana While Driving

- ⌘ Smoking or eating marijuana slows down your responses to sights and sounds making you a dangerous driver.
- ⌘ Marijuana causes sleepiness, distorts sense of time & space, and lowers ability to handle a quick series of tasks while driving.
- ⌘ **BIGGEST ISSUE for MARIJUANA DRIVERS:**  
unexpected events ( a car coming from a side street, a child running into the street)

# How Does Marijuana Affect the Brain (Recent Findings)

- ⌘ A recent and widely discussed report led by researchers at Duke University published a study in 2012 reporting the IQs of New Zealanders followed since birth found that cannabis users who had started their habit in adolescence had lower IQs than non-users.
- ⌘ Derik Hermann, a clinical neuroscientist at the Central Institute of Mental Health in Germany who reviewed the research and results but was not involved states “you could see as a consequence of cannabis use, IQ goes down”.

# Persistence of Regular Cannabis Use

	N	% male	Age 7- 13 full scale IQ	Age 38- full scale IQ	$\Delta$ IQ Effect Size
Persistence of Regular Cannabis Use					
Never Used	242	38.84	99.84 (14.39)	100.64 (15.25)	0.05
Used, never regularly	508	50.59	102.27 (13.59)	101.24 (14.81)	-0.07
Used regularly at 1 wave	47	72.34	101.42 (14.41)	98.45 (14.89)	-0.20
Used regularly at 2 waves	36	63.89	95.28 (10.74)	93.26 (11.44)	-0.13
Used regularly at 3 + waves	41	78.05	96.00 (16.06)	90.77 (13.88)	-0.35

# Casual Marijuana Use Effects on the Brain

Ref: Journal of Neuroscience April 2014

- ⌘ In the current study a MRI was used to compare the brains of 18 to 25 year olds who reported smoking marijuana at least once per week with those little to no history of marijuana use.
- ⌘ Although psychiatric evaluations ruled out the possibility that the marijuana users were dependent on the drug, imaging data showed significant brain differences.

