NCIC Education Conference

Substance Use Disorders and Recovery

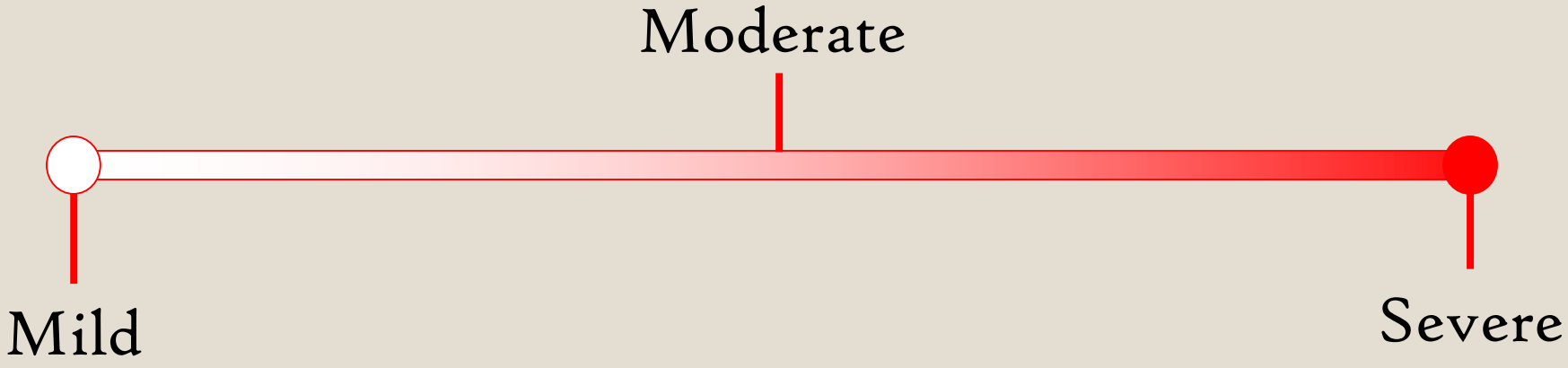
AMANDA BLUE, MSW, LCSW, LCAS

OCTOBER 06, 2016

Case Study

Initiating and Sustaining Recovery

- Problem severity



Initiating and Sustaining Recovery

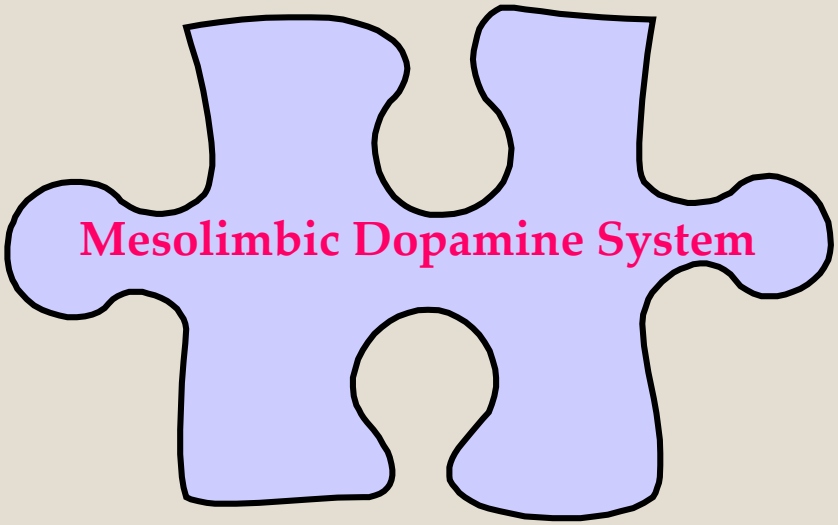
- Problem complexity
  - Addiction
  - Addiction + Mental Illness
  - Addiction + Mental Illness – Housing – Social Supports
- Recovery capital
  - Internal and external resources that can be mobilized
- Access to appropriately designed services

