

MARIJUANA USE & THE JUVENILE JUSTICE SYSTEM

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SW Clinical & Forensic
Psychological Services LLC

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OUTLINE

Adolescent Development

- Normative Development

Statistic of Juvenile Marijuana Use

Effects of Marijuana use on Juvenile development

- Cognitive Effects
- Emotional/Psychological Effects
- Brain Morphology Effects

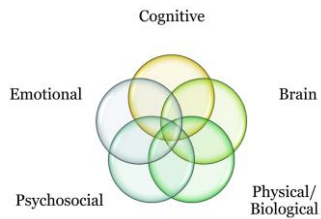
What should I be looking for?

Summary and Resources



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NORMATIVE ADOLESCENT DEVELOPMENT



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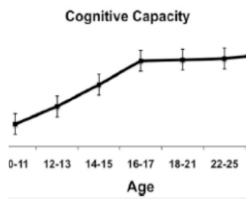
KEEP IN MIND



- Age is not an indicator for level of development
- Development is Dynamic
- Don't confuse normal behavior with socially acceptable behavior

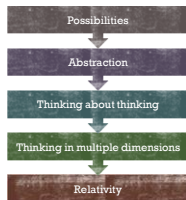
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Laurence Steinberg, Adolescent Development and Juvenile Justice, 5 ANN. REV. CLINICAL PSYCHOL. 47 (2009)



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Major Cognitive Changes in Adolescence



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BRAIN DEVELOPMENT

- By 6 brain is 90-95% of its size
- Born with most neurons
- Development is back to front
 - Prefrontal cortex is last to develop



| |
|--|
| Planning |
| Prioritizing |
| Organizing |
| Impulse control/regulation of emotions |
| Weighing of consequences |

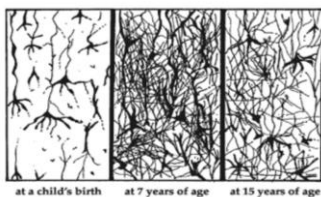
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BRAIN DEVELOPMENT

- Brain maturation completes at approximately age 25
- Adolescence is known to be one of two times of neural pruning or change
- White matter volume and integrity increases throughout childhood and adolescence into adulthood.
 - Associated with improvements in IQ and working memory performance
- Grey matter volume undergoes particularly substantial decreases in frontal and temporal grey matter during adolescence
 - Associated with improvements in working memory better problem solving, planning and verbal learning
- Social cognition changes
 - significant maturation of perspective taking and face processing

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SYNAPTIC PRUNING



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THE SOCIO-EMOTIONAL SYSTEM

- Responsible for processing emotions, social information, reward and punishment.
- Undergoes major changes in early adolescence that are related to hormonal changes.
- Changes result in:

Increased sensation-seeking

Increased/easier emotional arousal

Increased attentiveness to social information

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THE COGNITIVE CONTROL SYSTEM

- Responsible for deliberative thinking – weighing costs and benefits, thinking ahead, regulating impulses:
- Develops gradually from preadolescence well into the mid-20s.
- Changes result in:

More impulse control

Better emotion regulation

More foresight

More planning ahead

Better reasoning

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ABNORMAL DEVELOPMENT OR DISRUPTIONS IN DEVELOPMENT



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DISABILITIES AFFECTING NORMAL DEVELOPMENT IN ADOLESCENCE

- Learning Disabilities: Average intelligence but deficits in learning compared to others.



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OTHER COGNITIVE/DEVELOPMENTAL DISORDERS

- Attention Deficit Hyperactivity Disorder (ADHD)



- 20-30% of juvenile justice vs 3-5% in society

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OTHER COGNITIVE/DEVELOPMENTAL DISORDERS

- Autism Spectrum Disorder (ASD)



- 5-24% of juvenile justice vs 0.5% in society

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OTHER COGNITIVE/DEVELOPMENTAL DISORDERS

• Traumatic Brain Injury (TBI)

| Physical Impairments | Cognitive Impairments | Emotional Impairments |
|-----------------------|----------------------------|---------------------------------|
| speech | short term memory deficits | mood swings |
| vision | impaired concentration | denial |
| hearing | slowness of thinking | self-centeredness |
| headaches | limited attention span | anxiety |
| motor coordination | impairments of perception | depression |
| spasticity of muscles | communication skills | lowered self-esteem |
| paresis or paralysis | planning | sexual dysfunction |
| seizure disorders | writing | restlessness |
| balance | reading | lack of motivation |
| fatigue | judgment | difficulty controlling emotions |

- According to CDC two age groups at greatest risk for brain injury are age 0-4 and 15-19

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FETAL ALCOHOL SYNDROME

- Cognitive and behavioral deficits caused by in utero exposure to alcohol

| |
|---------------------------|
| Intellectual disability |
| Learning disability |
| Hyperactivity/impulsivity |
| Attention deficits |
| Poor social skill |

