

# The Cycle of Addiction and Challenges of the Opioid Crisis

One perspective from the Emergency  
Department

Dr. Sean Wilde, MD CCFP-EM

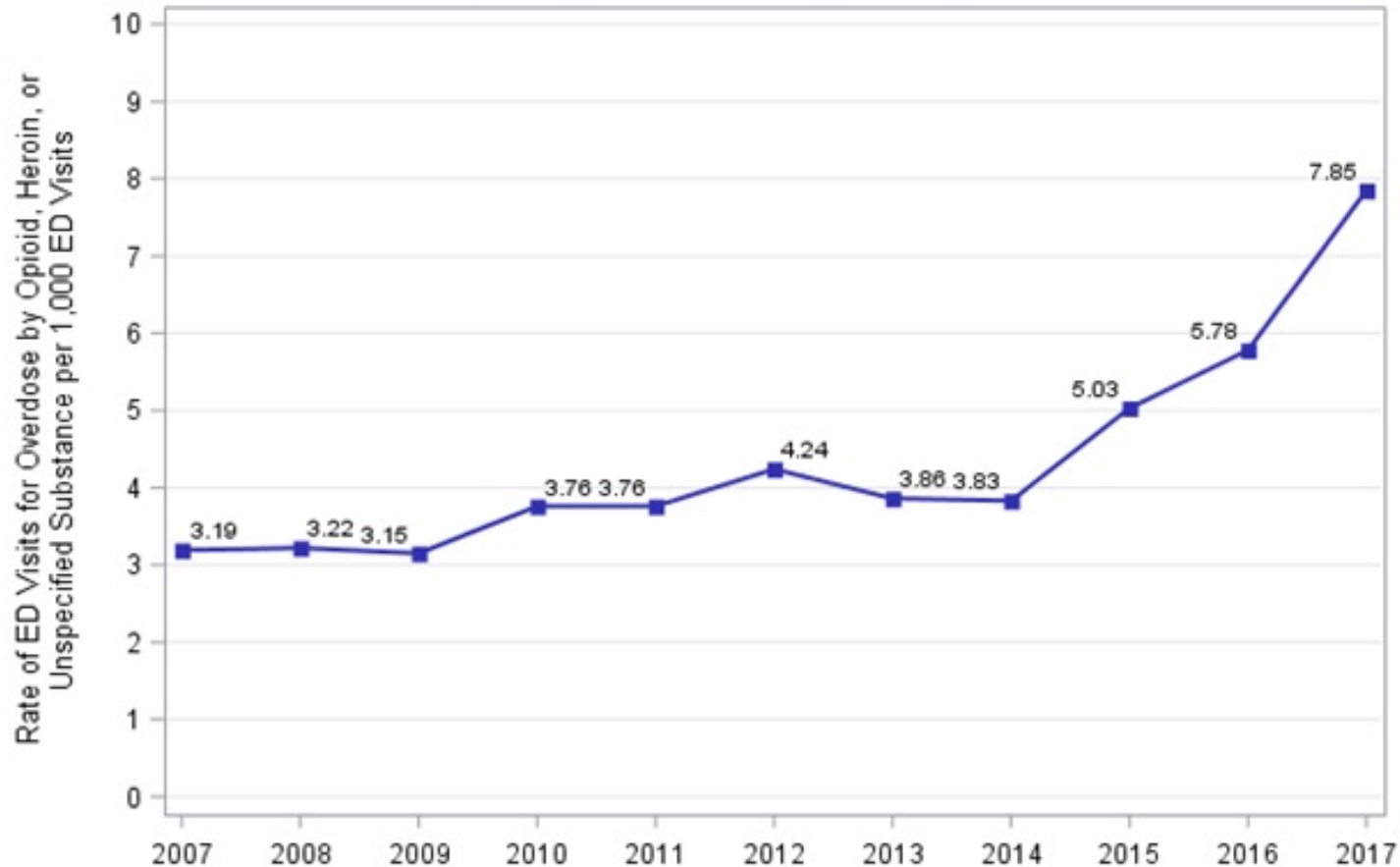
# Questions to Address:

- What do we mean when we say “Addiction is a brain disease?”
- What are the implications?