Many Paths Into Recovery

- Solo (natural) recovery
- Peer Assisted
  - Mutual Support groups (i.e. Alcoholics Anonymous)
- Treatment Assisted

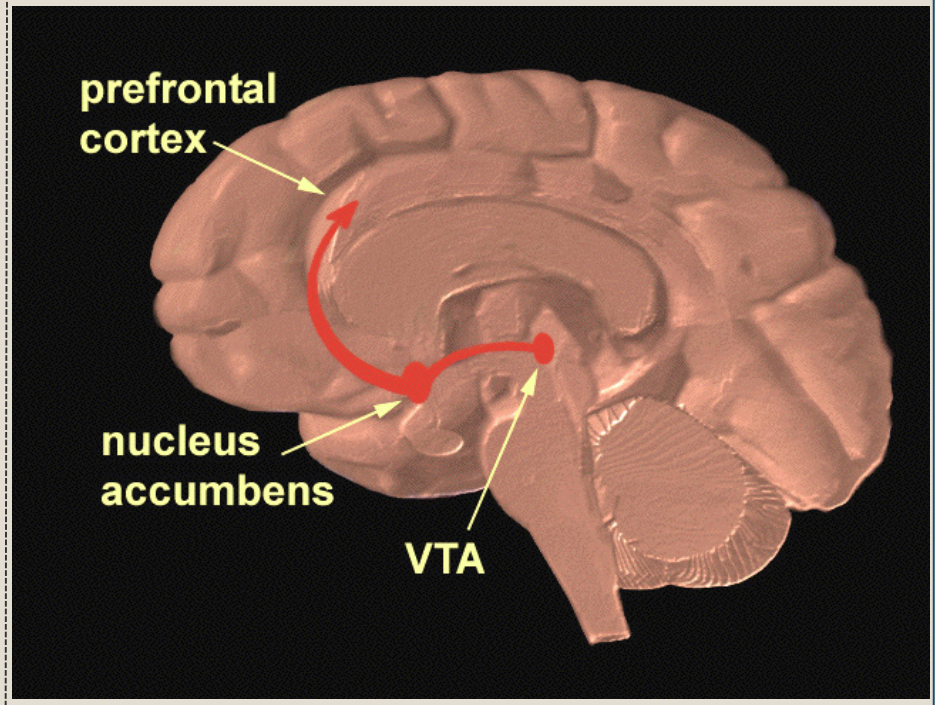
Emerging Evidence on Addiction

- Addiction is a brain disease
  - The mesolimbic dopamine system (reward pathway)
- Vulnerability for addiction
  - Why do some people develop problems with alcohol and other drugs while other people don't?
- Long-term effects of addiction
  - How does this impact the recovery process
- Addiction as a chronic illness


Mesolimbic Dopamine System

Mesolimbic Dopamine System

- This system is a collection of neurons that release the neurotransmitter dopamine.
  - Often called the reward pathway
- This pathway is activated by things that are rewarding.