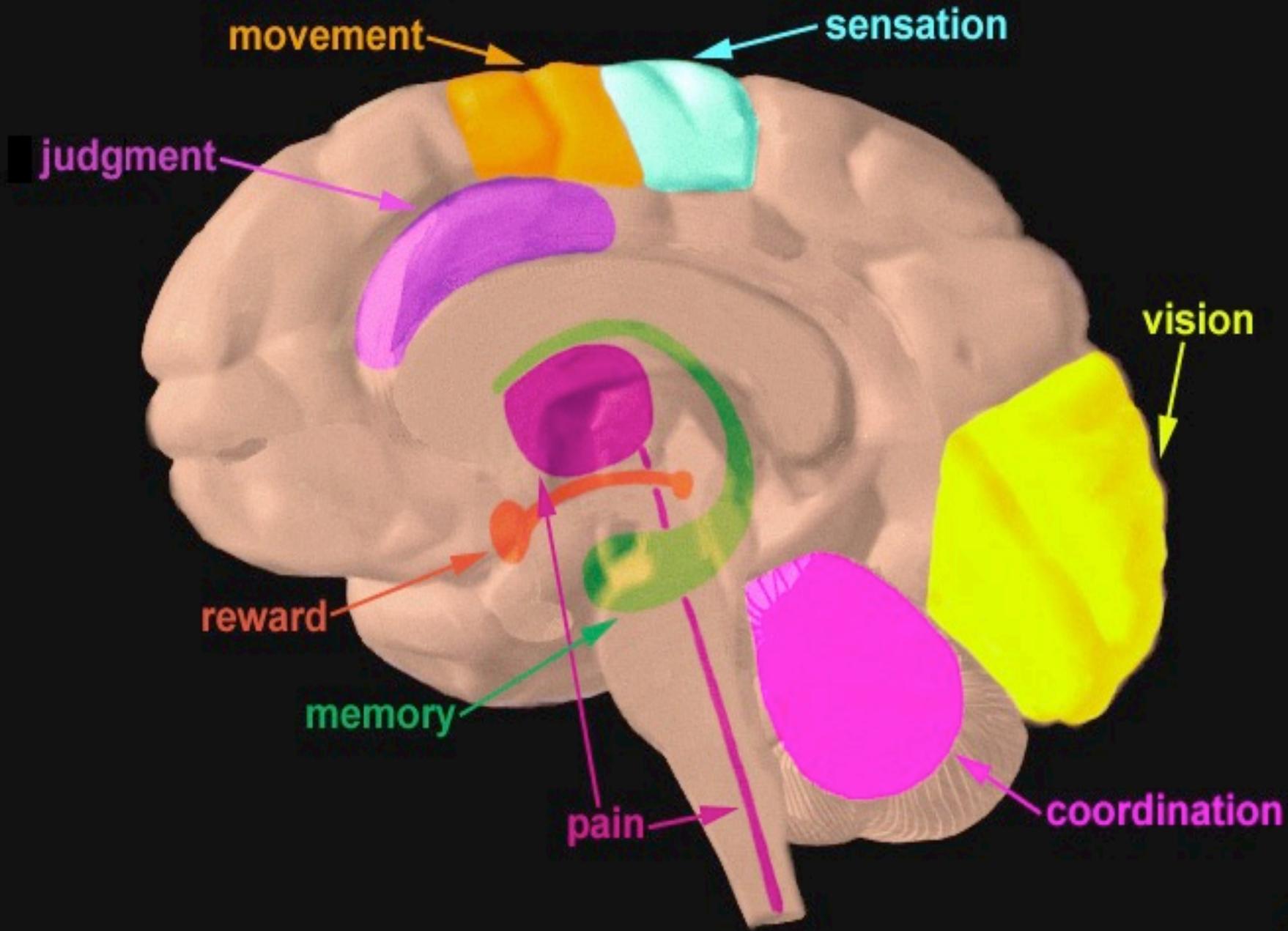
# Casual Marijuana Use Effects Cont'd

- ⌘ Results found: the more the marijuana users reported consuming, the greater the abnormalities in the nucleus accumbens and amygdala. The shape and density of both of these regions also differed between marijuana users and non-users.
- ⌘ The nucleus accumbens- the reward center of the brain- was larger and altered in its shape and structure in the marijuana users compared to non-users.

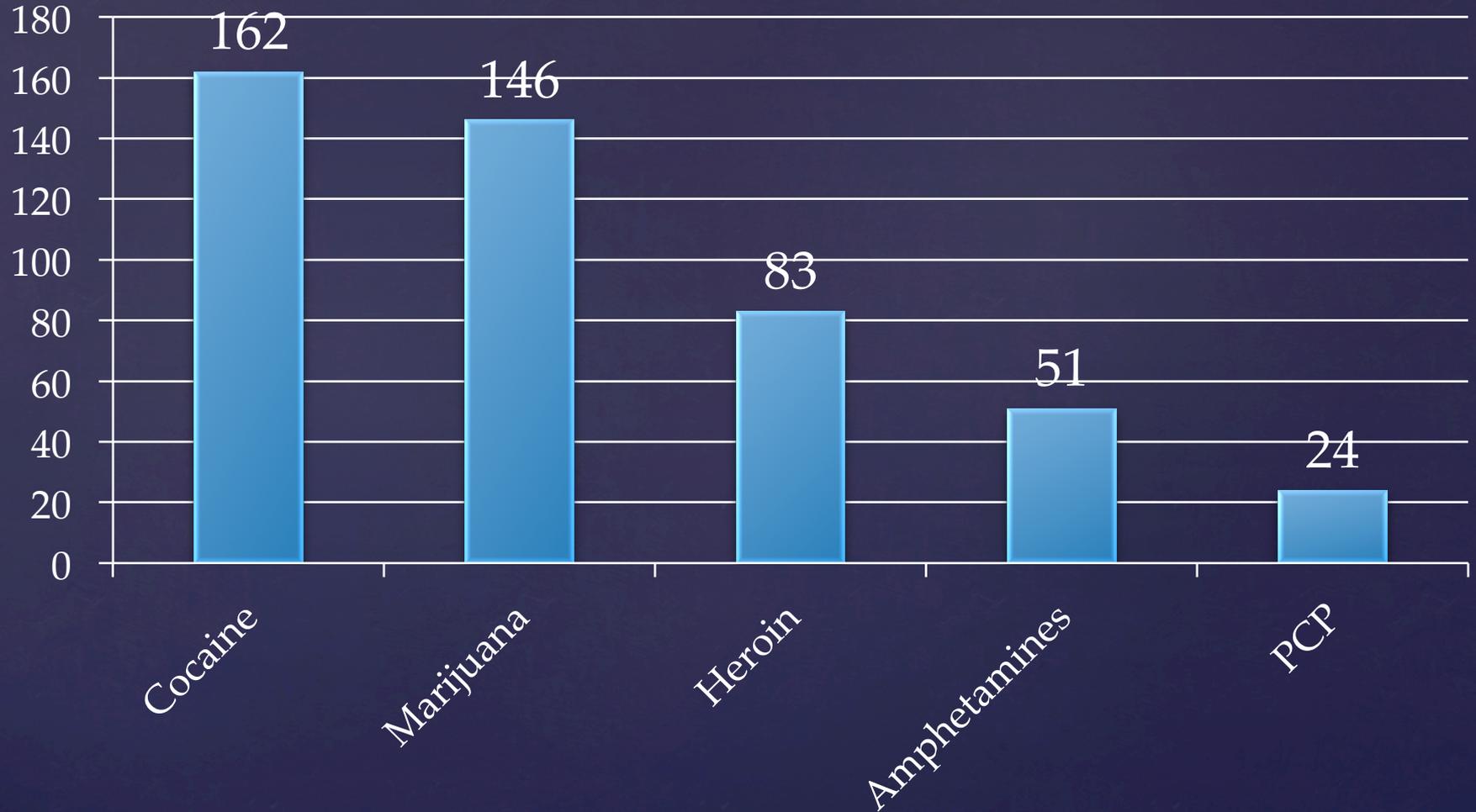
(Ref: Journal of Neuroscience April 2014)