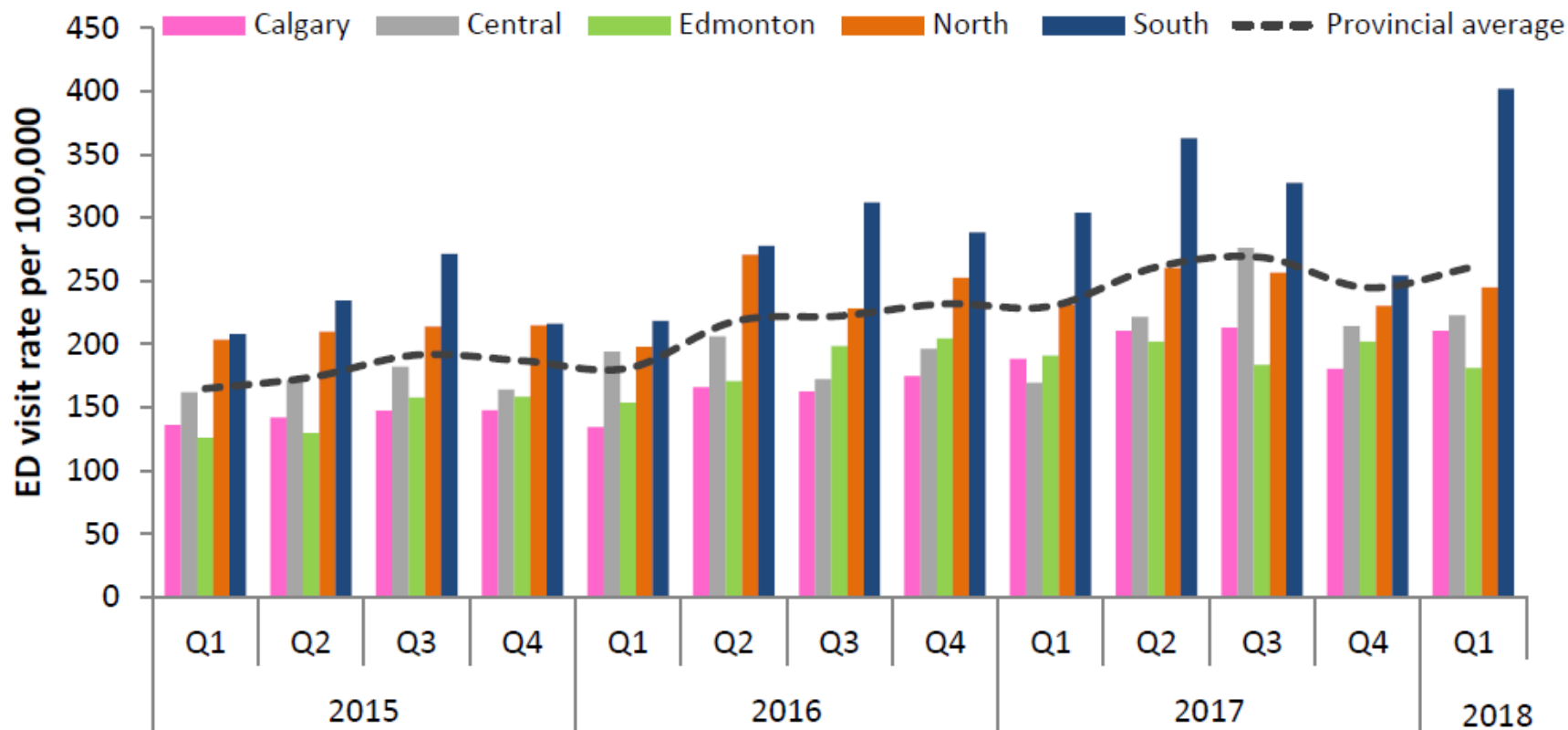
# It's not just local... Philadelphia

**Rate of ED Visits for Overdose by Opioid, Heroin, or Unspecified Substances per 1,000 Visits by Year, 2007-2017**



# Emergency department visits

**Figure 13:** Rate of emergency department (ED) visits related to opioid use and other substances of misuse, by quarter and Zone, per 100,000 person years. January 1, 2015 to March 31, 2018.



South Zone: 54% higher than provincial average

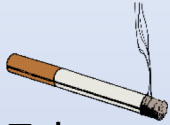
\*\* For all Substance Abuse visits \*\*



Alcohol

## Globally (2016)

- 3 million deaths per year
- Implicated in > 200 different health conditions



Tobacco

- Leading cause of heart and lung disease
- Various cancers



Cannabis

- Cannabis hyperemesis syndrome
- Intoxication and smoke inhalation risks
- Exacerbates some mental illness (psychosis)



Opioids

- Common chronic dependence
- New street drugs = high risk of death



Stimulants

- Cocaine, crack, amphetamines
- Agitation, irrationality, psychosis, dangerous behavior
- “Physiologic Overdrive” can be fatal