Mesolimbic Dopamine System

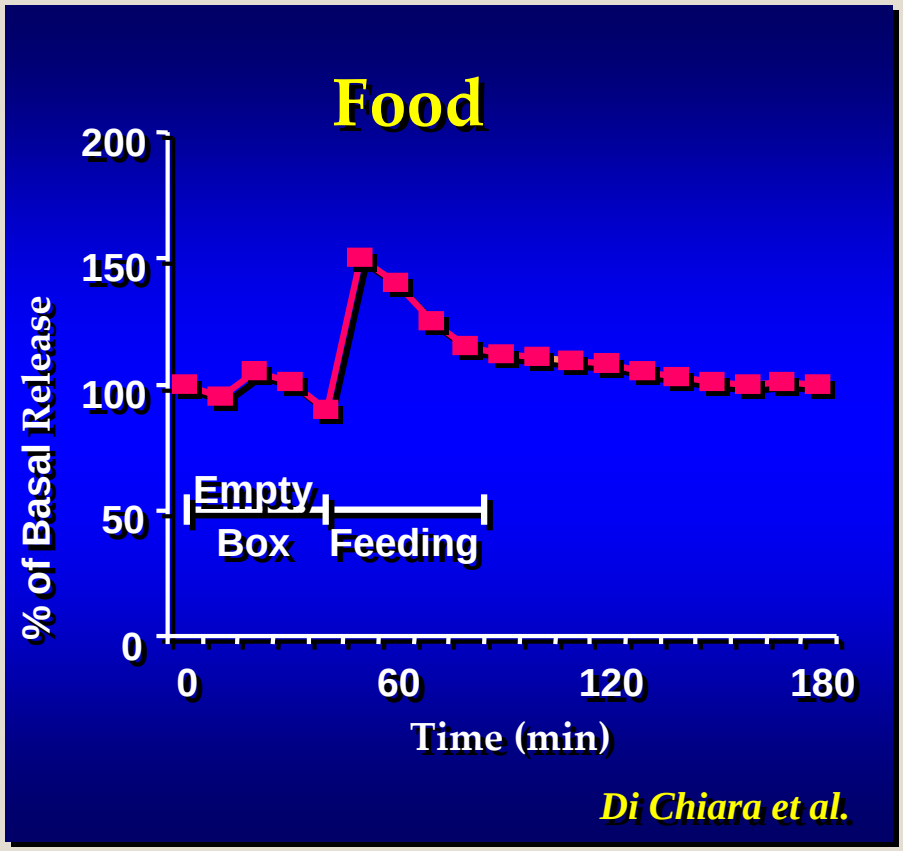
Mesolimbic Dopamine System

- What behaviors are related to survival?
  - Food, water, sex and nurturing
  - They are rewarding and are considered "natural reinforcers" because they are directly related to our survival
- What assures that we will engage in these behaviors?
  - The release of dopamine

