

Physiological Effects of Substance Abuse on Adolescents

Grand Rapids Counseling Services

1.

Topic Overview

1. Introduction to the Science of Addiction: Adolescent Onset
2. Food: Ally or Enemy
3. Trauma Informed Practices
4. The Stigma of Drug Addiction and Mental Health

2.

Physiological Effects of Substance Abuse on Adolescents

Grand Rapids Counseling Services

3.

GRCS
GRAND RAPIDS
COUNSELING SERVICES



Primary Practice Areas

- Court Related (MILJUD)
- State of Michigan Driver License Appeal
- (MI) SAP Return-To-Drive
- Addictions (substances of abuse, food, gambling, pornography)
- Plans of Last Intent

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Education
Grand Valley State University
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4.

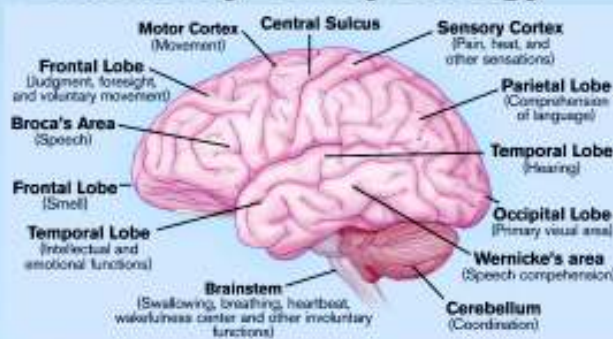
Psychological Effects of Alcohol & Drug Use on Juveniles

Learning Objectives

1. To be able to state the key changes in the brain as a result of use
2. What is the correlation between genetics and addiction

5.

Anatomy & Physiology



Motor Cortex (Movement)

Central Sulcus

Sensory Cortex (Pain, heat, and other sensations)

Frontal Lobe (Judgment, foresight, and voluntary movement)

Broca's Area (Speech)

Parietal Lobe (Comprehension of language)

Frontal Lobe (Smell)

Temporal Lobe (Hearing)

Temporal Lobe (Intellectual and emotional functions)

Occipital Lobe (Primary visual area)

Brainstem (Swallowing, breathing, heartbeat, wakefulness center and other involuntary functions)

Wernicke's area (Speech comprehension)

Cerebellum (Coordination)

6.

How Does Addiction Happen?

7.

Brain Disease

- **Dopamine** – pleasure reward neurotransmitter
 - *Drugs of Abuse* = 2-10x more dopamine than natural
- **Serotonin** – regulates feelings of appetite, mood, pain, temperature
- **Glutamate & GABA** – excitation & inhibition in brain

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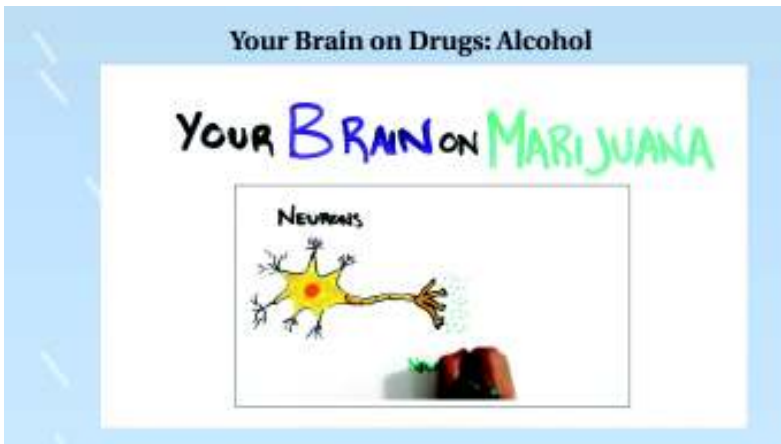
The Pathology of Addiction



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11.

YOUR BRAIN ON MARIJUANA



12.