# Evidence Grows that Heavy Marijuana Use May Harm Brain

- ⌘ NIDA-funded research shows heavy marijuana use ( at least four times per week over past six months) is linked to adverse changes in function and structure of brain areas associated with reward, decision making, and motivation.
- ⌘ Heavy marijuana use can also enhance some brain circuits- possibly to compensate for reduced function in specific brain regions. (This was more pronounced in those who started using at a young age-indicating developing brains are more vulnerable to marijuana's effects.)



## Rate of ED Visits per 100,000 population



DAWN Report 2011

# Marijuana Edibles Facts

- ⌘ Edibles give users a different kind of high than the one from smoking marijuana, largely because the pot is absorbed through the stomach instead of the lungs.
- ⌘ The effects are slower to arrive, generally last longer and can be more intense because people unwittingly eat more than they intend to.

# Marijuana Edible Facts

## Cont'd

- ⌘ People who smoke pot get high quickly, allowing them to better regulate how stoned they're getting.



Source: USA Today May 2014

# Marijuana Edibles Costs to Society

- ⌘ In March 2014 a college student from Wyoming jumped to his death from a Denver hotel balcony after eating a marijuana cookie.
- ⌘ Witnesses stated the man was rambling incoherently after eating a large serving of the doped cookie. Coroner ruled "marijuana intoxication" as a major factor in his death

# The Cost of Marijuana Edibles to Society

- In April 2014 a Denver, Colorado man is accused of killing his wife after eating now-legal pot candy, according to Denver authorities.
- The victim called 911 to report her husband was hallucinating & rambling since he had eaten then marijuana candy and taken his prescription medication



# 1 in 8 DUI Citations involved Marijuana (CO. State Patrol Data)

- ⌘ In 2014 marijuana was one of the indicators in 674 citations issued for DUI, 12% of DUI citations, marijuana was the only indicator in 354 citations.
- ⌘ Colorado DOT did a study and reported 43% of marijuana consumers said it was ok to drive high, and after a hefty informational campaign found that 1 in 5 recreational pot users still didn't know driving while high was illegal.

# Recent Marijuana Regulations

- ⌘ Regulations that took place the first part of May 2014 edible marijuana products cannot contain more than 100 mg of THC
- ⌘ However, there is no standard on the size of the product (meaning one candy bar can contain 100 mg of THC or one bag of cookies).
- ⌘ These regulations apply only to recreation use marijuana.

Source: USA Today May 2014

# Recent Marijuana Regulations

- ⌘ Under these regulations edible products will be tested for strength and how well the marijuana is dispersed in brownies/candy.
- ⌘ As of June 1 smokable marijuana will be strength-tested and the results made public.

