



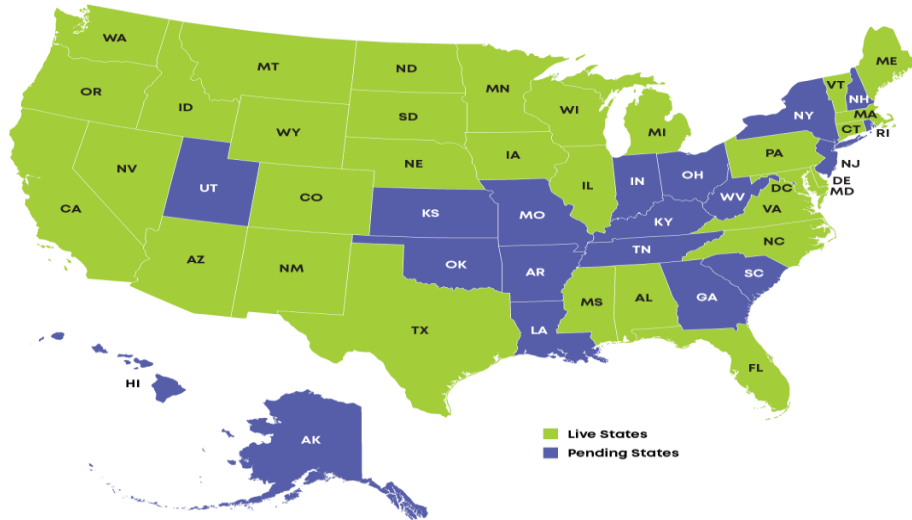
Addiction and the Brain

The
Effect of Opioids and Buprenorphine



Who we are

Bicycle Health is a Telehealth Addiction Medicine program serving patients with opioid use disorder. We began serving patients in 2017, and have grown to 20000+ patients across 32 states serving 2/3rd of the US.



10000+

Monthly
engaged patients

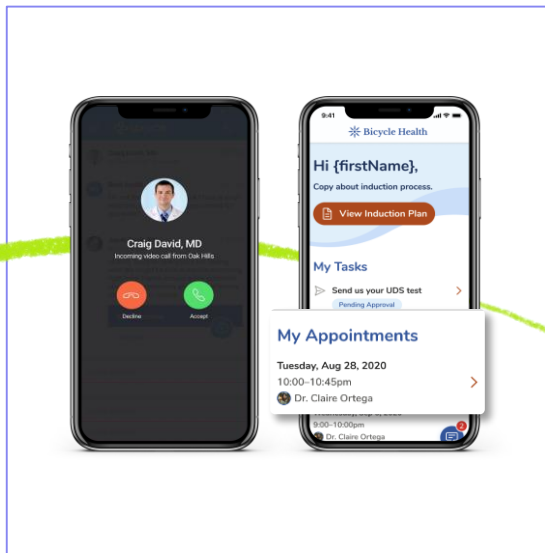
90+

Employed clinicians
MDs, NPs, PAs, LCSWs and
Certified Recovery Coaches

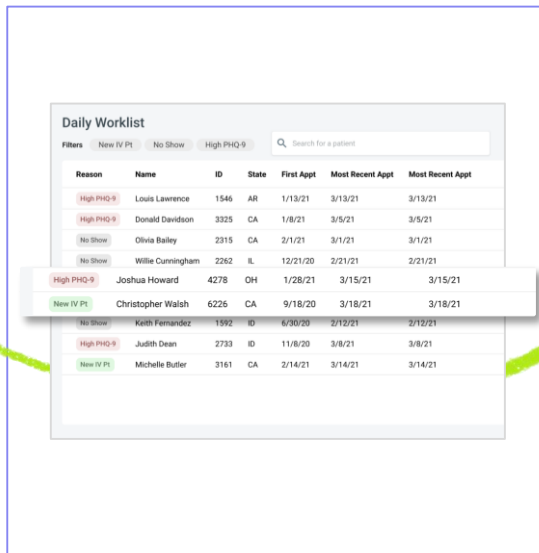
Our fundamental building blocks

Technology enabled

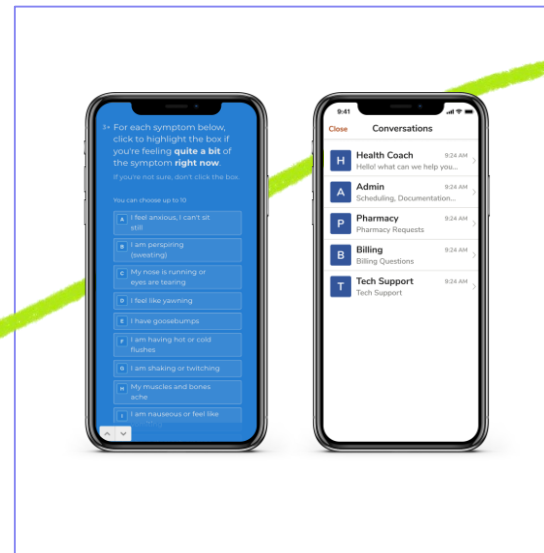
Patient-Centered Team Based Care



Integrated Behavioral Health



Chronic Disease Management



The Bicycle Health care model

Combines the standard of care for Addiction Treatment (MAT) and Integrated Behavioral Health



Medications for Addiction Treatment (MAT)

Buprenorphine - Naloxone

Recovery Coaching & Peer Support

Integrated Behavioral Health

1-1 & Group Therapy

Case Management & Care Coordination

- Clinical team of 50+ full time employed medical providers with min 2+ yrs of addiction med. experience
- 25% of providers are MDs double boarded in both primary/internal medicine and addiction medicine
- Every MD supervises less than 3 NPs/PAs
- Therapy delivered by LCSWs and Recovery Coaching delivered by CCAR certified peer coaches
- Provider NPS of 53 with less than 10% annual turnover and less than 1% regrettable turnover
- Concierge level care with an average panel size of 152 patients and max panel size of 246 patients
- We also treat co-occurring SUD and mild-moderate mental health conditions.
- All providers coordinate care with the patient's primary care provider