- 23-27% of juvenile justice vs 2-5% in society

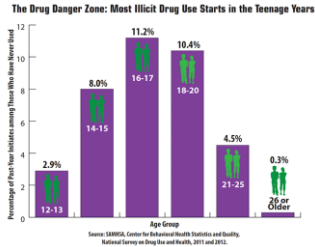
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MENTAL HEALTH DISORDERS

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|--|
| Depression |
| • Agitation, reactive anger |
| Bipolar Disorder |
| • Mania, risk taking, irritability |
| PTSD |
| • Trauma and abuse, irritable, reckless behavior, reactive |
| Anxiety Disorders |
| • OCD, generalized |

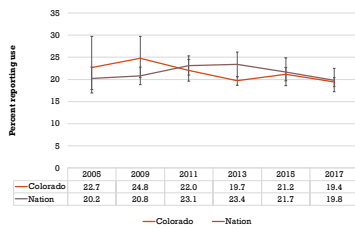
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SUBSTANCE USE ISSUES



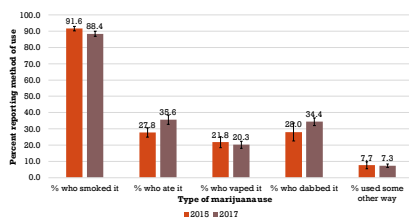
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High school students' past 30-day marijuana use, Colorado and Nation, 2005–2017



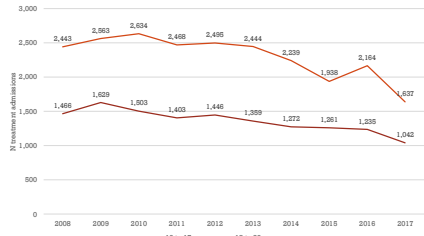
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High school students' reported methods of marijuana use, by type of use, 2015 & 2017



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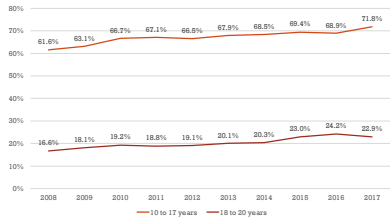
NUMBER OF TREATMENT ADMISSIONS MARIJUANA AS PRIMARY DRUG



Source: Colorado Department of Human Services, Drug-Alcohol Combined Data System (2018).

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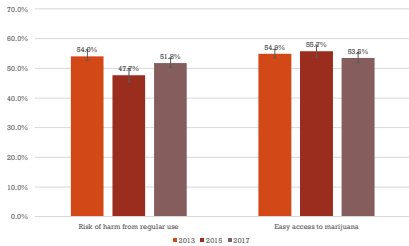
TREATMENT ADMISSIONS PERCENT REPORTING MARIJUANA AS PRIMARY DRUG OF ABUSE



Source: Colorado Department of Human Services, Office of Behavioral Health, Drug/Alcohol Coordinated Data System. Analyzed by the Division of Criminal Justice.

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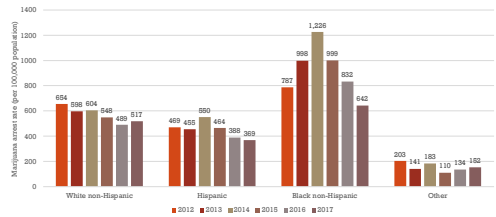
RISK OF HARM AND EASE OF ACCESS, COLORADO HIGH SCHOOLS



Source: Marijuana Health Monitoring and Research Program, Colorado Department of Public Health and Environment, Healthy Kids Colorado Survey, at <https://www.colorado.gov/jacdd/cdphs/healthy-kids-colorado-survey-data-tables-and-figures>

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JUVENILE MARIJUANA ARREST RATES, BY RACE

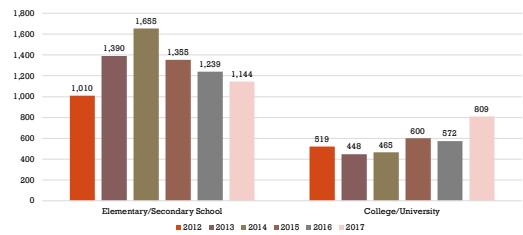


Source: Colorado Bureau of Investigation, National Incident-Based Reporting System; Colorado State Office of Demography.