# Marijuana

## ↳ Signs of Abuse

- ∅ dry mouth
- ∅ bloodshot eyes
- ∅ altered time
- ∅ impaired recall
- ∅ slowed motor skills
- ∅ depersonalization
- ∅ distorted perception
- ∅ munchies

## ↳ Signs of Withdrawal

- ∅ anger
- ∅ insomnia
- ∅ hyperactivity
- ∅ decreased appetite
- ∅ Paranoia
- ∅ Memory problems
- ∅ Low productivity

# Marijuana

## Treatment Issues

- ∅ physical issues
- ∅ emotional issues
- ∅ a-motivational
- ∅ arrested  
development
- ∅ memory loss
- ∅ detection

## Court Issues

- ∅ legalization
- ∅ medical issues
- ∅ depersonalize orders
- ∅ long detection  
period
- ∅ balance stimulants
- ∅ team attitudes

# Pharmacotherapy: Treating Marijuana Withdrawal Symptoms

- ⌘ Orally administered THC reduced craving and ratings of anxiety, feelings of misery, difficulty sleeping, and chills. (Haney et al., 2004)
- ⌘ A moderate oral dosage of THC (10 mg, three times daily) suppressed many marijuana withdrawal symptoms.(Budney et al., 2007)
- ⌘ A higher oral dosage of THC (30 mg, three times daily) almost completely abolished withdrawal symptoms.(Budney et al., 2007)

# Cannabis, Cognition, and Psychosis

(D. Cowley Journal Watch Psychiatry *December 28, 2007*)

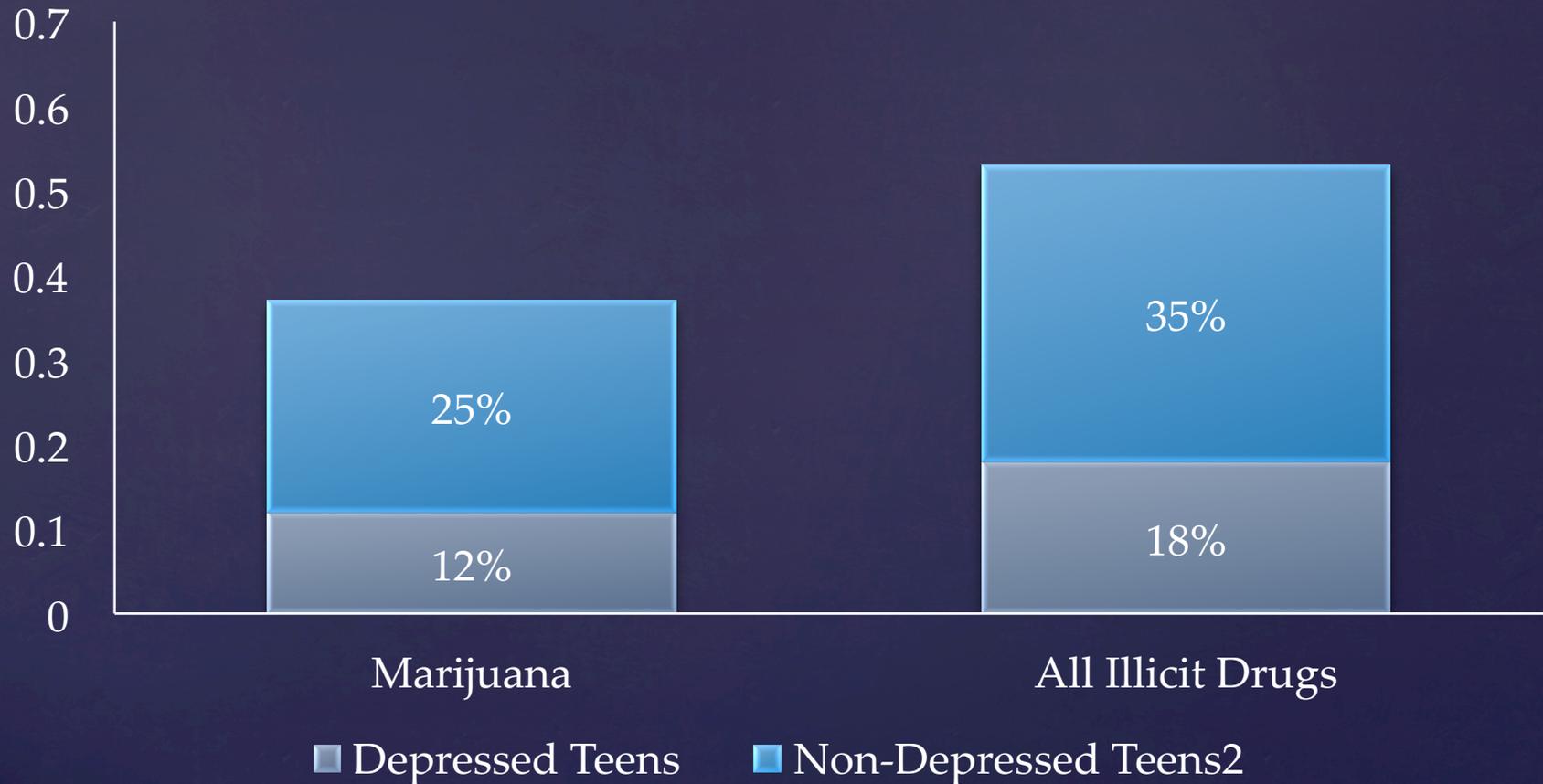
- ⌘ Whether cannabis use could be linked to psychosis was another research focus. In a systematic review of 11 longitudinal, population-based studies that controlled for multiple variables, researchers found a 40% increased risk for psychotic symptoms in cannabis users
- ⌘ the body of evidence suggests that cannabis use carries with it increased risks for psychosis onset, worsening of existing psychotic conditions, and cognitive impairment, which may add to existing cognitive problems and disability in psychotic patients.