Our outcomes

86%

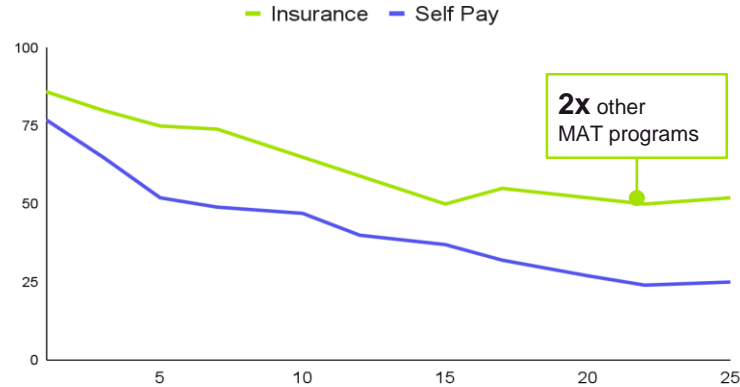
retention
at 1 month

79%

retention
at 3 month

70%

retention
at 12 month



95%

Patients overcome
problematic
opioid use in
1 week²

89%

Of new patients
get Motivational
Interviewing

80%

Patient Net
Promoter Score³

70%

Patients see
a medical
provider
within
24 hours

9.8%

No show
rate vs 23%
industry avg

5.5

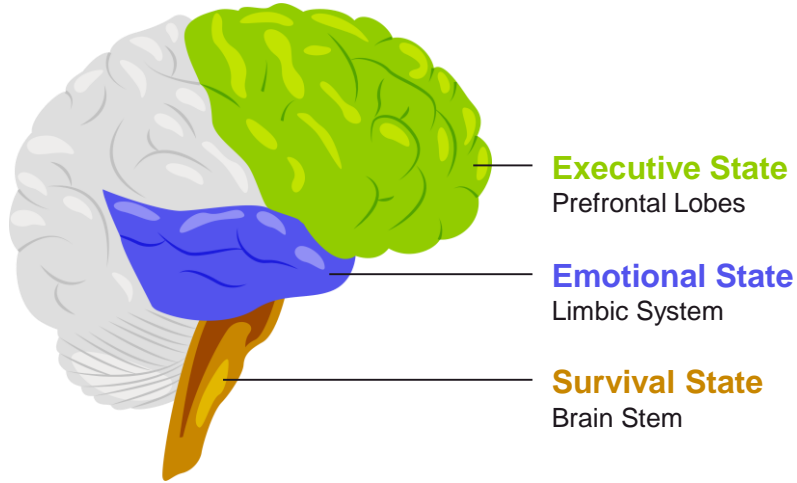
ED visits
reduced
annually for
high utilizers

1. As measured by patients having an appointment with their medical provider x months after their initial intake appointment. DOI: 10.1016/j.jsat.2021.108329

2. As measured by comfort on medical treatment and urine drug screen supporting no ongoing illicit opioid use.

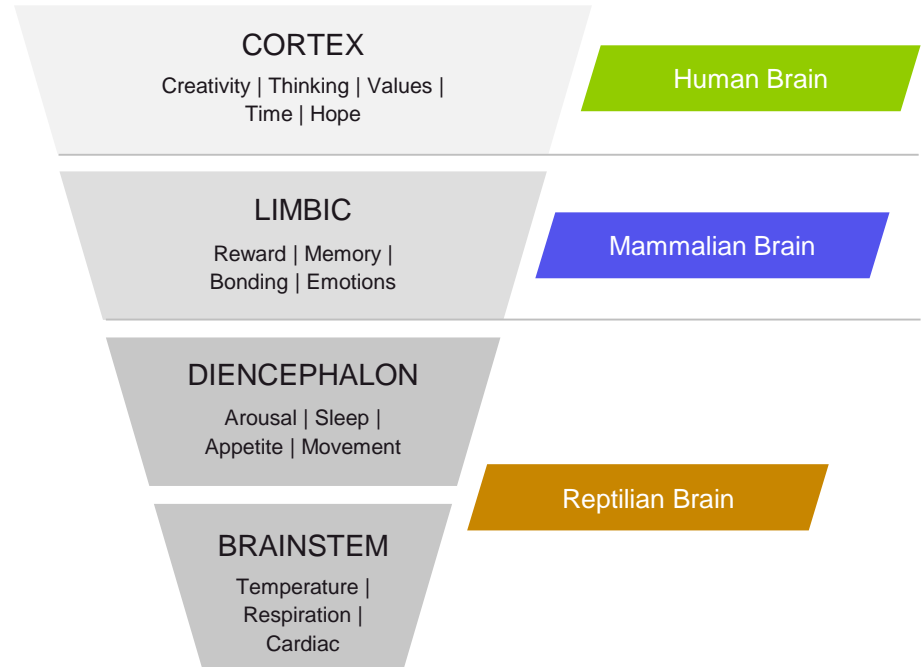
3. As per self reported responses to Bicycle Health's questionnaires