**FEATURE**

## Winnipeg: A city wide awake on crystal meth



Social worker says crystal meth 'is absolutely rampant' in Winnipeg

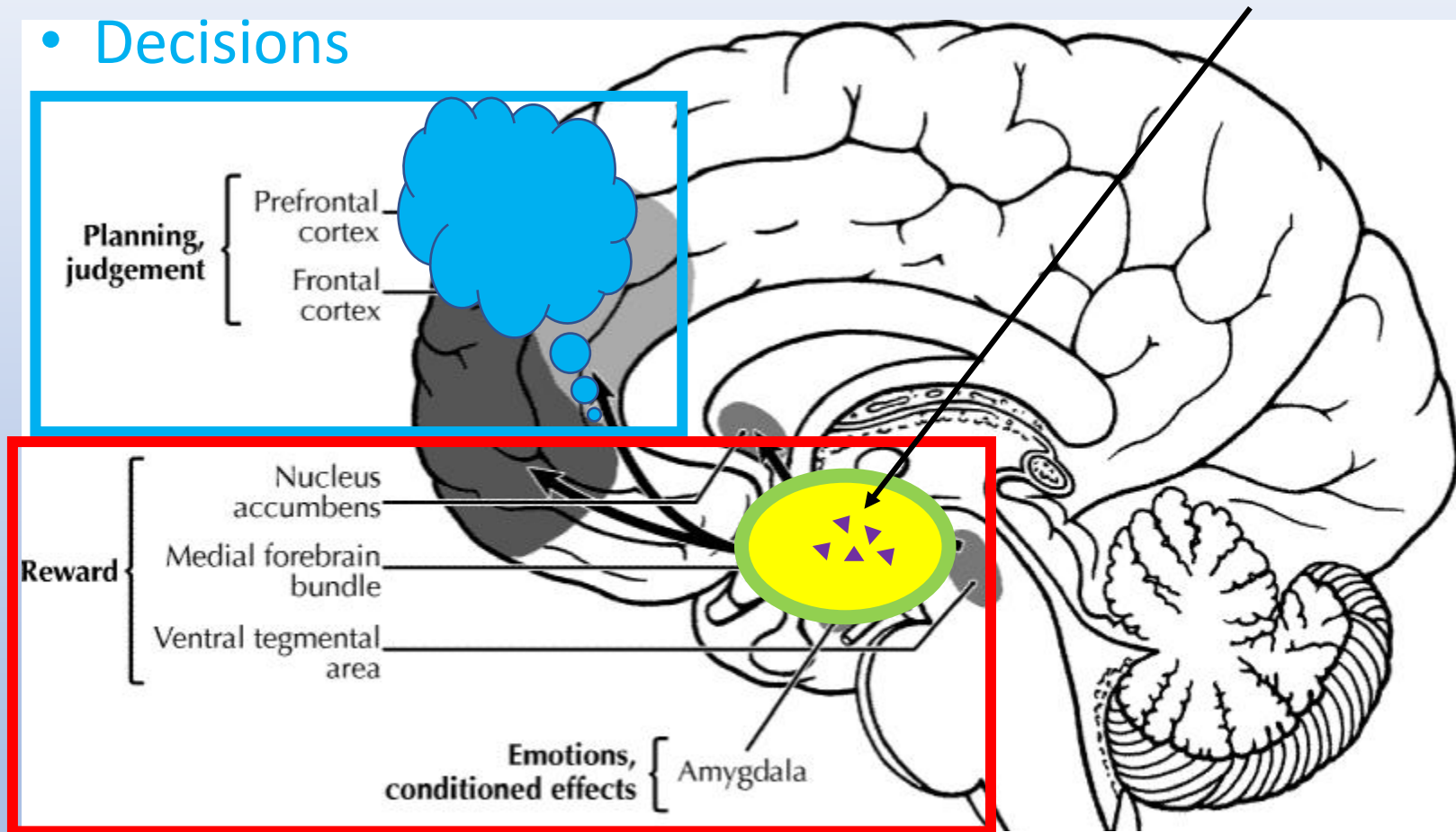
Jill Coubrough · CBC News · Posted: Oct 22, 2017 7:00 PM CT | Last Updated: October 23, 2017



# The “thinking” rational brain

- Judgement
- Decisions

Neurotransmitters



## The instinctive “reptilian” brain

- Survival needs
- Seek pleasure, avoid pain



# Dopamine:

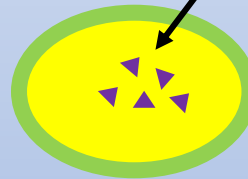


## Neurotransmitters

- + pleasure, motivation, energy
- +++ anxiety, psychosis, physiologic over-drive
- fatigue, loss of motivation/pleasure

### “Reward” Pathway

- Pleasure
- Reinforcement
- Motivation to repeat



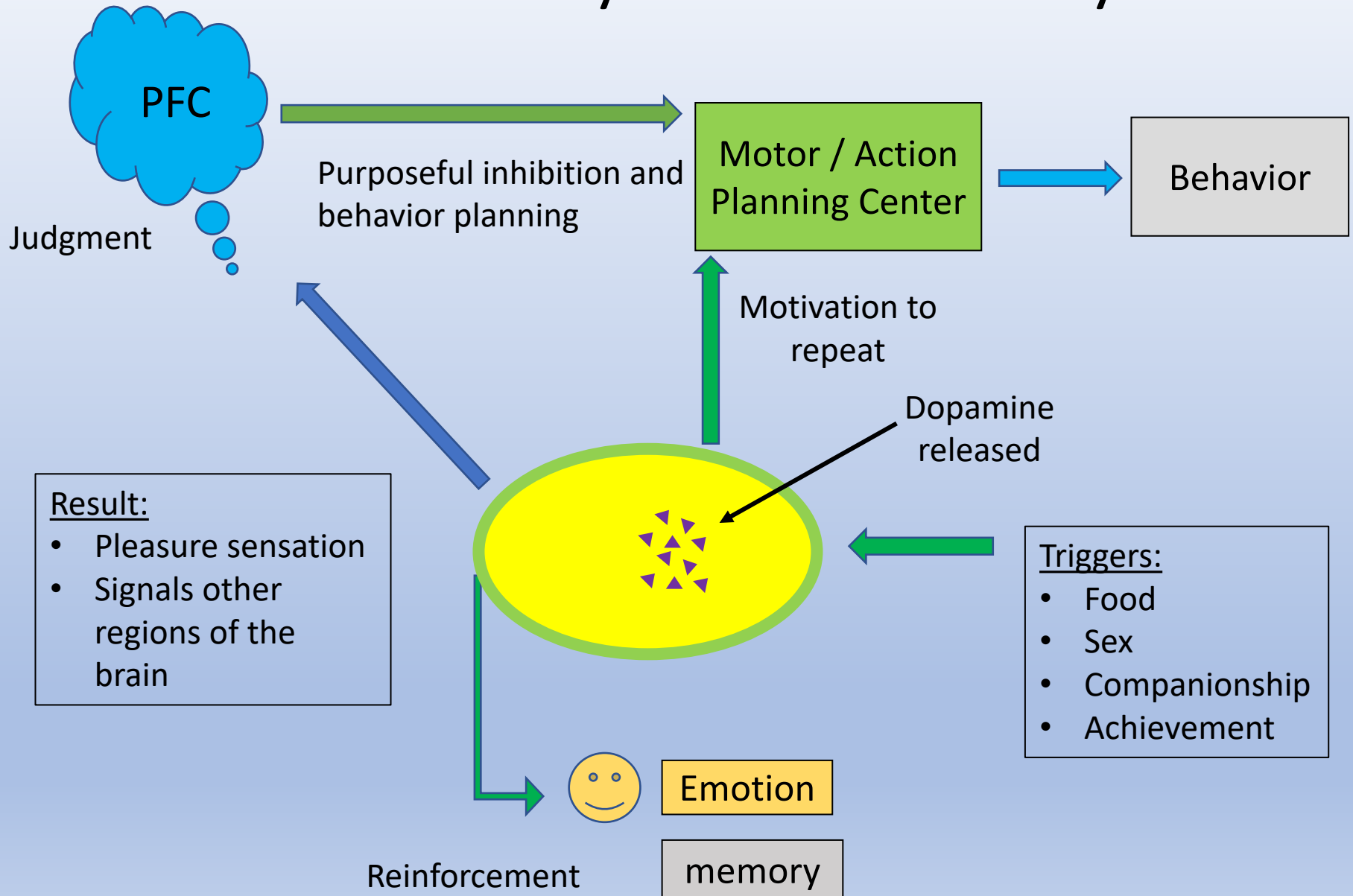
### Dopamine Triggers:

- Food
- Sex
- Achievement
- Winning

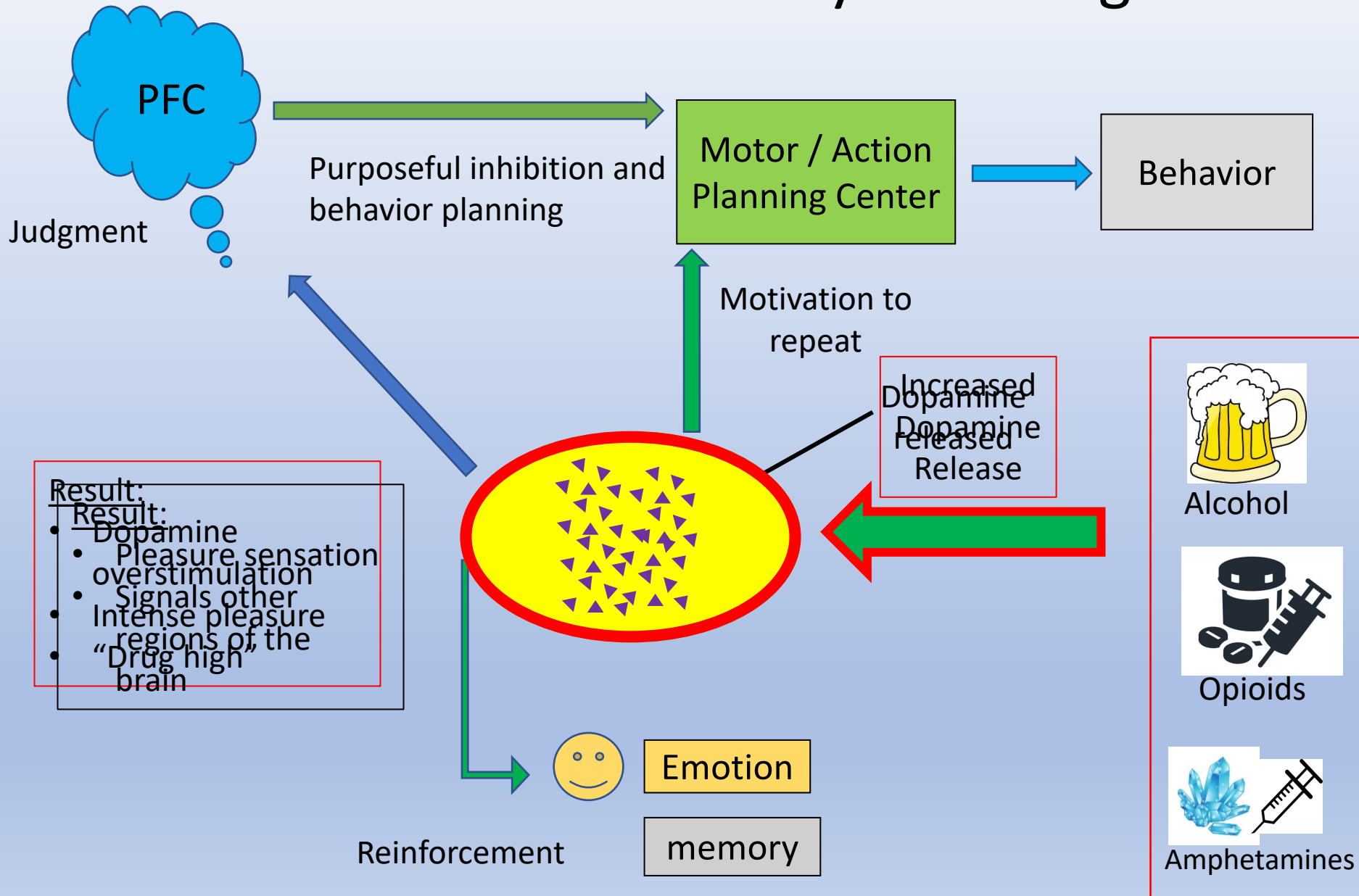
Vital: No dopamine = no motivation to act