# Teen Marijuana Use Worsens Depression

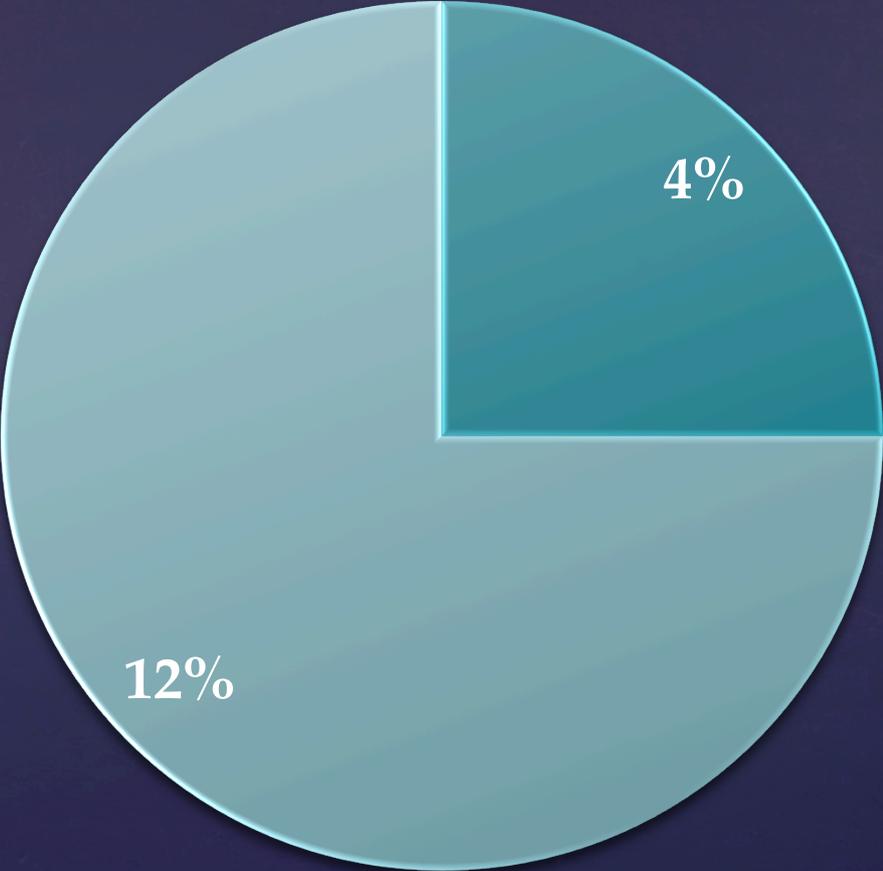
- ⌘ Two million teens report feelings of depression and loss of interest in daily activities during the past year.
- ⌘ Depressed teens are twice as likely as their peers to abuse or become dependent on marijuana.
- ⌘ Teens who smoke marijuana as least once a month are **3x more likely** to have suicidal thoughts than non-users.
- ⌘ The percentage of depressed adults and percentage of depressed teens is equal, but depressed teens are more likely to use marijuana and other drugs.

# Marijuana & Illicit Drug Use among Depressed versus Non-Depressed Teens

National Survey on Drug Use and Health, SAMHSA, 2007



# Girls Surpass Boys in Reported Depression (Past Year)



- Boys
- Girls

# Link Between Marijuana Use, Depression, and Other Mental Health Problems

- ⌘ Teens who smoke marijuana when feeling depressed are also more likely to become addicted to marijuana or other illicit drugs.
- ⌘ 8% of depressed teens abused or became dependent on marijuana during the year they experienced depression, compared with only 3% of non-depressed teens.
- ⌘ Overall, more teens are in treatment for marijuana dependence than for any other illicit drug.