We have 3 brains

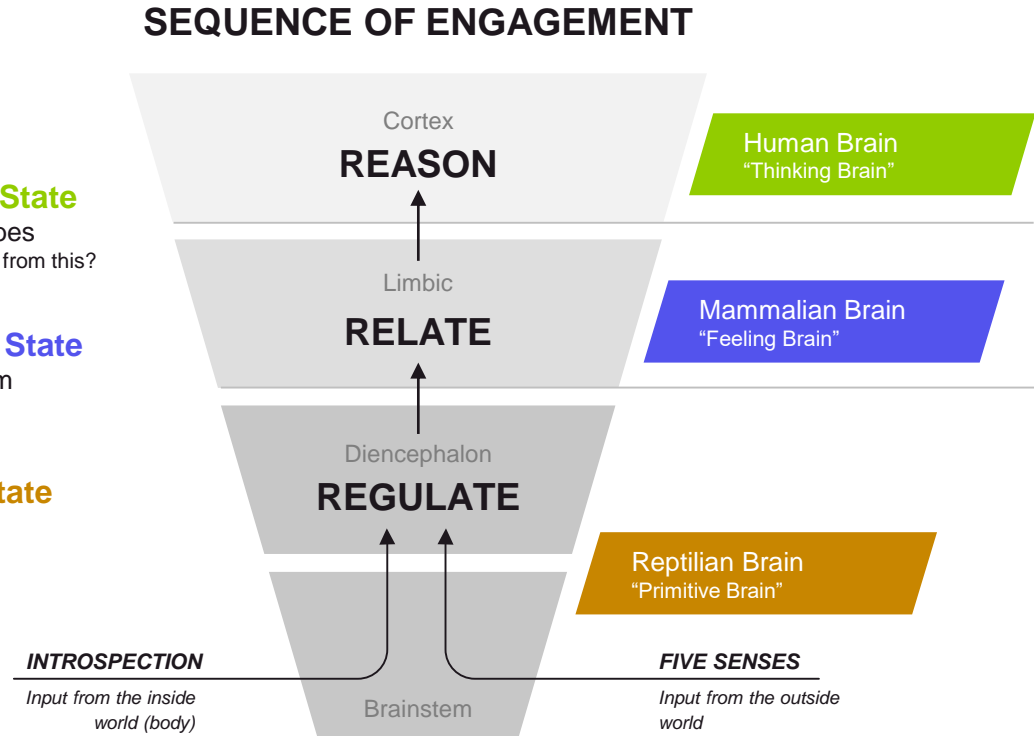
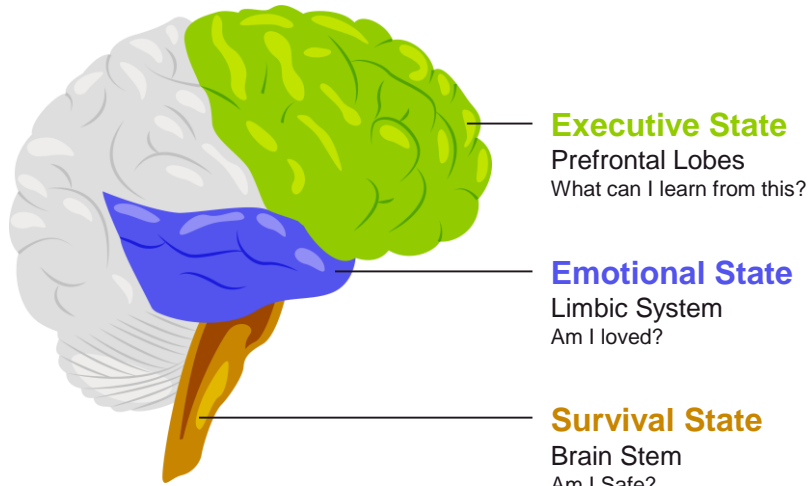


A MODEL OF THE BRAIN

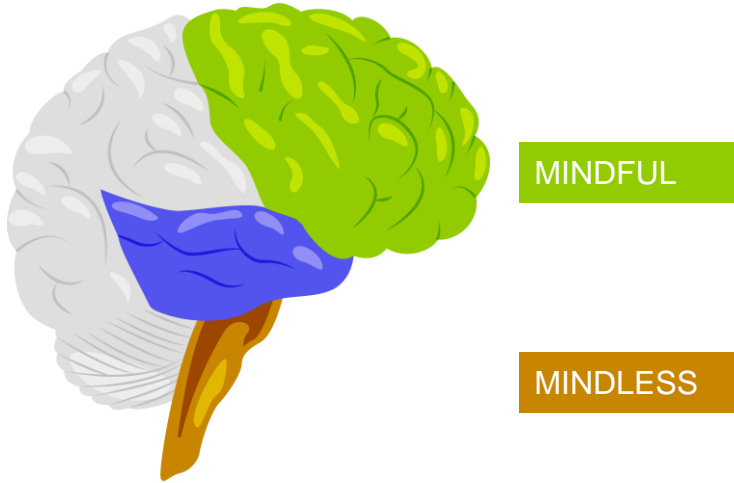
Hierarchical Organization of the human brain



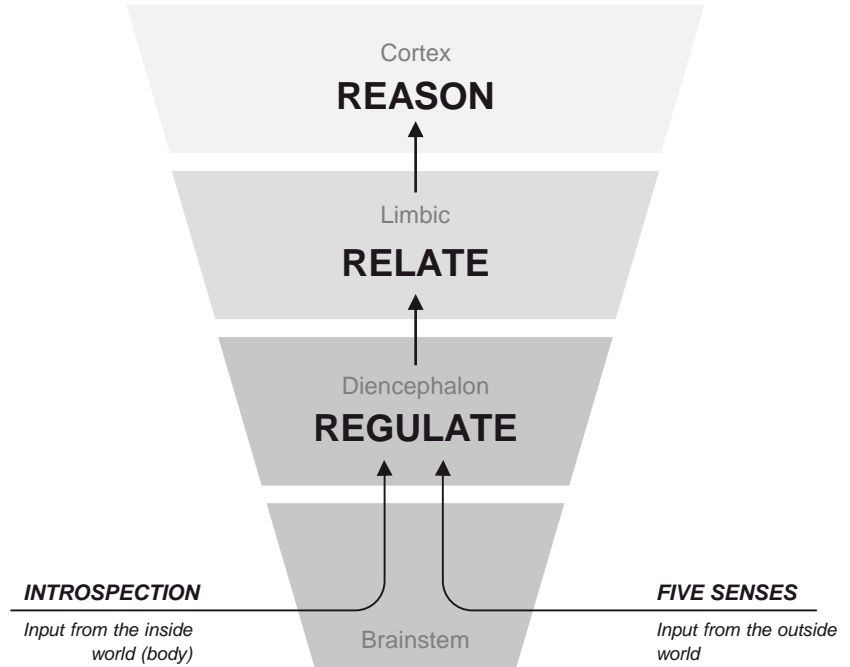
The 3 brains receive information from the world



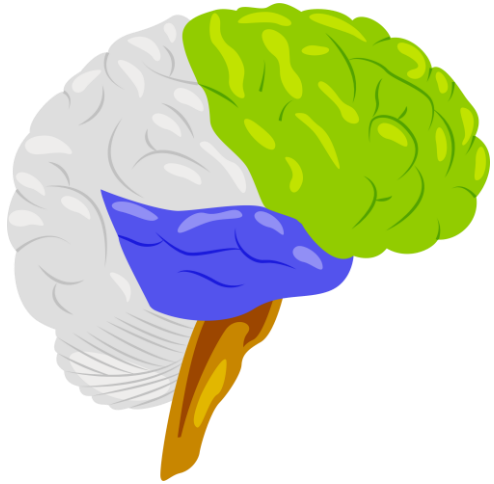
The 3 M's



SEQUENCE OF ENGAGEMENT



The Limbic System is the “MINEFIELD”