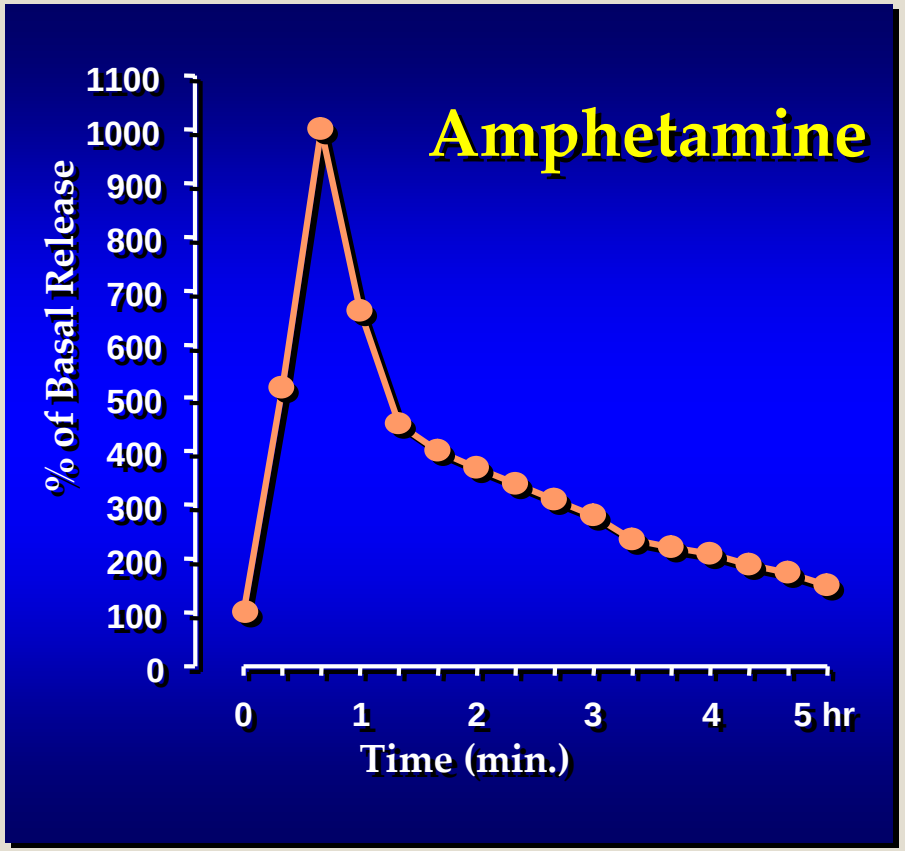
Mesolimbic Dopamine System

- Rewarding experiences tell the brain "do it again" so a behavior will be repeated
  - AOD increase dopamine at a much greater magnitude and duration than natural reinforcers (5 – 10 times greater)