Source: 2005 Treatment Episode Data Set (TEDS), SAMHSA, 2008

# Smoking Cannabis Can Lead to Manic Behavior

- ⌘ Scientists have found a significant link between marijuana use and mania (ranging from hyperactivity and difficulty sleeping to aggression, becoming delusional, and hearing voices).
- ⌘ Lead researcher Dr. Marwaha of Warwick University examined the effect of marijuana on people who had experienced mania, and set out to find 1) Does cannabis use lead to increased occurrence of mania symptoms or manic episodes in individuals with pre-existing bipolar disorder and (2) does cannabis use increase the risk of onset of mania symptoms in those without pre-existing bipolar disorder.

(By M. Davies February 2015, [dailymail.co.uk](http://dailymail.co.uk))

# Smoking Cannabis Can lead to Manic Behavior Cont'd

- ⌘ This study was published in the *Journal of Affective Disorders*, and found cannabis use tended to precede or coincide with episodes of mania
- ⌘ Found there was a strong association with new symptoms of mania-suggesting these are caused by marijuana use.
- ⌘ Found marijuana significantly worsened mania symptoms in people who had previously been diagnosed with bipolar disorder.
- ⌘ The findings add to previous studies that have linked marijuana to increased rates of mental health problems including depression, anxiety, schizophrenia and psychosis.

# Marijuana: THC Level and Impact of Impairment

{ Dr. Ken Robinson

# Potency, Purity, and Dose

- ⌘ Potency is dependent on THC concentration
- ⌘ Usually expressed as a % THC per dry weight of material
- ⌘ Average THC% in marijuana is 1-5%, hashish 5-15%, hashish oil 20%
- ⌘ One hit or a single intake is approximately  $1/20^{\text{th}}$  of a gram

# Pharmacokinetics

- ⌘ Concentrations vary depending on potency of marijuana and the manner the drug smoked
- ⌘ Peak plasma concentration of 100-200ng/ml routinely encountered
- ⌘ Plasma THC concentrations generally fall below 5ng/ml less than 3 hours after smoking

# Interpretation of Blood Concentration and Impairment Levels

- ⌘ It is difficult to establish a relationship between a person's THC blood or plasma concentration and performance impairing effects.
- ⌘ THC concentrations typically peak during the act of smoking and decline rapidly.
- ⌘ Significant THC concentrations (7 to 18 ng/ml) are noted following a single puff or hit of marijuana.

# THC Levels & Impairment Cont'd

- ⌘ Peak plasma THC concentrations ranged from 46-188 ng/mL after smoking 8.8 mg THC over 10 minutes.
- ⌘ Chronic users can have mean plasma levels of 45ng/mL 12 hours after use
- ⌘ It is inadvisable to try and predict effects based on blood THC concentrations alone and currently impossible to predict specific effects based on THC concentrations.
- ⌘ It is possible for a person to be affected by marijuana use with concentrations of THC in their blood below the limit of detection of the method.

# Duration of Effects

- ⌘ Effects are felt within minutes and reach their peak in 10-30 minutes.
- ⌘ Typical marijuana smokers experience a high that lasts approximately 2 hours
- ⌘ Most behavioral and physiological effects return to baseline levels within 3-5 hours after drug use
- ⌘ Some residual effects in specific behaviors can be seen up to 24 hours. Psychomotor impairment can persist after the high has dissipated.

⌘ Animal studies have shown sex differences in cannabis-induced analgesia, but these studies had not previously been done in humans. A new study explored this issue by assessing the analgesic and subjective effects of cannabis in 42 users, half of whom were male and the other half female.

# Cannabis-Induced Analgesia

⌘ Participants were given cannabis containing either 0 or up to 5.6 percent THC, the psychoactive ingredient in marijuana. Pain levels were then assessed in the cold-pressor test, where participants submerge their hands in cold water and researchers record the time it takes for participants to report pain and to remove the hand. Participants also answered questions designed to assess the subjective effects of cannabis.

# Cannabis-Induced Analgesia

⌘ Active cannabis increased pain tolerance in both men and women for a short time after smoking, and reduced pain sensitivity in men, but not women. In contrast, active cannabis increased ratings for both sexes in subjective measures of abuse liability (e.g., liking the drug), drug strength, and intoxication ("high"). This suggests that sex-dependent differences should be considered when considering cannabis as a potential therapeutic for pain.