Developmental Disease

- Two "At Risk" Subsets for future addiction in early adolescence (12-14y/o)
 1. Limited parental supervision – almost 100% environmental
 - Emotional & conduct problems – use to cope (feel good and/or better)
 - Highly sociable, fun-seeking, impulsive
 2. Greatest predictor for addiction = regular use 14-16 y/o
 - Undeveloped brain
 - Social / Peer Pressure
 - Curiosity / Experimental
- 50% of all children live with a parent who abuses drugs.
- 24% of kids live with a parent who binge drinks.

13.

How Alcohol & Drugs Affect The Brain

Learning Objective

What is the correlation between genetics and addiction.

14.

Immediate Impacts

- **Cerebral Cortex** –
 - loss of thought & verbal filtering
 - perception distortion (no fear)
 - Physical distortion (no pain, hearing loss)
 - Cognitive suppression (decision making, impulse control, problem solving, reasoning)
- **Hypothalamus** – stops telling kidneys to absorb water
- **Cerebellum** – balance & coordination
- **Temporal Lobes** – interference with short and long-term memory (blackouts)

15.

Long-term Impacts

- **Less** dopamine production
- **Reduced** number of neurons (receptors) to receive signals / information
- Cognitive Impairment *killing* of brain cells
- Neural Pathway Destruction *alters* nervous system (cardiac arrhythmias), ability to cope with stress, paranoia, memory storage, emotional problems

16.

Genetic Predisposition to Addiction

17.

Factors

- Est. **40-60%** of addiction vulnerability can be attributed to genetics
- *Co-morbid* mental illness
- Naturally **low** levels of dopamine (reward / pleasure) & serotonin (mental illness)
- Memory Disorders
- Children of drug addicts are **8x** more likely to get addicted themselves.
- Of the **30,000 genes** in the body, about **89** are linked to addictive personality. Of these 89 genes, **21** are linked to triggers and desires for using.

18.

Research

The following list compiles a number of genes with ties to addiction, and most of them were discovered through animal research:

ALDH2 – people with two copies of this gene are unlikely to become alcoholics.

Cnr1 – the cannabinoid receptor gene; mice who lack it are not as responsive to morphine.

Creb – morphine addiction is unlikely among mice who lack this gene.

CYP2A6 – a protective allele of this gene is more common in nonsmokers, and it makes them more prone to nausea from tobacco exposure.

DRD2 – the dopamine receptor gene; its A1 allele is more enhanced among alcoholics and cocaine addicts.

Htr1b – the serotonin receptor gene; mice who lack it are more drawn to alcohol and cocaine.

Mpdz – mice with a more pronounced presence of this gene showed milder withdrawal symptoms from barbiturates and other hypnotic sedatives.

Per2 – mice consume three times as much alcohol when this gene is defective.

(“Addiction Personality”, 2018)

19.



Call to Action

- Promote Prevention
- Network with other professionals & community resources

20.



Physiological Effects of Substance Abuse on Adolescents

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GRCS
Graduate Research Center for
Community Engagement



Primary Practice Areas

- Weight Loss
- Diabetes (Type I & Type II)
- ADHD
- Energy Management
- Attentional Disorders
- Insomnia
- Depression
- Mind Clarity

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Spring Arbor University
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22.

FOOD: ALLY OR ENEMY?

Learning Objectives

1. How does food contribute to alcohol/drug use in adolescence
2. Simple dietary changes to help the adolescent body heal & stay sober

23.

FOOD: ALLY OR ENEMY?

“You are what you eat - so don't be Fast, Cheap, Easy, or Fake”



24.

Drug = a medicine or other substance which has a **physiological effect** when ingested or otherwise introduced into the body.

25.

Drug = a medicine or other substance which has a **physiological effect** when ingested or otherwise introduced into the body.

University of Michigan Study in 2015:

- ⊗ Some foods can be as addictive as illegal drugs
- ⊗ "Clinical studies in humans have observed that some individuals meet the criteria for substance dependence when the substance is food."

26.

ENEMY!

The most common addictive foods are foods high in sugar, flour, fat, grains and salt or some combination of these.