Understanding the Power of Dopamine



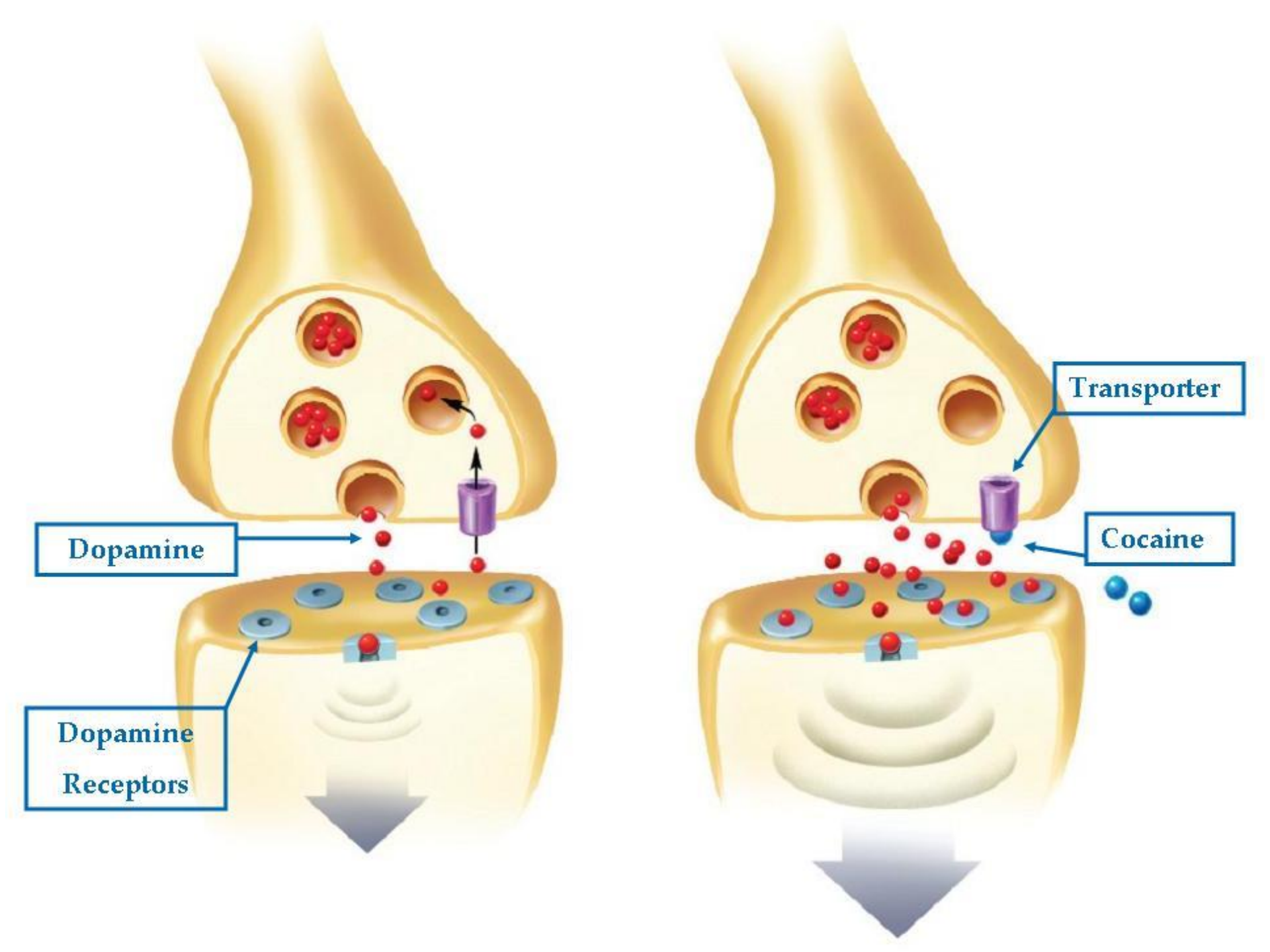
Scale 0 – 200

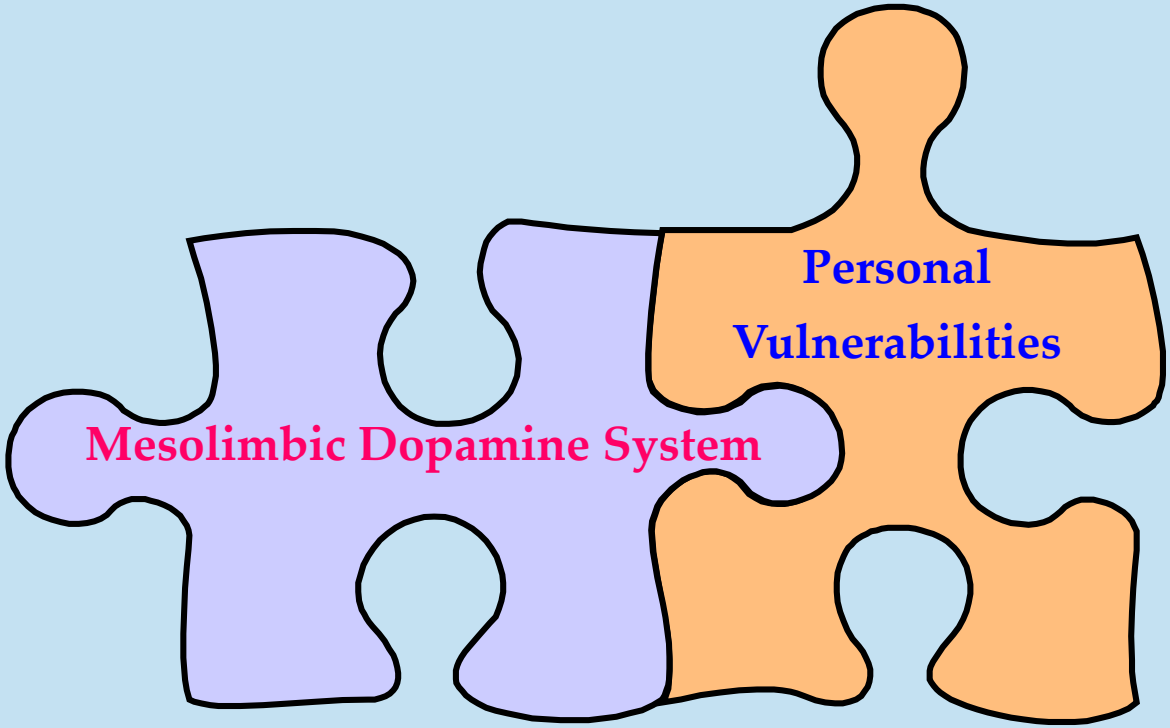


Scale 0 – 1,100

Mesolimbic Dopamine System

- The probability of dopamine interacting with a receptor is based upon how much dopamine is released and how many receptors are available.