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MARIJUANA OFFENSES IN COLORADO SCHOOLS

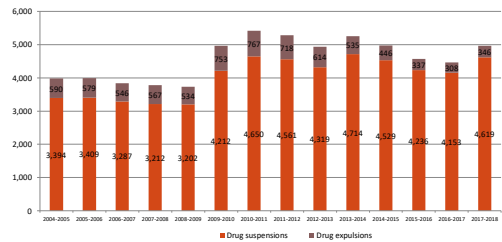


Source: Colorado Bureau of Investigation, National Incident-Based Reporting System.
Note: Prior to 2013, school/university was a single location code. There were 128 offenses in 2013 using this more generic location code; these are not included in the totals because it is not possible to determine the specific location.



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DRUG SUSPENSIONS AND EXPULSIONS

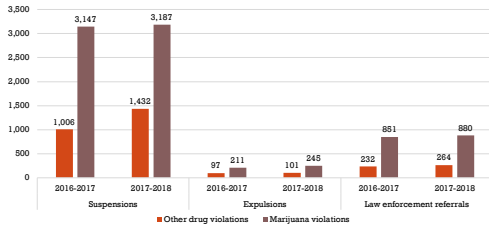


Note: Marijuana was reported separately for the first time in 2008-09, but data was not collected for the entire school year, making totals from the 2008-09 school year.
Source: Colorado Department of Education.



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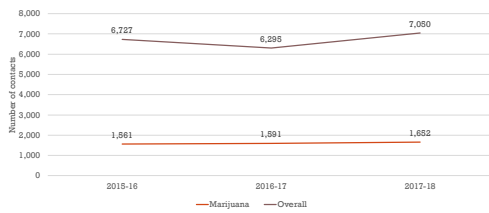
SCHOOL DISCIPLINE FOR DRUGS, 2016-17 & 2017-18



Source: Colorado Department of Education, at <http://www.cde.state.co.us/cderetail/suspend-equivalent>.

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LAW ENFORCEMENT CONTACTS IN SCHOOLS

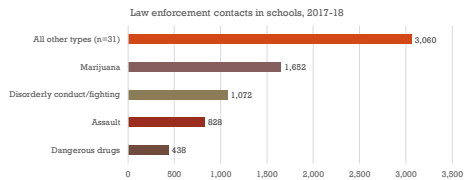


- One-quarter of all law enforcement contacts in schools are for marijuana
- 96% of the marijuana contacts resulted in a summons

Source: Colorado Division of Criminal Justice, Law Enforcement Contacts with Students, https://www.colorado.gov/pacific/dcj-cjcrn/StudentContact_SD.

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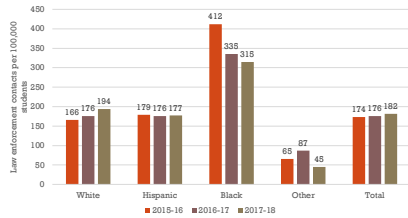
LAW ENFORCEMENT CONTACTS IN SCHOOLS, 2017-18



Source: Colorado Division of Criminal Justice, Law Enforcement Contacts with Students, https://www.colorado.gov/pacific/dcj-cjcrn/StudentContact_SD.

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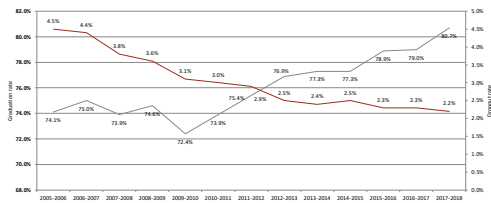
LAW ENFORCEMENT CONTACT RATES FOR MARIJUANA IN SCHOOLS



Source: Colorado Division of Criminal Justice, Law Enforcement Contacts with Students, https://www.colorado.gov/pacific/dcj/ony/StudentContact_50

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COLORADO GRADUATION & DROPOUT RATES



Source: Colorado Department of Education.

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Heavy Marijuana Use In Adolescence Has Been Associated With:

- Poor school performance
- Higher dropout rates
- Increased welfare dependence
- Greater unemployment
- Lower life satisfaction
- Drop in neuropsychological functioning equivalent to 4-6 IQ points

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COGNITIVE EFFECTS

Consistently research has found detrimental effects in cognitive domains related to:



Other Findings include poorer performance in:



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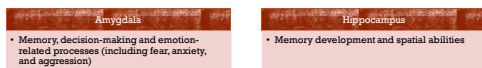
EMOTIONAL/PSYCHOLOGICAL EFFECTS



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BRAIN MORPHOLOGY EFFECTS

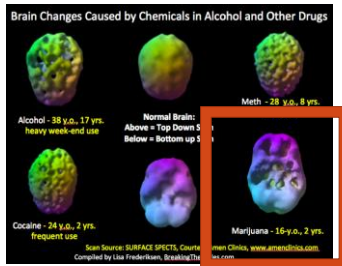
- Gray Matter
 - May illicit premature tissue development
 - Impose a marijuana-related effect on regressive changes (e.g., synaptic pruning, death of overproduced cells).
 - May alter ongoing myelination of fiber tracts that are impacting gray matter estimates.
- White Matter
 - In general, research points to poorer white matter integrity in adolescent marijuana users
 - Poorer white matter integrity has been found to correlate with poorer neurocognitive functioning
 - Generally effect is more modest compared to the impact adolescent alcohol use
- Most affected areas are:



• Memory, decision-making and emotion-related processes (including fear, anxiety, and aggression)

• Memory development and spatial abilities

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BRAIN CHANGES EVEN WITH LOW LEVELS OF CANNABIS USE

- Sample of 14-year-old adolescents (males and females) with just one or two instances of cannabis use compared to controls
- Found increase in gray matter volume in certain parts of the adolescent brain
- The biggest differences in gray matter were Amygdala and Hippocampus
- What the increased brain matter volume means is unclear...
 - But remember the brain is supposed to be thinning at this stage not thickening so pruning is being disrupted

Source: Orr, C., Specht, P., Cao, Z., Albaugh, M., Chaarani, B., Mackey, S., ... & Bromberg, U. (2019). Grey Matter Volume Differences Associated with Extremely Low Levels of Cannabis Use in Adolescence. *Journal of Neuroscience*, 39(10), 1817-1827.

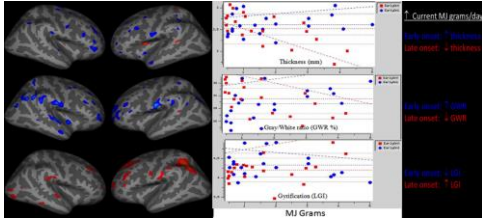
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TIMING IS KEY

- Past research has found:
 - Use prior to age 16 predicted impaired reaction time on a task of sustained attentional processing
 - Use prior to age 17 related to poorer performance on verbal memory and fluency tasks, and verbal IQ
 - Use prior to age 18 linked to poorer performance on tasks of sustained attention, impulse control, and executive functioning
- Overall findings show poorer cognitive performance on measures of attention and learning, and memory
- Some effects persist even after abstinence
 - However, subtle cognitive effects are likely to resolve after longer-term abstinence
 - Young adult users have shown improved memory performance with long-term abstinence (8 years)
- Earlier onset also linked to stronger link to development of psychotic symptoms
 - cannabis by age 15 were 4x likely to develop psychotic symptoms

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TIMING IS KEY



Source: Filbey, F. M., McQueeney, T., DeWitt, S. J., & Mishra, V. (2015). Preliminary findings demonstrating latent effects of early adolescent marijuana use onset on cortical architecture. *Developmental cognitive neuroscience*, 16, 18-23.

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GENERAL DEVELOPMENTAL GUIDELINES IN THE JUVENILE JUSTICE SYSTEM

<10: Know they are in trouble but not clear on long term effect

11-13: May have an appreciation for concrete consequences (go to jail), but not the long term impact

14+: May have a better grasp of long term effects

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PERCEPTION OF THE COURT

<10: Self-centered, non-adversarial and every one is there to help them

11-13: Concrete perspective of adversarial nature, and rights are given and taken by authority

14+: A sense of the adversarial nature of court and beginning to see rights as a possession

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DECISION PROCESS IN COURT MATTERS

<10: Poor management of their options, typically cannot use facts to process decisions to their advantage, and often self-defeating

11-13: Maybe, maybe not! Often overly compliant and may agree without actually choosing but simply responding to perceived authority

14+: Capable of more complex decision processes and potential for long range thinking

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REASONING BEHIND DECISIONS

<10: Avoid punishment

11-13: What does the authority want to hear?

14+: Blending their wants with those of others

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RIGHT TO REMAIN SILENT

<10: You have to be quiet in court

11-13: Stay quiet or don't have to talk?

14+: Understand the choice not to talk but may not fully understand the implied issue of incrimination

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AND IF I DON'T TALK?

<10: I will be in trouble with the judge

11-13: I will get in trouble

14+ I have the right to remain silent

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RED FLAGS

- Is my client young? 8-12
- Is my client low IQ?
- Does my client have a special education history?
- Is there substance use issues esp. methamphetamine + Cannabis?
- Is there a psychosis or other mental health concerns
- ADHD/immaturity issues?

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What Does It All Mean?

- Adolescence is a time characterized by a Socio-emotional System that is easily aroused and highly sensitive to social feedback.
- Adolescence is a time characterized by a still-immature Cognitive Control System.
- Marijuana use in adolescent disrupts normal development and can have immediate and long term effects.
- Adolescents in general are:

Less able to control impulses

Less able to resist pressure from peers

Less likely to think ahead

More driven by the thrill of rewards

- Adolescent with Marijuana use are likely to have increased challenges in all areas

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QUESTIONS?



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