# The Healthy Reward Pathway

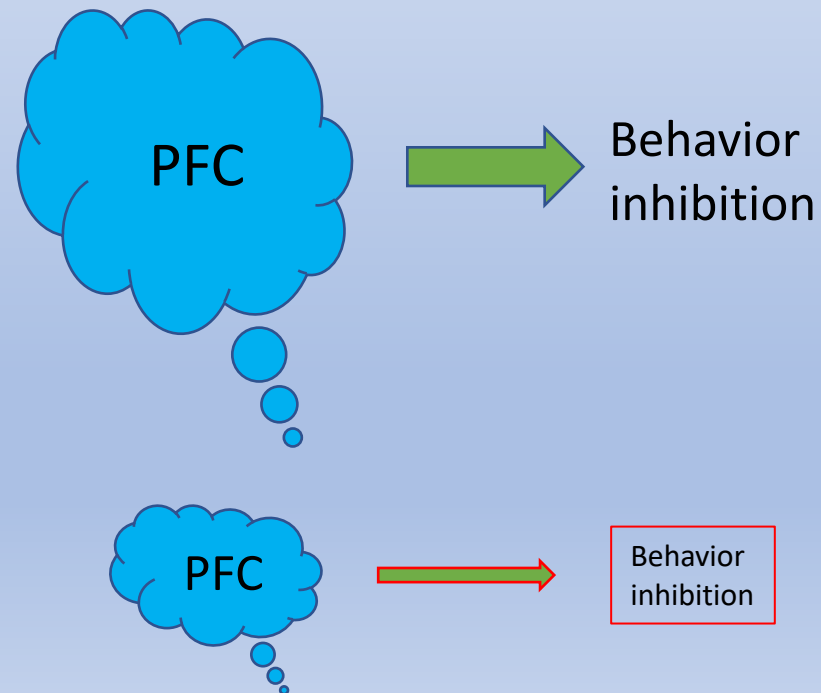
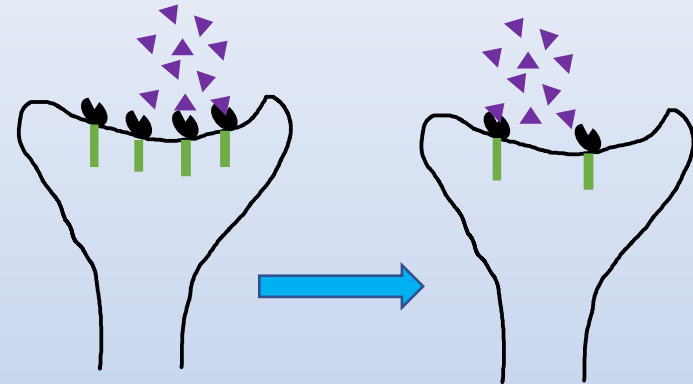


# The Reward Pathway and Drugs



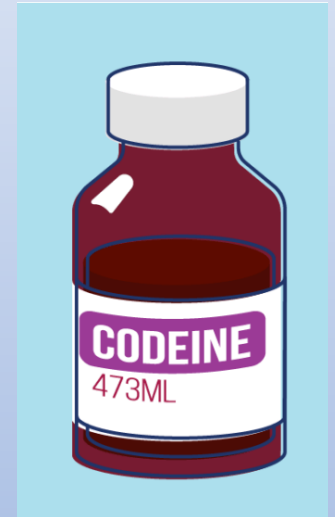
# Results of Excessive Dopamine

- Body makes fewer dopamine receptors
  - Tolerance = more drug for same effect
  - “Natural highs” no longer work
  - No drug = dopamine deficiency
- Prefrontal Cortex
  - Dopamine receptor loss leads to weaker inhibitory feedback





# Opioids



## Endorphins

- + Pain relief, lower anxiety, human bonding and love
- +++ Sedation, decreased respiratory drive
- Hypersensitivity to pain, impaired social bonding



## MEDICAL TREATMENTS

# Massachusetts Sues OxyContin Maker Purdue Pharma, Saying It 'Peddled Falsehoods'

June 13, 2018 · 2:40 PM ET



COLIN DWYER



**"Ask your doctor  
if OxyContin is  
right for you."**

A pharmacist holds a bottle of OxyContin earlier this year at Daniel's Pharmacy in San Francisco.