Dopamine
Dopamine Receptors
Transporter
Cocaine


Personal
Vulnerabilities
Mesolimbic Dopamine System

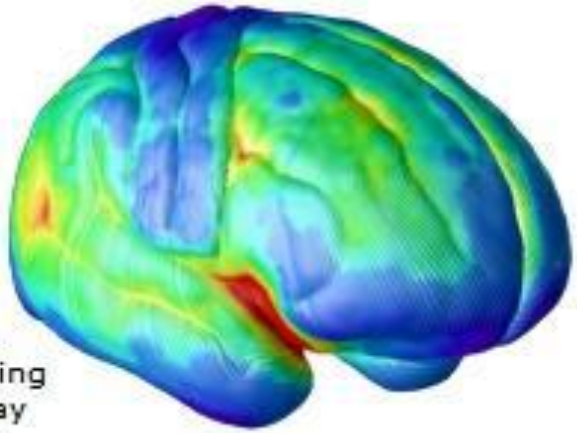
Vulnerability for Addiction

- Genes and environment contribute to increased risk for AOD problems or can serve as protective factors against AOD problems

Developmental Vulnerabilities

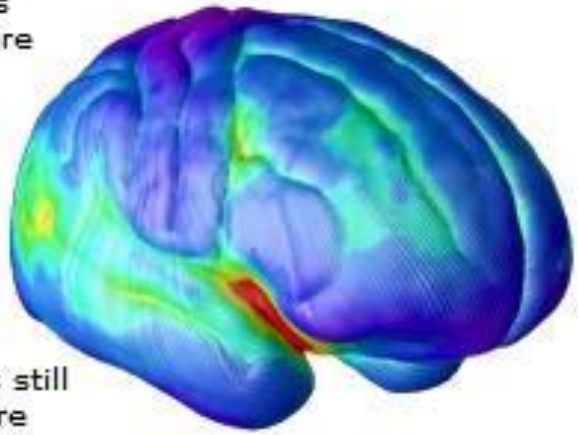
- The mean age of initiation of drinking alcohol in 2005 was 14.2 years

- What is happening in the adolescent brain when this occurs?



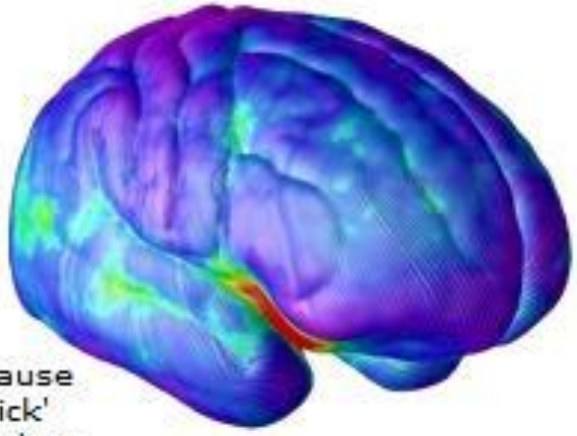
Age 12

During adolescence, the brain is undergoing a lot of changes. Gray matter diminishes as neural connections are pruned.



Age 16

Because the brain is still developing, it is more sensitive to drugs.



Age 20

The changes drugs cause are more likely to 'stick' and become hardwired as addiction by adulthood.

Developmental Vulnerabilities

- Individuals who are not heavy users of alcohol or other drugs during adolescence and into their early 20s are less likely to develop an addiction in later life