⌘ Source: <https://www.drugabuse.gov/news-events/latest-science/women-less-sensitive-than-men-to-analgesic-not-rewarding-effects-cannabis>

# Cannabis-Induced Analgesia

⌘ A study published in 2015 by Forensic Science International found that THC stays in the blood of chronic users longer than previously thought. Researchers monitored 21 participants who admitted to consuming marijuana heavily over the previous three months. Each participant abstained from the drug over the course of the study. After 24 hours, nine of the participants still had active delta-9-THC levels above 5 nanograms per milliliter of blood, meaning they would have been over the legal limit in states with per se limits of 5 nanograms or less, as well as any state with a zero-tolerance policy. Two participants still tested at 5 nanograms more than five days into the study.

# Marijuana and Driving

- ⌘ Drivers in Washington are over the legal limit if they have 5 nanograms or more of delta-9-THC in their blood sample. But because marijuana breaks down rapidly in the human body, delta-9-THC quickly converts into the inactive metabolite carboxy-THC.
- ⌘ “The sooner the blood can be drawn the better,” said Brianna Peterson, the toxicology laboratory manager for the Washington State Patrol. “THC may no longer be detectable after three to six hours.”

# Marijuana and Driving

- ⌘ A report by the Colorado Department of Public Safety found both a 46 percent drop in the number of marijuana arrests in 2014, the first year commercial marijuana was available, and a rise in marijuana use among young people.
- ⌘ In overall rates of emergency room visits, from 739 per 100,000 in the three-year period before legalization to 956 per 100,000 in the first year and a half of legalization.

# Marijuana

[http://mobile.nytimes.com/2016/10/25/us/marijuana-legalization-ballot-measures.html?emc=edit\\_th\\_20161025&nl=todaysheadlines&nid=20659915&\\_r=0&referrer=](http://mobile.nytimes.com/2016/10/25/us/marijuana-legalization-ballot-measures.html?emc=edit_th_20161025&nl=todaysheadlines&nid=20659915&_r=0&referrer=)

# Treatment Adherence

Moving from assessment to treatment requires addressing the sources of adherence problems

⌘ Client beliefs and perceptions about the problem

- Perceptions about treatment
- Ambivalence about change
- Expectancies about treatment outcomes

⌘ Bipolar Disorder

⌘ Over 6 to 12 mos

⌘ 34% to 80%

⌘ Schizophrenia

⌘ 11% to 80%

⌘ Cardiovascular

⌘ Beta 46%

⌘ Cholesterol 44%

⌘ Osteoporosis

⌘ 43% to 53%

# Rates of Medication Adherence

1. Confrontation and Assessment of Self.  
(Assesses clients' beliefs, attitudes, behavior, & defense mechanisms.)

2. Assessment of Current Relationships.  
(Includes planning to heal damaged relationships.)

3. Reinforcement of  
Positive Behavior & Habits.  
(Helping others raises awareness of moral responsibility.)

4. Positive Identity Formation.  
(Exploration of Inner Self and Goal-setting.)

## Seven Major Treatment Elements of Moral Reconciliation Therapy

5. Enhancement of Self-Concept.

(Ego-enhancing exercises and habits change what clients think of themselves.)