27.

The Science of Addictive Food



28.



29.



30.

How Sugar Affects the Brain



31.



32.

ENEMY!



33.

The Science of Addictive Food



34.



35.

PHYSIOLOGICAL EFFECTS:

Sugar

- No nutritional value
- Causes Inflammation
- Compromises the immune system
- Can impair your body's ability to absorb nutrients, vitamins and minerals from the food you eat
- Negatively affects memory
- Linked to
 - Type 2 diabetes/obesity
 - (Non-alcoholic) Fatty liver disease
 - Heart disease
 - Cancer
 - Depression

Drugs & Alcohol

- No nutritional value
- Causes Inflammation
- Compromises the immune system
- Can impair your body's ability to absorb nutrients, vitamins and minerals from the food you eat
- Impairs judgment and concentration
- Linked to
 - Type 2 diabetes/eating disorders
 - Fatty liver disease
 - Heart disease
 - Cancer
 - Mental Disorders

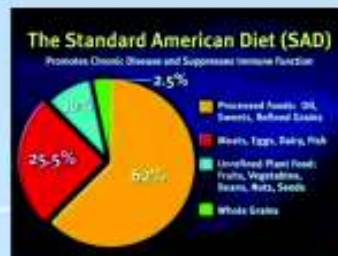
36.

PERCENTAGE OF YOUTH AGES 12-17 WHO EXPERIENCED A MAJOR DEPRESSIVE EPISODE (MDE) IN THE PAST YEAR BY AGE AND GENDER, 2004-2015



SHIBATA, Substance Abuse and Mental Health Services Administration, National Survey on Drug Use and Health

ENEMY! STANDARD AMERICAN DIET:



Top foods/drinks intakes by adolescents age 12-19 years (in rank order):

- GRAINY:**
 - Tortilla chips & corn chips/tostitos/puffs
 - Cookies
 - Pizza
 - White bread/croutons
 - Crackers
- VEGETABLES:**
 - Potato chips
 - Pizza
 - Tomato salsa and ketchup
 - French fries
 - Lettuce
- FRUITS:**
 - Orange and grapefruit juice
 - Bananas
 - Non-citrus juice
 - Oranges
- DAIRY:**
 - Fluid milk
 - Cheese
 - Ice cream
 - Pizza
 - Candy (ready, cheddar)
- PROTEIN:**
 - Mac and cheese
 - French fries and french onion
 - Fried chicken and chicken
 - Garlic nuggets
 - Candy (ready with nuts)
 - Tacos
- OILS:**
 - Tortilla chips and corn chips
 - Potato chips
 - Pizza chips
 - Candy
 - Popcorn
 - Salad dressing
- ADDED SUGARS:**
 - Carbonated soft drinks
 - Candy
 - Fruit flavored drinks
 - Ice cream
 - Cookies
- SOLID FATS:**
 - Ice cream
 - Cookies/Pizza
 - Candy
 - Caki

SOURCE: What We Eat in America (WWEIA), the dietary intake interview component of the National Health and Nutrition Examination Survey (NHANES).

Attack the Enemy by:



EDUCATING



WHAT WE DO FOR OUR KIDS!...

KIDS' MEALS

KIDS' CLOTHES

KIDS' BEDS

40.

Attack the Enemy by:



REDUCE SUGAR

41.

Attack the Enemy by:



REDUCE SUGAR

- Cut out sugary beverages including juice
- Replace "white" with "whole"
- Use cinnamon and vanilla to naturally sweeten things
- If you struggle with a sweet tooth, you can take *chromium picolinate* supplements to help decrease your sugar cravings.

42.

Attack the Enemy by:



REDUCE SUGAR

- Cut out sugary beverages including juice
- Replace "white" with "whole"
- Use cinnamon and vanilla to naturally sweeten things
- If you struggle with a sweet tooth, you can take *chromium picolinate supplements* to help decrease your sugar cravings

Where do children age 4-18 get most sugar from?