Jeff Chiu/AP

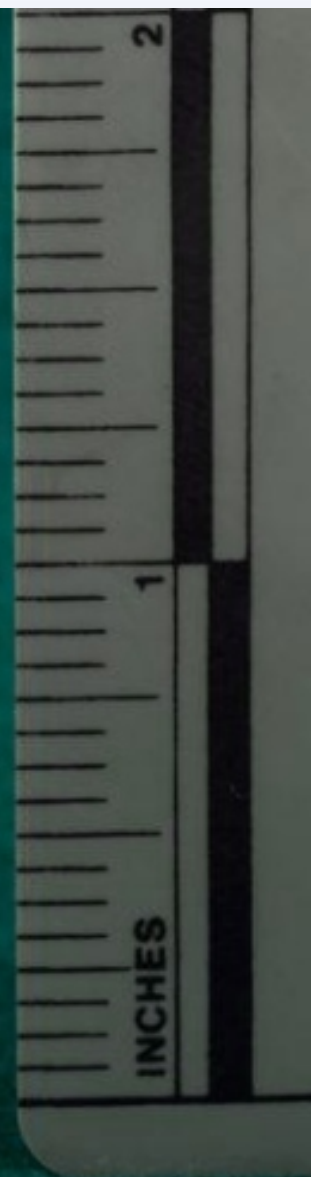
# The 2017 Canadian Guideline for Opioids for Chronic Non-Cancer Pain

## methadone maintenance treatment

client  
handbook

REVISED







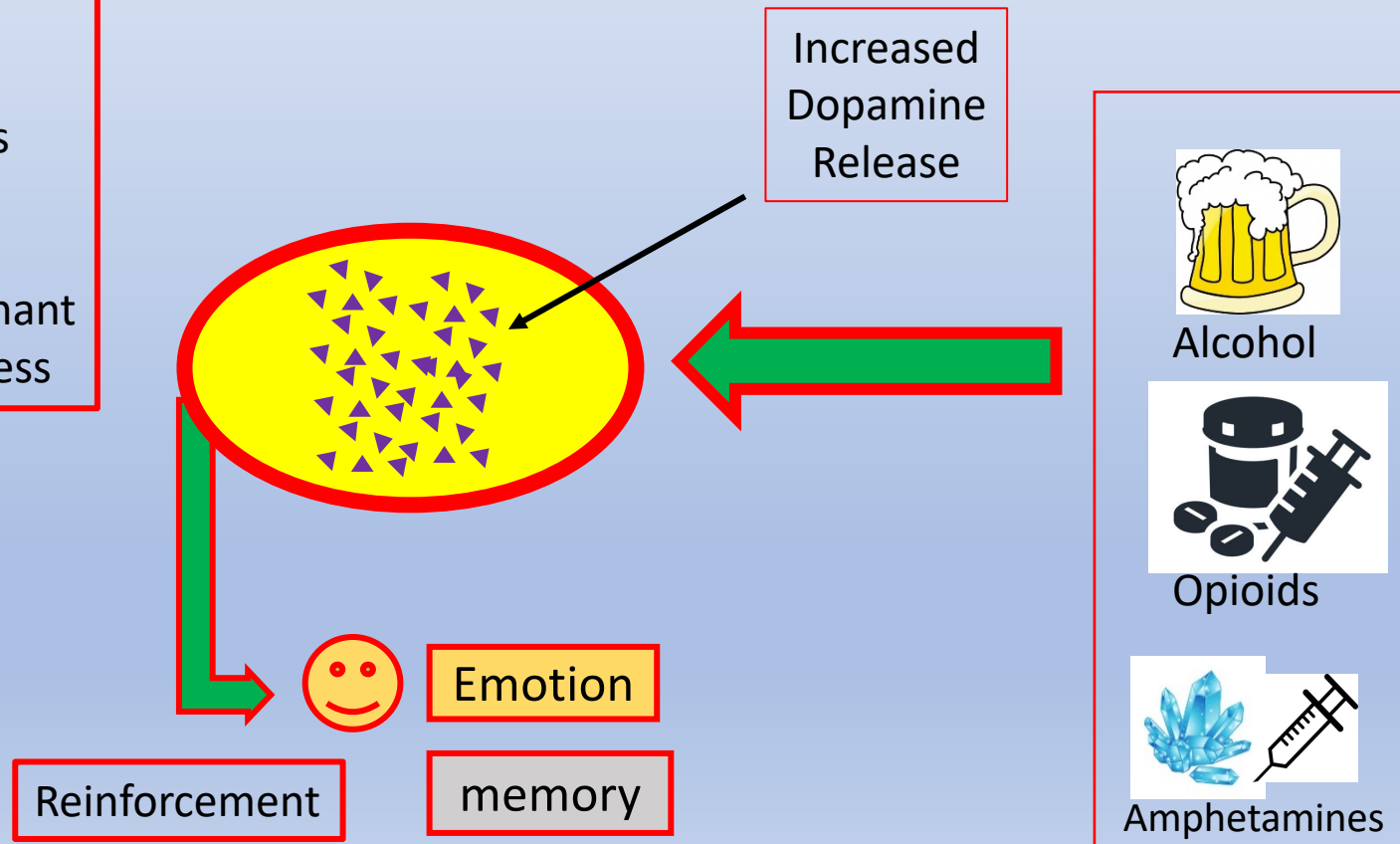
# Substance Addiction:

The continued use of a substance despite obvious and repeated harmful effects on your life

