

Substance Use Disorders: brains, behavior, and diagnosis

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Disclosures

Speaker: Jessica Gregg has nothing to disclose

Objectives

1. Understand the diagnostic criteria for substance use disorders

2. Review (some of) the neurobiology of addiction

DSM 5



Diagnostic and Statistical Manual of Mental Disorders

11 criteria

Craving/Compulsion/Consequences/Loss of Control

DSM 5: Substance Use Disorder





Taking in larger amounts or for longer than intended

Unsuccessful efforts to cut down

Spending a lot of time obtaining the substance



Craving or a strong desire to use the substance

DSM 5: Substance Use Disorder





Continued use despite recurring social or interpersonal problems due to use

Important activities given up or reduced

Recurrent use in physically hazardous situations



Persistent / Recurrent physical or psychological difficulties from use

Recurrent use resulting in a failure to fulfill major role obligations

DSM 5: Substance Use Disorder





Tolerance*

Withdrawal*

Substance Use Disorder





The words we use to describe our patients affects the care they get







Positive

Person who uses substances

Recurrence of Use

Pharmacotherapy

Accidental Drug Poisoning

Person with a Substance Use Disorder



Recovery Dialects

The words we use matter.

Negative

Substance Abuser

Relapse

Medication-Assisted Treatment

Overdose

Addict

Alcoholic

Opioid Addict

While some negative language is okay to use in mutual aid meetings, its use should be avoided in public, when advocating and in journalism.

SOURCE: Ashford, R. D., Brown, A. M., & Curtis, B. (2018). Substance use, recovery, and linguistics: The impact of word choice on explicit and implicit bias. Drug and Alcohol Dependence, 189, 131–138.

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Mesolimbic Dopamine System







The use of dopamine neurons to shape responses to rewards is seen in simple organisms like worms and flies.

It evolved millions of years ago.

Dopaminergic impulses tell organisms to move toward reward (warmth, food, moisture)



- In humans, those dopaminergic impulses travel through the NAC
- Mediate responses to food, sex, social interactions
- DA projections from VTA to NA release DA and tell the NA to go for it!
- Connects with memory and emotional centers



1. Hungry caveman eats berry. It is sweet and pleasurable and he doesn't starve.

2. Brain pays close attention so he can repeat the action

3. Sees the berry bush again, remembers the berry, craves the berry, eats it.

4. Lives



All addictive substances activate this pathway



- Over time, people, places, things associated with drug use can activate the pathway and trigger cravings
- Even when images associated with drug use are shown too rapidly to be "seen" they still trigger cravings
- Repeated activation of this pathway triggers further changes that "hard wire" habits

Dysregulation



- Repeated activation of the pathway also leads to dysregulation: impaired ability of the front of the brain to regulate what is going on in the older regions of the brain.
- Prefrontal cortex helps determine the risks and benefits of behaviors and make rational choices.



- Prefrontal cortex is newer and more complicated. It needs a little time to weigh in.
- Repeated activation of the VTA to NAC track slowly strengthens those connections. Habits get hard wired, fast and automatic. Prefrontal cortex can't keep up.



Like stepping on brakes of car barreling down a hill only to discover that brakes have been disconnected.





Withdrawal/Negative Affect:

1. Fewer dopamine receptors \rightarrow

a. Less sensitivity in reward system to addictive substances \rightarrow tolerance

b. Less sensitivity in reward
system to natural reinforcers
→ feel generally lousy

2. Release of hormones like NE, CRF, and dynorphin \rightarrow withdrawal



Preoccupation/Anticipation

Downregulated dopamine receptors + increased NE, CRF, dynorphin + increased glutamate \rightarrow

changes in frontal cortex \rightarrow

Increase craving and decreased ability to regulate impulses \rightarrow

both impulsive and compulsive substance seeking



- Medications to decrease craving and attenuate withdrawal symptoms
- Behavioral interventions that entrain different habits
- Little pleasures like like family, friends, jobs well done, tasks accomplished, regulates DA levels and allows reinforcement of positive behaviors, different habits

This ECHO clinic

- Discuss medications that help with craving and withdrawal and help people pause and engage in activities that provide meaning
- Discuss importance of Peers for connection
- Learn about evidence-based behavioral interventions
- Discuss harm reduction as a life-saving intervention and treatment



Thank You