- Soft drinks
- Biscuits, buns, cakes, pastries, & puddings
- Fruit juice
- Sugar & chocolate confectionary
- Yoghurt, ice cream and other dairy desserts
- Breakfast cereals

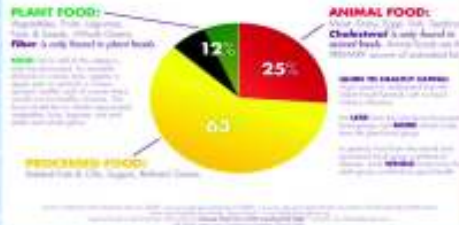
43.

Attack the Enemy by:



REDUCE PROCESSED FOODS

U.S. FOOD CONSUMPTION AS A % OF CALORIES



44.

Attack the Enemy by:



INCREASE VEGETABLES AND FRUITS

U.S. FOOD CONSUMPTION AS A % OF CALORIES



45.

Attack the Enemy by:



REDEFINE "SNACK"



46.

Attack the Enemy by:



DON'T BUY THE LIE: "Eating Healthy is More Expensive"



47.

Inexpensive Super-Foods:



- Fruits & veggies
 - When buying fresh, buy what is in season & freeze
 - Frozen are just as healthy as fresh
 - Make sure canned in own juice and no added salt
- Eggs
- Nuts & Nut butters
- Fish
- Whole grains
- Beans & Lentils

48.

Attack the Enemy by:

USE FOOD AS AN ALLY



<p>•Antioxidants</p> <ul style="list-style-type: none"> - Berries - Kale - Spinach - Kidney & Pinto beans - Artichokes - Dark Chocolate - Pecans - Red Cabbage - Cilantro 	<p>•Magnesium</p> <ul style="list-style-type: none"> - Spinach - Almonds - Whole grains - Dark Chocolate <p>•Omega 3's</p> <ul style="list-style-type: none"> - Flax seeds - Chia seeds - Salmon - Walnuts 	<p>•Sulfur</p> <ul style="list-style-type: none"> - Kale - Cabbage - Cauliflower - Asparagus - Tomatoes - Garlic - Onions - Avocado - Sweet potatoes - Watermelon - Nuts - Brussel Sprouts
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Attack the Enemy by:

TAKE IT SLOW










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Primary Practice Areas

- Court Related (DUI/DWI)
- State of Michigan Driver License Appeal
- Adoptions (advertisers of abuse, food, gambling, etc.)
- Phase of Life Issues
- Anxiety & Depression (stemming from trauma)

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Law University
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Master of Arts in Counseling

52.

Trauma Informed Practices

Learning Objectives

1. A clearer understanding of the impact of trauma and adolescents.
2. Define trauma informed practice, highlighting some of the methods, techniques, and assessment tools.
3. Ways to support adolescents who have been exposed to trauma

53.

Trauma-Informed Practices with Children and Adolescents:

Southwest Michigan Children's Trauma Assessment Center (CTAC) supported by Western University found the following:

- 71% have moderate to major receptive language delays
- 82% have moderate to major memory delays
- 70% have moderate to major visual processing delays
- 85% have moderate to major attention deficits
- 60% have probable to definite sensory processing problems

54.

Trauma-Informed Practices with Children and Adolescents

The Adverse Child Experiences (ACE) supported by the Center for Disease Control (CDC) found the following:

- A multitude of health and social problems including *heart and liver disease, alcoholism, drug abuse, fetal death, and interpersonal violence.*
- This study underscores the childhood trauma does not only impact **psychosocial outcomes**, but also **physical well-being** and overall **health**.

55.

Body Keeps the Score

Research conducted by Jeffery Gray on the Amygdala

The **Amygdala** is the part of the brain that determines if sound, image, and body sensations are a threat.

- Data found:
 - Sensitivity of the amygdala depended, in part, on the **amount** of serotonin in the brain.
 - **Low serotonin** resulted in hyperactive response to stress.
 - High levels of serotonin resulted in a **decrease** in aggressive responses to potential threat.