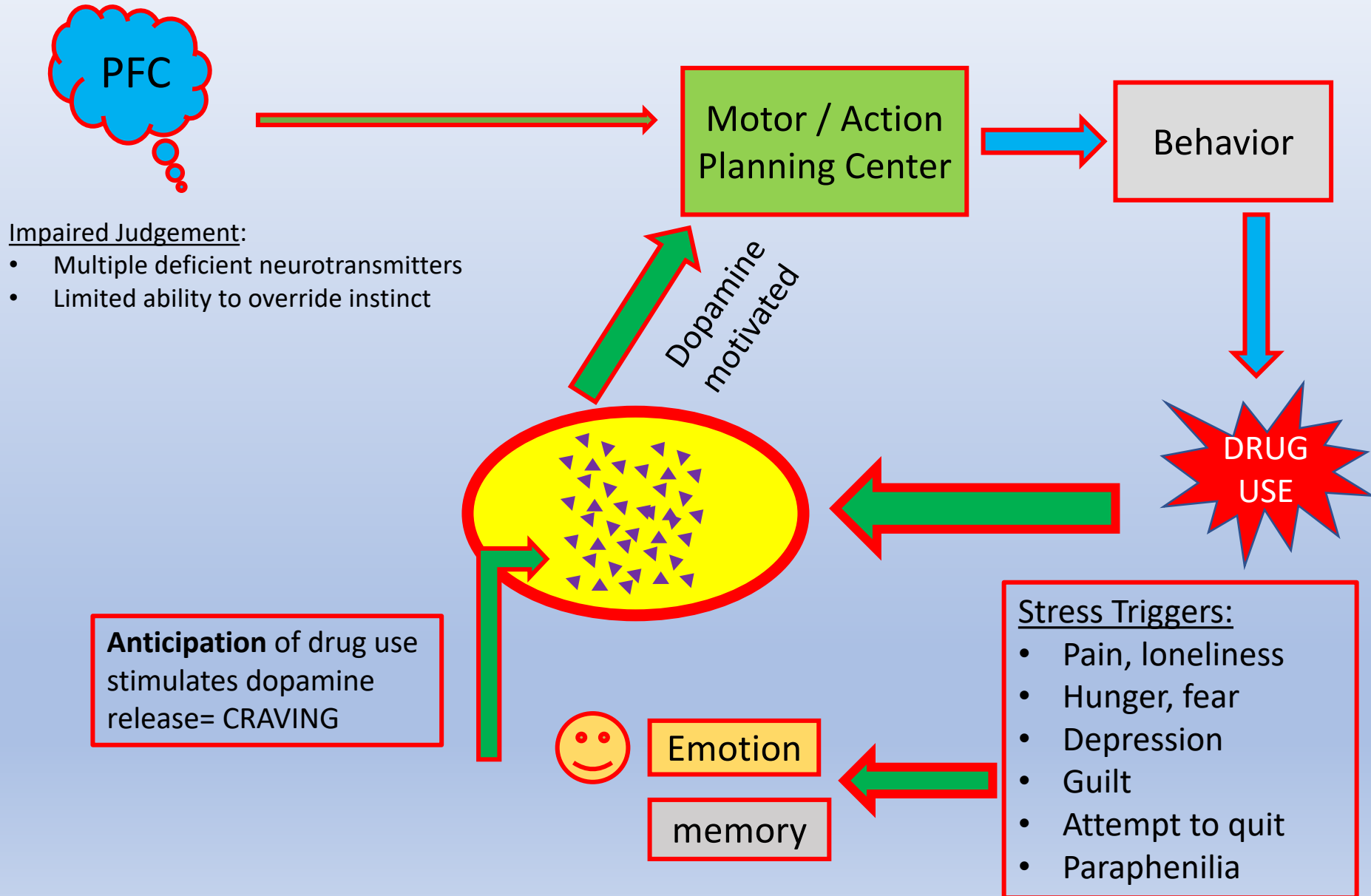
# Drug Learning in the Reptilian Brain

## Result:

- “Drug high”
- Brain associates drug use with survival
- Becomes dominant response to stress