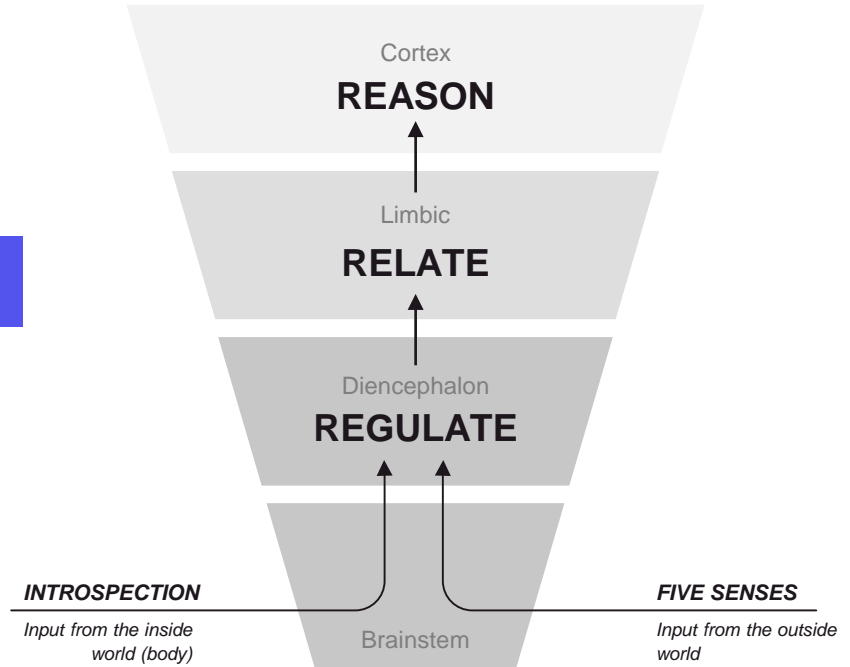


MINDFUL

MINEFIELD

MINDLESS

SEQUENCE OF ENGAGEMENT



Trauma and the Limbic System

Example:

Paddington the Cub tries to play with a kitten and he gets scratched.



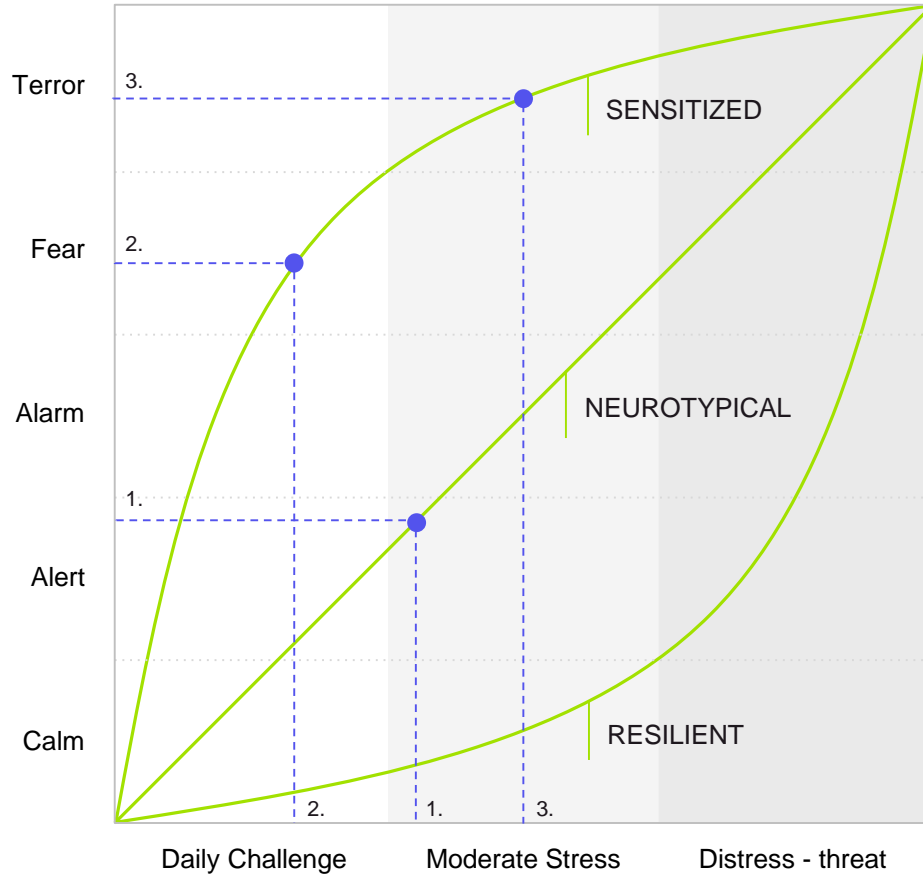
In trauma, the Limbic System hijacks the “Thinking Brain”

External stimuli ~~Sounds the alarm~~ ~~DANGER~~

- Shuts off cortex (thinking brain)
- LS signals release of adrenaline (heart racing, rapid breathing)
- Fight (or flight or freeze)

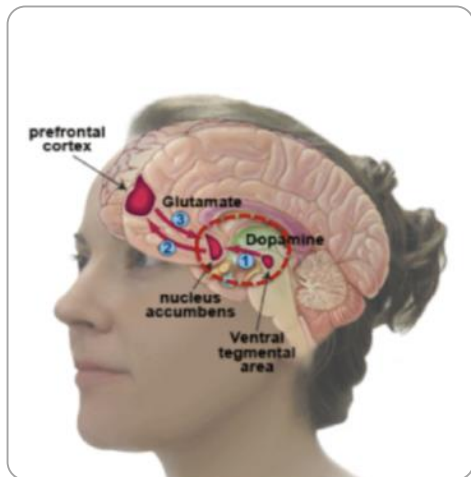


Paddington the Mad/Sad/Scared Bear



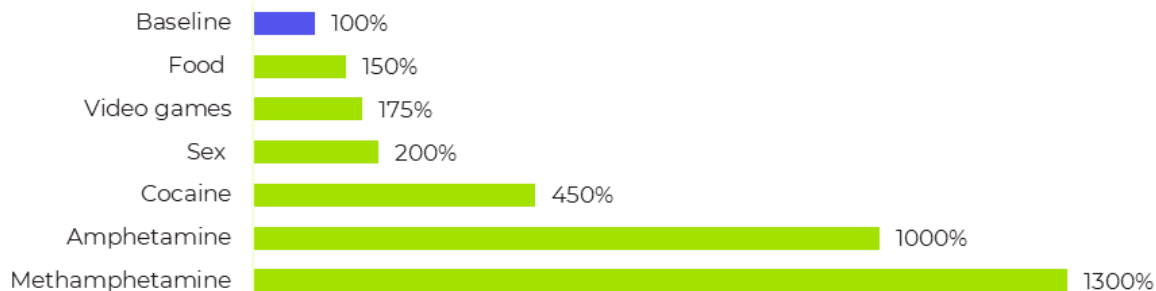
In addiction, the Limbic System hijacks the “Thinking Brain”

- Dopamine reward pathway
- When an intoxicating substance is used, dopamine is released.
- In the limbic system, leads to pleasure, relaxation, reward/motivation.