56.

Continuing to explore the effects of trauma on the brain

• Scott Rauch found:

- When people are impacted by trauma the amygdala decreased in function distorting interpretation of images, sounds, or thoughts causing the person to remain in a state of alarm.
- Trauma exposure decreases the functioning of the Broca. The Area of the brain responsible for putting thoughts and feelings into words.
- Trauma exposure activates the right brain and deactivates the left brain causing a direct impact on the capacity to organize experience into logical sequences and to translate our shifting feelings and perceptions into behavior, therefore, hindering the brain's ability to organize, sequence, and translate information.

57.

Research on how trauma impacts the Thalamus

- *Chronic Trauma* decreases the functioning of the Thalamus. The Thalamus is responsible for filter information between the left brain and right brain. It is the piece that helps a person navigate components of *attention, concentration, and new learning*.
- A **decrease** in the Thalamus forces a person to experience *sensory overload*.
- If a person can't shut down naturally, they may enlist **maladaptive strategies** such as drugs, alcohol, and other pleasures to force the sensory overload to shut down.

58.

What is Trauma?

Trauma is the response to any event that shatters your safe world so that it's no longer a place of refuge. Trauma is more than a state of crisis; it is a normal reaction to abnormal events that overwhelm a person's ability to adapt to life. It is a place of powerlessness.

(The Complete Guide to Crisis and Trauma, p. 185, 81)

59.

Highlights

- Trauma **freezes** a person's ability to think.
- It causes a **disconnect** between the left side of the brain (cognitive functions - Thinking) and the right side (Emotional/Behavioral Functioning - Takes the Pictures) of the brain.
- Trauma essentially **hijacks** the brain and the brain becomes altered by decreasing functions. There is an imbalance between the left brain (cognitive/explicit) and the right brain (picture/implicit). It also limits a person from putting into words how they feel.

60.

Direct correlation between Adolescents and Substance Abuse

In 1963 a research study was completed on 180 families by Alan Sroufe. The study was held in an effort to future understand Nature versus Nurture.

61.

Findings

- Children need to be able to develop many facets of relationships to help keep arousal within manageable boundaries and develop the child's ability to self-regulate their arousals.
- Children in the study that did not have these relationships, when exposed to a situation that stimulated chronic over-aroused, and lived in disorder, did not develop proper self-regulation (*Left Brain and Right Brain Sequencing*).
- Children with erratic and unpredictable caregivers appear to struggle with the increase in physiological needs, are attention seekers, can become instantly frustrated, struggle with anxiety, expect constant reassurance, and struggle with a desire to engage in play with peers.
- If trauma is chronic then the likelihood of Adolescents have struggled with aggression, opposition, disruption, Addiction, behavior problems in school, maintaining peer relationships, and expressing empathy for others will significantly decrease.

62.

Karlen Lyons-Ruth: 1980's Study

- Reaffirmed that trauma impacts on a young person can result in substance abuse
- Children who grew up with disruptive emotional communication patterns struggle with a stable sense of **self-worth, impulsivity** (*excessive spending, promiscuous sex, Substance Abuse, reckless driving, and binge eating*), inappropriate and intense **anger**, and **self-injurious** behaviors.
- The biggest impact this study observed was **Emotional Withdrawal** (*Dissociation and Denial*).

63.

"Roughly *one-third to one-half* of severely traumatized people develop substance abuse problems. Because trauma exposure leads to **chronic** overarousal physically, mentally, emotionally, and relationally there is a desire to turn it off (Find Rest). Two methods used are Numbing and Sensation Seeking (food, working out, drugs, alcohol, thrill-seeking, spending money, self-injurious behaviors, and promiscuity). The attempt is to give themselves a false sense of control and dull the intolerable inner world."

Dr. Bessel Van Der Kolk

64.