# The Drug Modified Reward Pathway

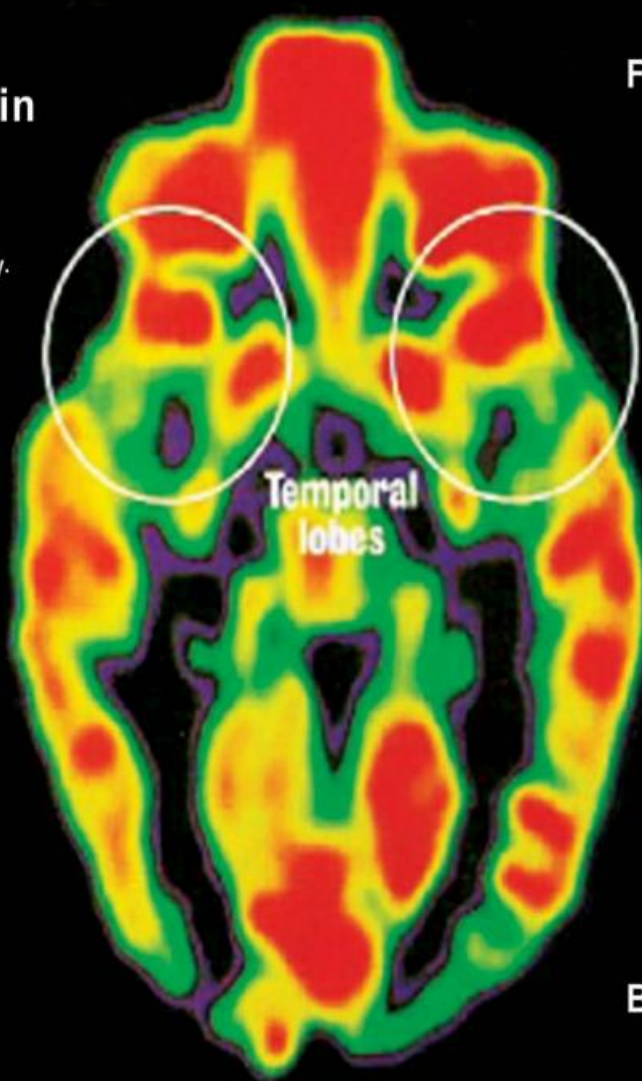


# Trauma Predisposes to Addiction:

- Hardest using street drug populations almost always survivors of early life trauma
- Trauma can cause some of the same brain changes as drug abuse.
- Abused brain is primed for addiction
- One mechanism of inter-generational Trauma
- Untreated mental health disorders have similar effect.

## Healthy Brain

This PET scan of the brain of a normal child shows regions of high (red) and low (blue and black) activity. At birth, only primitive structures such as the brain stem (center) are fully functional; in regions like the temporal lobes (top), early childhood experiences wire the circuits.

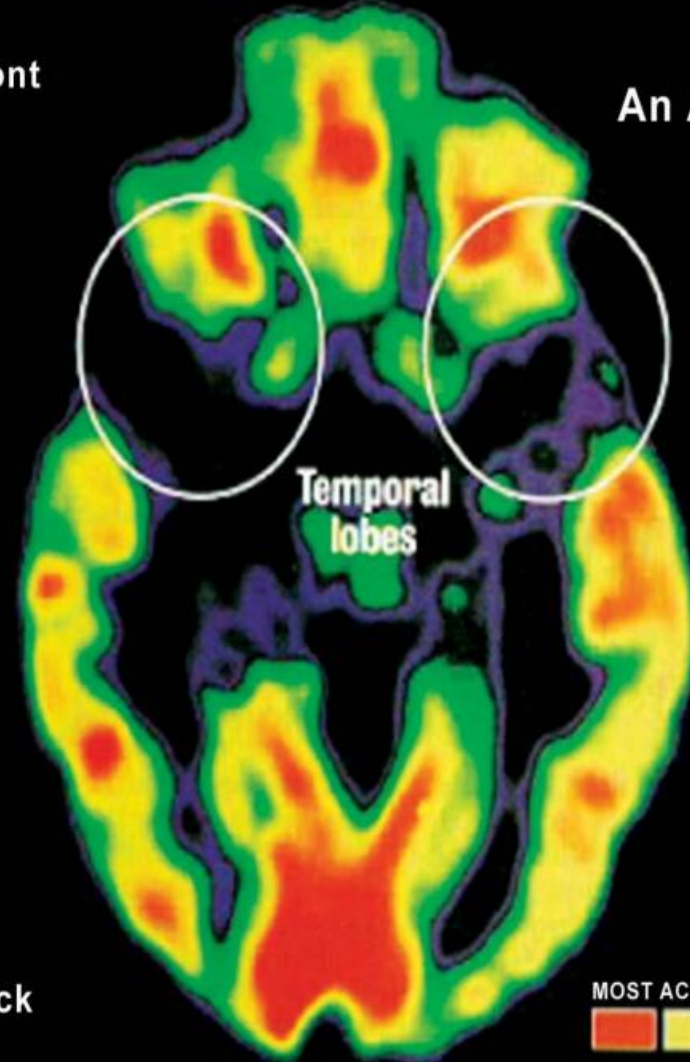


Front

Back

## An Abused Brain

This PET scan of the brain of a Romanian Orphan, who was institutionalized shortly after birth, shows the effect of extreme deprivation in infancy. The temporal lobes (top), which regulate emotions and receive input from the senses, are nearly quiescent. Such children suffer emotional and cognitive problems.



MOST ACTIVE    LEAST ACTIVE

Red	Yellow	Green	Blue	Black
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# The way out

- Paradoxically, way out of addiction starts with choice by the user to change
- Need to make same choice many times as will fail often
- Retrain use of the Pre-frontal cortex
- Brains can be re-trained
  - Neuroplasticity
- Requires significant external support, and addressing inciting and concomitant trauma and mental health.

# Successful Addiction Treatment Includes:

- Recognizing the biological loss of control of the users actions
- Extending the opportunity for recovery entry with harm reduction
- Medically supervised therapy to reduce cravings
- Removal from the drug using environment
- Simultaneous treatment of past abuse and mental illness
- Emotionally supportive human connections
- Meaningful small victories to train the brain to assert cognitive control over impulses
- Acceptance of the relapse and recovery cycle



# Primary Sources

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# Suggested Reading

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- Maté, Gabor. In the Realm of Hungry Ghosts: Close Encounters with Addiction. 2009. Vintage Canada.
  - [https://www.amazon.ca/Realm-Hungry-Ghosts-Encounters-Addiction/dp/0676977413/ref=sr\\_1\\_1/137-7481152-1060144?ie=UTF8&qid=1538877491&sr=8-1&keywords=in+realm+of+hungry+ghosts](https://www.amazon.ca/Realm-Hungry-Ghosts-Encounters-Addiction/dp/0676977413/ref=sr_1_1/137-7481152-1060144?ie=UTF8&qid=1538877491&sr=8-1&keywords=in+realm+of+hungry+ghosts)