How much dopamine does an activity release?

Various activities cause the brain to release more dopamine than usual. Enjoying food brings a 50% boost to dopamine levels in the brain, for instance. Video games and Sex also increase dopamine, and drug use does so significantly. It's not reasonable to equate the brain response to drug use with that of video games.



In addiction, the Limbic System hijacks the “Thinking Brain”

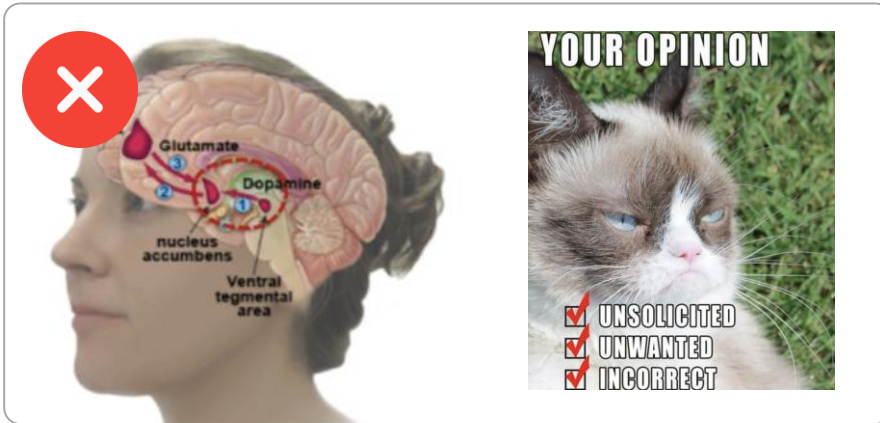
Excessive use leads to:

Over-developed reward pathway
in the Limbic System



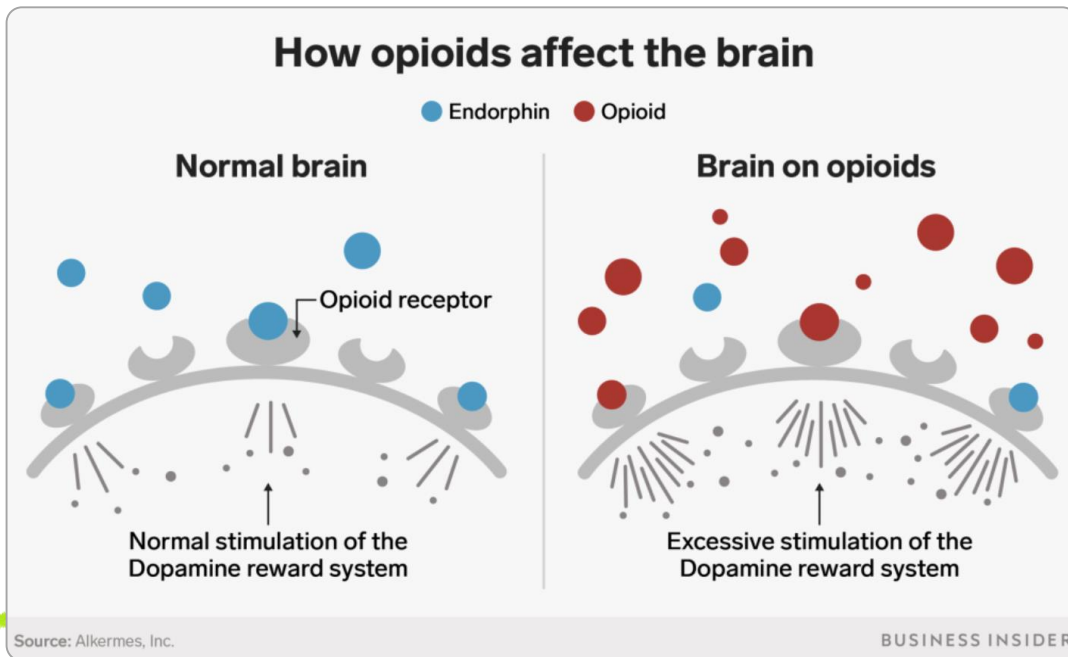
Atrophied connection
with the Cortex

The Limbic system bypasses the thinking brain



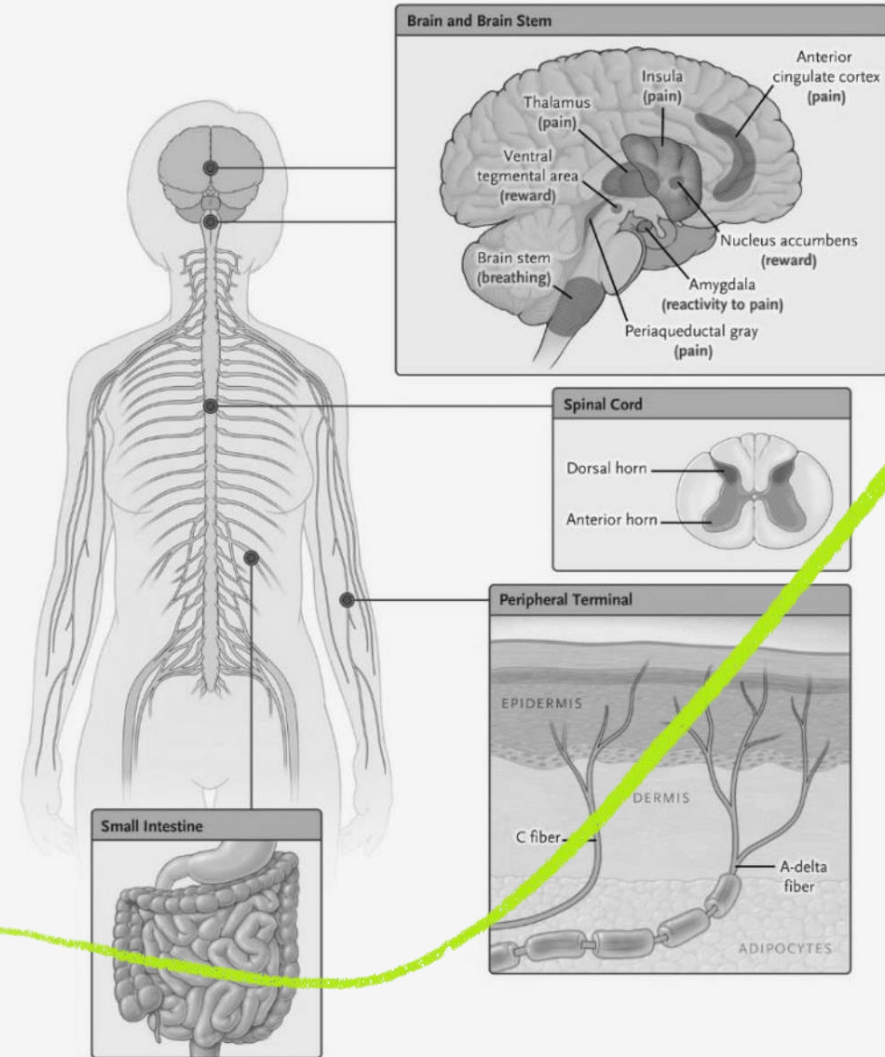
How do opioids play into all this?

- Opioids and endorphins activate opioid receptors.
- Temporarily increase dopamine.
- Increased pleasure and increased motivation/reward.



Where are there opioid receptors?

- Everywhere.
- Cortex and Spinal Cord (pain relief)
- Intestines (constipation)
- Limbic System (pleasure/euphoria, decreased fear and anxiety)
- Brainstem (breathing)



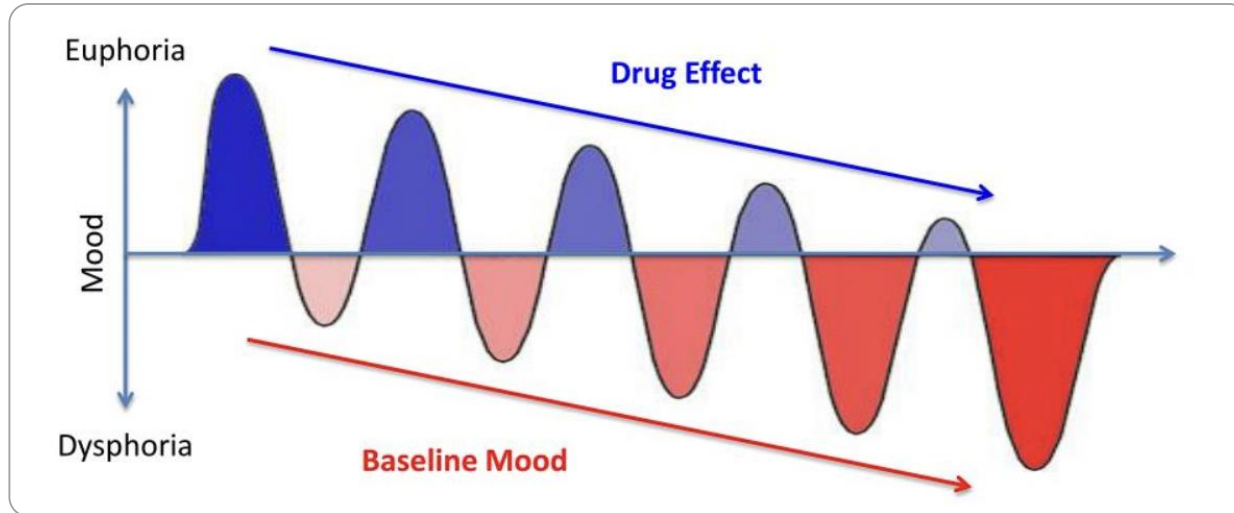
What are the effects of chronic opioid use?

Less and less Dopamine released



More and more Opioids required

Homeostasis has changed



What are the effects of chronic opioid use?



Less and less
dopamine
released



More and more
opioids required

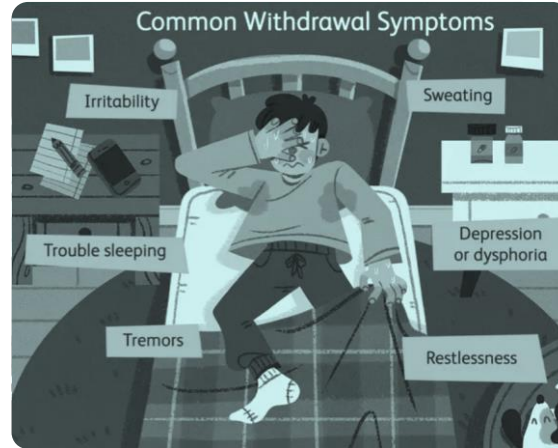
Homeostasis has changed

The opioid receptor has changed!

What are the effects of chronic opioid use?



Withdrawal symptoms when the couch is unoccupied



In opioid addiction, two things going on

Distorted and altered opioid receptors
aka **The Unhappy Couch**



Dysregulated limbic system aka **Paddington
the Sad/Mad/Scared Bear**



Opportunity to de-personalize, de-pathologize, de-stigmatize

“Thinking Brain” has been hijacked by the
Limbic System

aka the Sad/Mad/Scared Bear

Blaming, shaming, “Just stop using drugs”



Historically trying to improve the “Thinking Brain” aka the
Bear Trainer’s competency
(or write off as “weak” or “lazy”)

How can we expect a bear trainer to tame a bear
in distress?

How do opioids play into all this?