Call to Action

1. Incorporate a more holistic approach by blending other Professional Services to form a unique team that can stand with the adolescent.
2. Find professionals that are capable of teaching adolescents Self-Regulation and Mindfulness.
3. Ensuring that the professionals helping are informed regarding:
 - The importance of observation/assessment
 - Aware of the elements of recovery – reliving, releasing, and reorganizing
 - What stage of recovery the adolescent is at - cognitive (learning) stage, emotional (reaction) stage, or mastery (stable) stage.

65.

Assessment Tools

- a. Trauma Assessment Pathway Model (TAP)
- b. Trauma Symptom Checklist for Children (TSCC-A)
- c. Youth Self-Report (YRS)
- d. University of California PTSD Reaction Index for DSM-VI (UCLA-PTSD-RI)
- e. Child and Adolescent Questionnaire (CAQ)
- f. Behavioral Emotional Rating Scale (BERS-2)
- g. Sensory and Art Assessments

66.

Resources

- *Trauma-Informed Practices With Children and Adolescents* - full of case studies, methods, models, assessment tools, techniques, and resources.
- *The Body Keeps the Score* - detailed breakdown of how trauma impacts the brain and strategies for the professional helper that can help prepare you for working with someone that has experienced trauma. It allows the professional to be mentally prepared.

67.

Online Resources

- Bethany Christian Services - <https://www.bethany.org/>
- The DART Program (Residential Program) - <https://hopenetwork.org/behavioral-health-services/dart-child-adolescent-residential-services/>
- Child and Family Services - <http://www.ihcwestmichigan.com/services/child-family-services/>
- Top 10 Recommended Trauma-Informed Care Online Resources - <https://www.crisisprevention.com/Blog/April-2012/Top-10-Recommended-Trauma-Informed-Care-Online-Res>

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Physiological Effects of Substance Abuse on Adolescents

Grand Rapids Counseling Services

69.

Primary Practice Areas

- Depression
- Anxiety
- PTSD
- Grief and Loss
- Applied Behavior Analysis

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Michigan State University
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**Drug Addiction:
Breaking the stigma**

Learning Objectives

1. Emphasize the magnitude and abundance of drug addiction within the U.S regardless of age, sex, gender, cultural/family background, etc.
2. Detail the history of creating stigmas regarding drug addiction and mental health in the U.S and how to reverse said stigma in the present day.

**Drug Addiction:
Breaking the stigma**

THE WAR ON DRUGS The Stigma Begins

- 1960's brought recreational drug use to suburbanized, white America
- 1971 Richard Nixon officially declares a, "War on Drugs"
- 1973 DEA is created
- 1986 Ronald Regan signs the Anti-Drug Abuse Act resulting in significant racial disparities in prisons due to sentencing of crack Vs powder cocaine



Mandatory federal sentence for first-time offender

Amount (grams)	Powder cocaine	Crack cocaine
5	1 year	5 years
30	1 year	10 years
300	3 years	15 years
3,000	10 years	25 years

73.

I LOVE The 80'S



VS



74.

Perception

All drug addicts are bad people. They have no jobs or have lost their jobs because they have **CHOSEN** to become addicts.

Only poor people from single-family households, become drug addicts.

Addiction is not real. You can quit whenever you want!

Celebrities or wealthier drug abusers are okay because they are able to maintain employment or have been successful. These people are not bringing down society like the **REAL** Drug Users.



75.

REALITY

In 2017

- **23.9%** of individuals between the ages of 12-18 reported smoking marijuana at least one time per week
- **10%** of individuals 12-18 years old reported smoking marijuana every day
- **23.8%** of individuals 12-18 years old have reported using illicit drugs such as opiates, hallucinogens, and stimulants
- **7.9 million** of these individuals suffered from a co-occurring disorder



76.

Call to Action



- Treat adolescents as mature individuals
- Respect their intelligence
- Know that each individual has his/her own life and own reasons for using. So do not lump them all together.
- Don't repeat how drugs are bad and how they are bad for using them

MOST IMPORTANTLY, be REAL with them!

77.

Physiological Effects of Substance Abuse on Adolescents

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78.