6. Decrease Hedonism

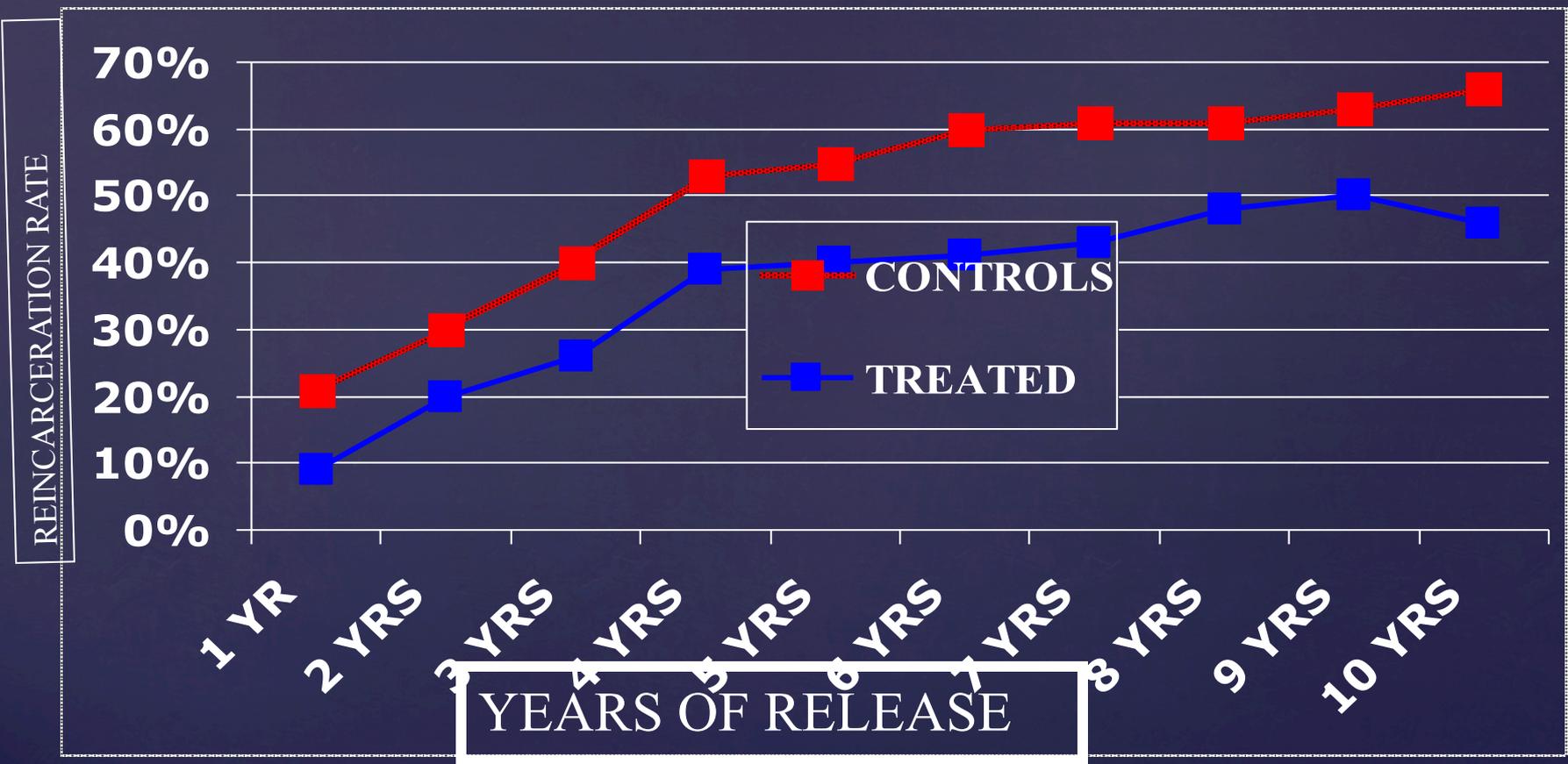
( teaches clients to develop delay of gratification and control of pleasure-seeking behavior.)

7. Develops Higher Stages of Moral Reasoning.

(With greater concern for others and social systems.)

## Seven Major Treatment Elements of Moral Reconciliation Therapy (continued)

REINCARCERATION RATES OF MRT TREATED FELONY OFFENDERS  
COMPARED TO NON-TREATED CONTROLS ONE TO TEN YEARS  
AFTER RELEASE  
(SHELBY COUNTY CORRECTION CENTER, MEMPHIS, TN 1987-1998)



&MRT™ -Treated Participants  
in Virginia Drug Courts  
Show a Substantively  
Significant Reduction in  
Recidivism Risk

& Excerpted from *Virginia Adult Drug Treatment  
Courts Cost Benefit Analysis October 2012* by Fred L.  
Cheesman, Ph.D., Tara L. Kunkel, MSW, et. Al.,  
National Center for State Courts , Williamsburg,  
VA

Drug Courts who use  
MRT™ have a recidivism  
rate that is **65% lower**  
than Drug Courts who do  
not employ MRT™

(Excerpted from *Virginia Adult Drug Treatment Courts Cost Benefit Analysis* October 2012 by Fred L. Cheesman, Ph.D., Tara L. Kunkel, MSW, et. Al., National Center for State Courts , Williamsburg, VA.)

# NADCP's Position on Recreational Marijuana

⌘ NADCP has long been committed to guiding the Drug Court field and the broader criminal justice and treatment communities with science, not ideology. After thoroughly reviewing the research regarding the safety of recreational marijuana use and the efficacy of “medical” marijuana, NADCP unequivocally stands against the legalization of marijuana and the use of smoked marijuana as “medicine.”