Heroin, hydrocodone, oxycodone, fentanyl are short-acting

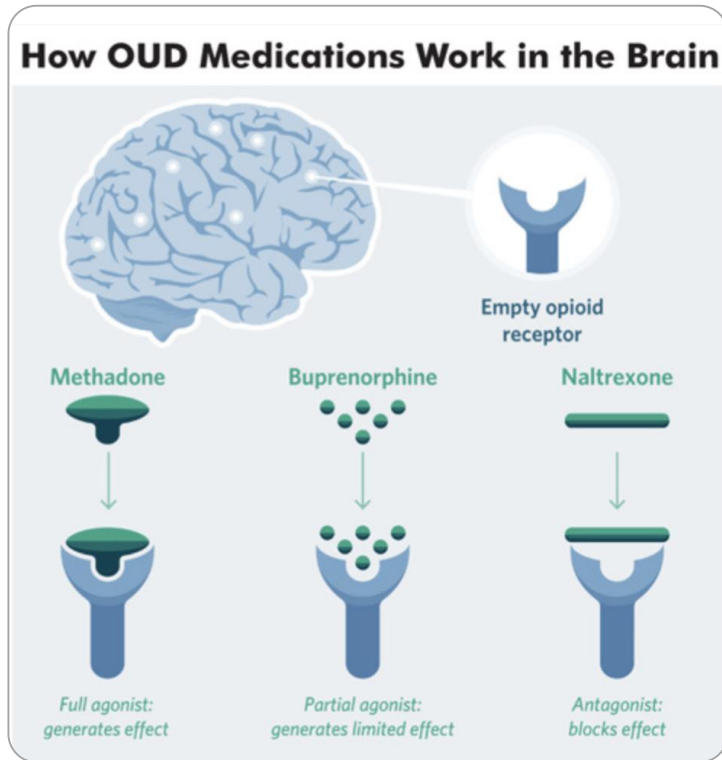
Transient + heavy-weight, i.e., couch surfers

Methadone

Longer stay + heavy-weight, i.e., Airbnb (group of 4 with lots of luggage)

Buprenorphine

Longer stay, BUT light-weight, i.e., tiny house Airbnb (single person, 1 pack)



How do Buprenorphine and Methadone work?



Which one is better?

Opioid Blocking

Euphoria

Regulations

Induction Challenges

Overdose Risk



Which one is better?

Opioid Blocking

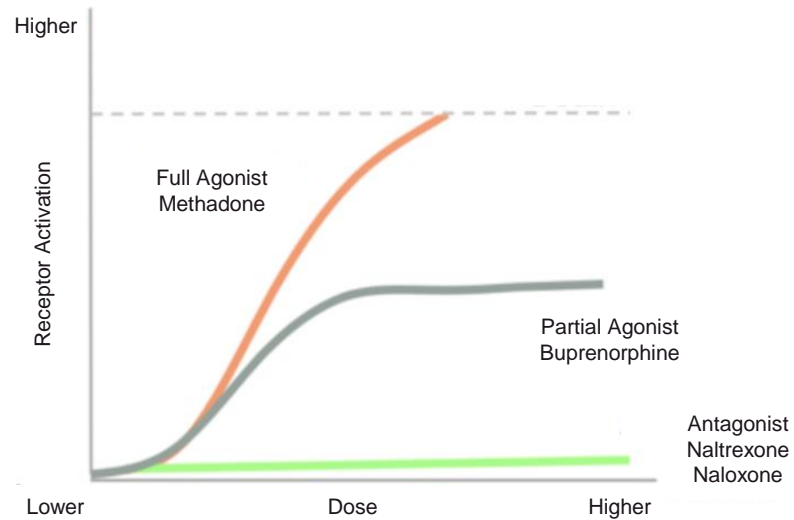
Euphoria

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MAT for Opioid Use Disorders: How they Work



Which one is better?

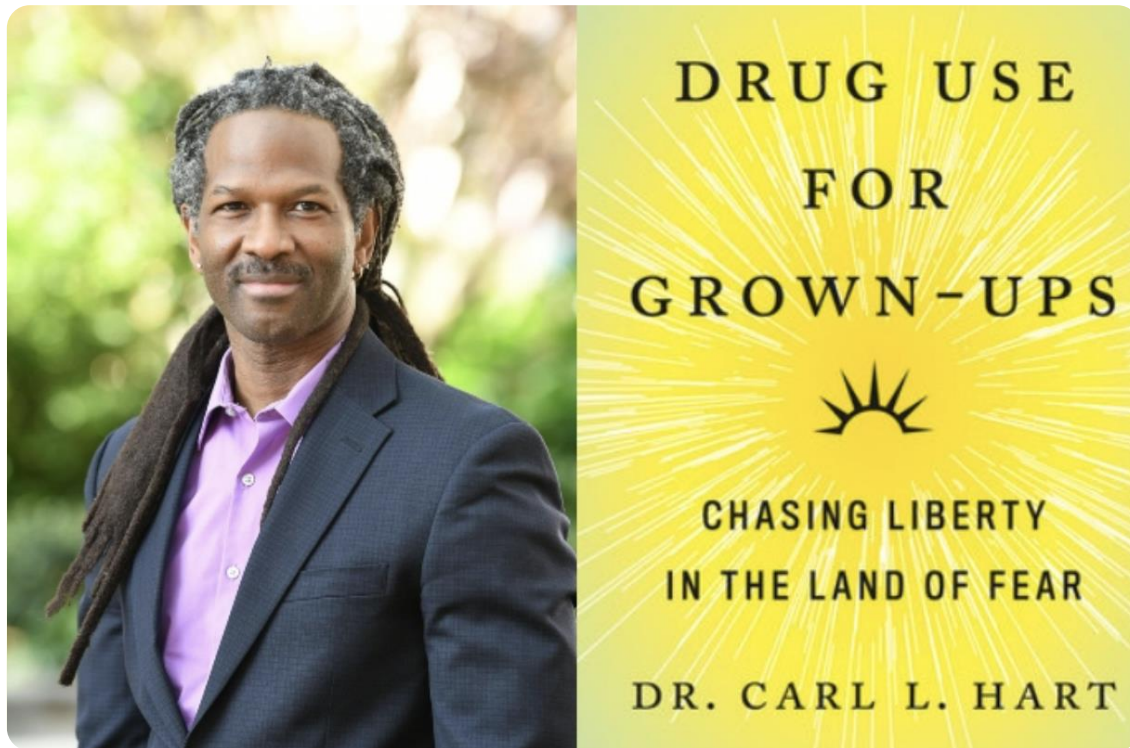
Opioid Blocking

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Which one is better?

Opioid Blocking

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Chartbook

THE PEW CHARITABLE TRUSTS

Sept 2022



Overview of Opioid Treatment Program Regulations by State

Restrictive rules put evidence-based medication treatment out of reach for many

The Pew Charitable Trusts

Which one is better?