Developmental Vulnerabilities

Biological Vulnerabilities

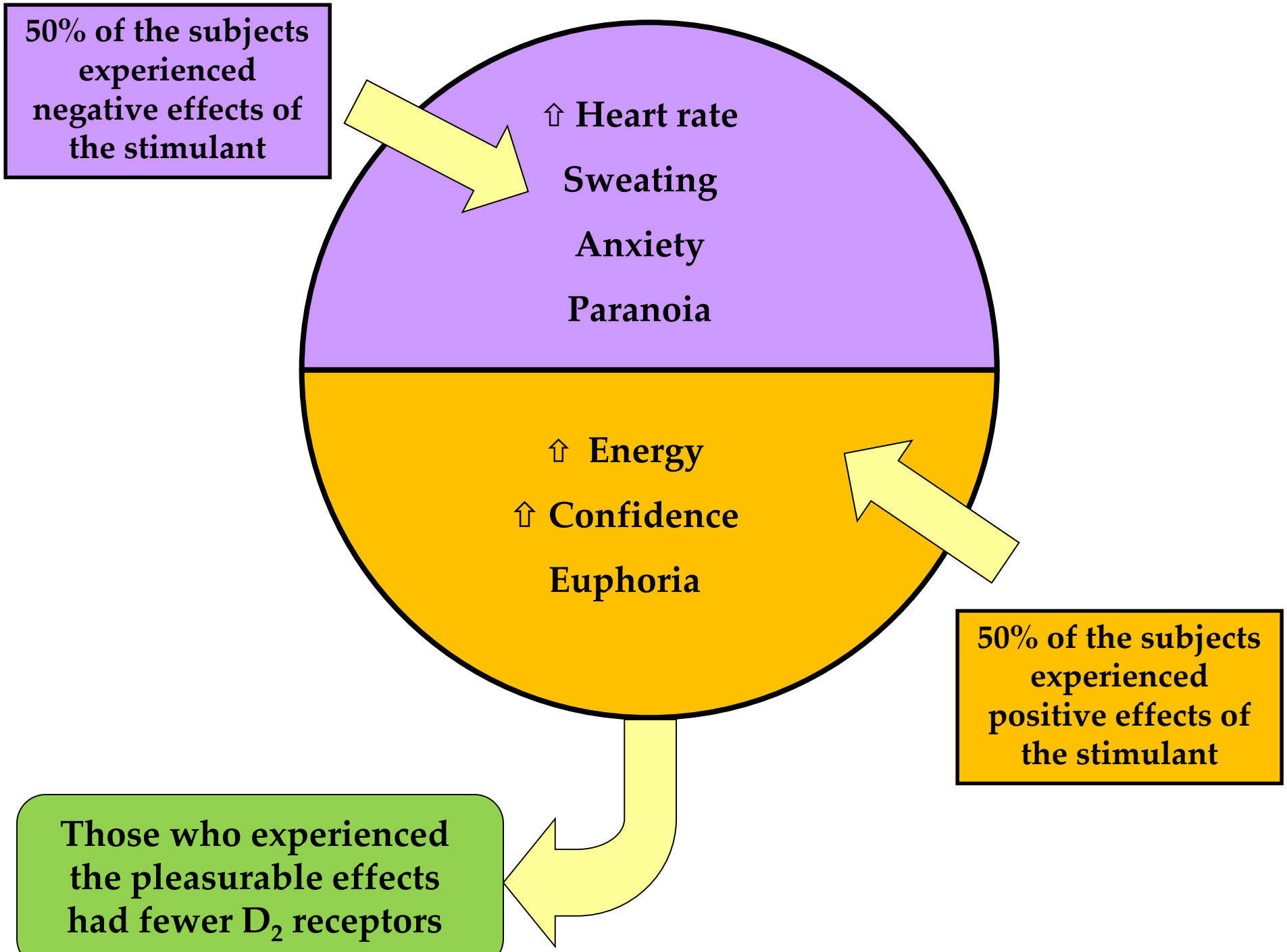
- Differences between how individuals experience the effects of alcohol and other drugs