Opioid Blocking

Euphoria

Regulations

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Overdose Risk

Fentanyl has been found locally in these substances:

M30 pills

These are the most common pills containing fentanyl in our area.



V48 & A215 pills

These pills, although less common, may also contain fentanyl.



Powders

Fentanyl can also be found in white powders.



Public Health
Seattle & King County 

Which one is better?

Opioid Blocking

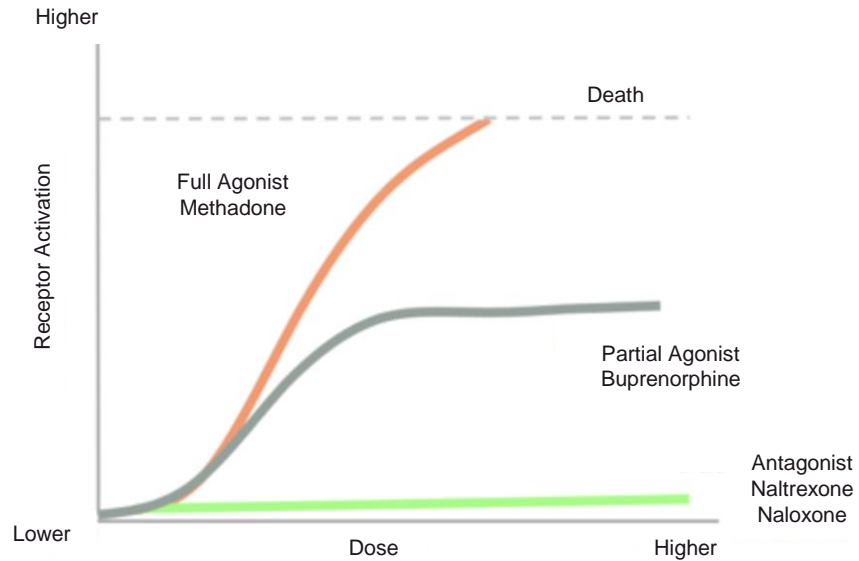
Euphoria

Regulations

Induction Challenges

Overdose Risk

MAT for Opioid Use Disorders: How they Work



Key Points

Addiction is an illness of the “Feeling Brain”

The limbic system hijacks the “Thinking Brain”

Stop blaming the trainer.

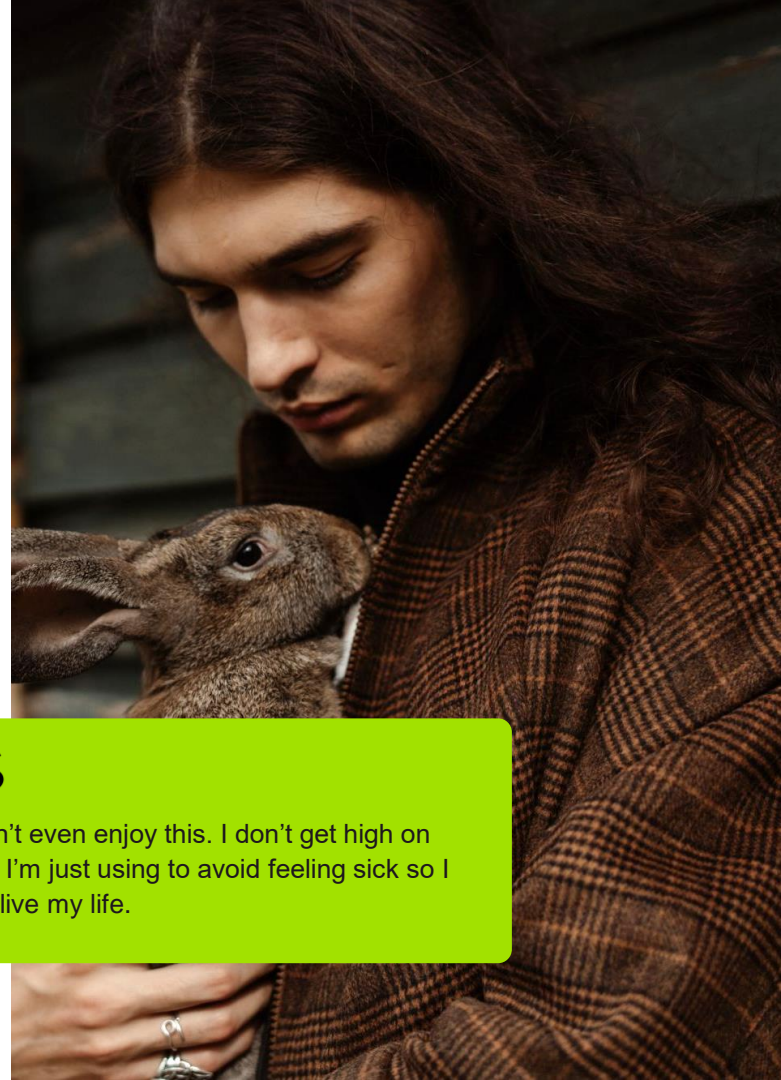
Opioid use disorder also involves distorted opioid receptors.

Terrible cycle of dosing and withdrawal.

Buprenorphine allows the unhappy opioid receptors to settle down and re-calibrate...

so the “butt groove” gradually diminish.

Near-zero overdose risk!



“

I don't even enjoy this. I don't get high on this. I'm just using to avoid feeling sick so I can live my life.

References

Perry, B.D., (The ChildTrauma Academy). (2013) 1: The Human Brain [Video webcast]. In Seven Slide Series. Retrieved from <https://www.youtube.com/watch?v=uOsgDkeH52o>

Winfrey, O., Perry, B. D. (2021). What Happened to You? Conversations on Trauma, Resilience, and Healing. United States: Flatiron Books.

The Pew Charitable Trusts. (2016, November 22). *Medication-assisted treatment improves outcomes for patients with opioid use disorder*. The Pew Charitable Trusts. Retrieved February 16, 2023, from <https://www.pewtrusts.org/en/research-and-analysis/fact-sheets/2016/11/medication-assisted-treatment-improves-outcomes-for-patients-with-opioid-use-disorder>

Thank you



Behavioral Health Awareness Series

If you are an Evernorth or Cigna customer and have questions about Substance Use treatment or about your benefits and how to use them, please contact:

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