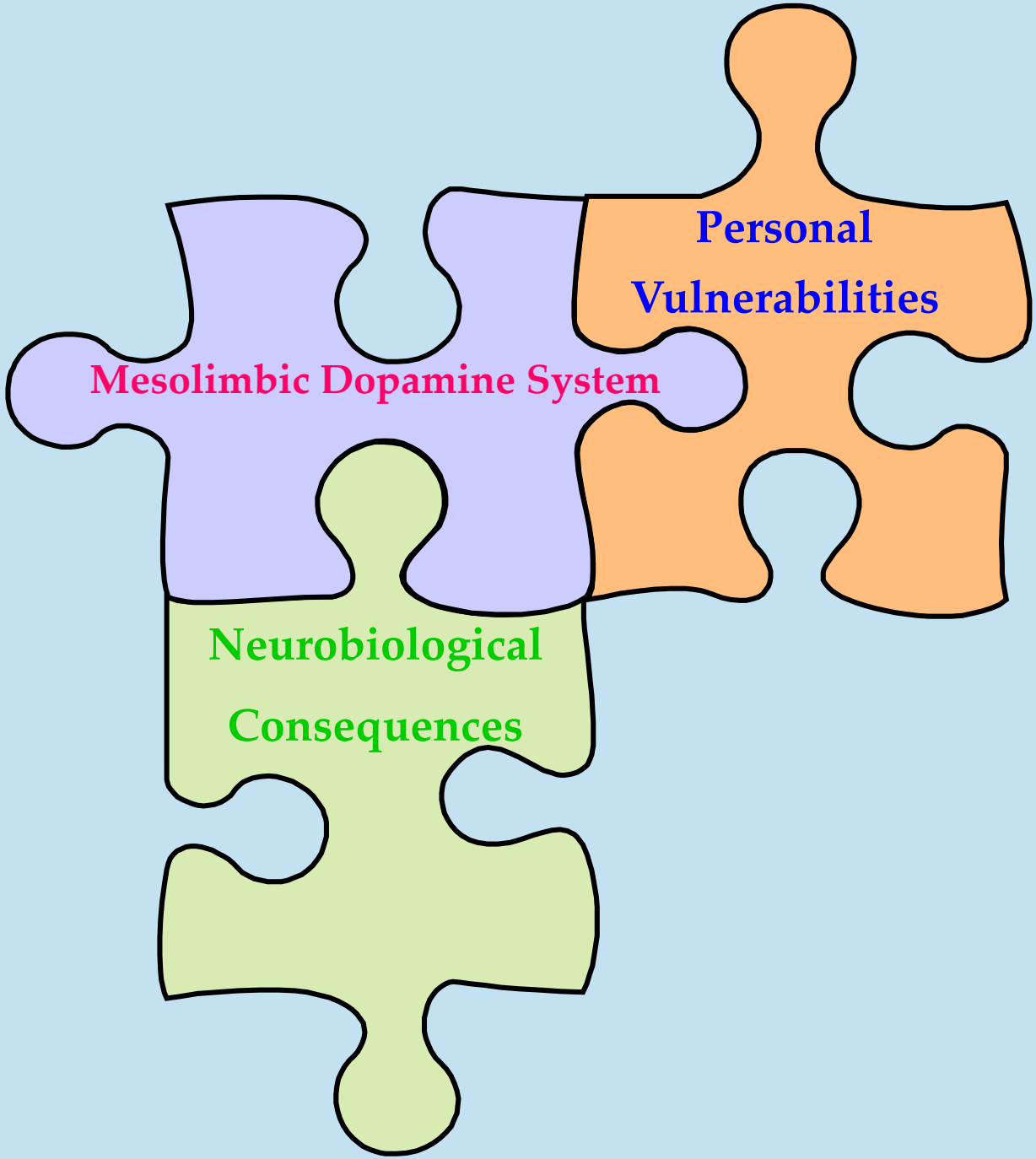
Alcohol

3 times more likely to have a family history of alcoholism than members of Group One

Dopamine Receptors

- In one study, Ritalin was administered intravenously to test subjects


50% of the subjects experienced negative effects of the stimulant
⇧ Heart rate
Sweating
Anxiety
Paranoia
⇧ Energy
⇧ Confidence
Euphoria
50% of the subjects experienced positive effects of the stimulant
Those who experienced the pleasurable effects had fewer D_2 receptors


Personal
Vulnerabilities
Mesolimbic Dopamine System
Neurobiological
Consequences

Neurobiological Consequences

- Prolonged AOD use in vulnerable individuals changes brain functioning:
  - Related to memory
  - Related to judgment/decision making
  - Related to the ability to find natural rewards "rewarding"
  - Related to delaying gratification

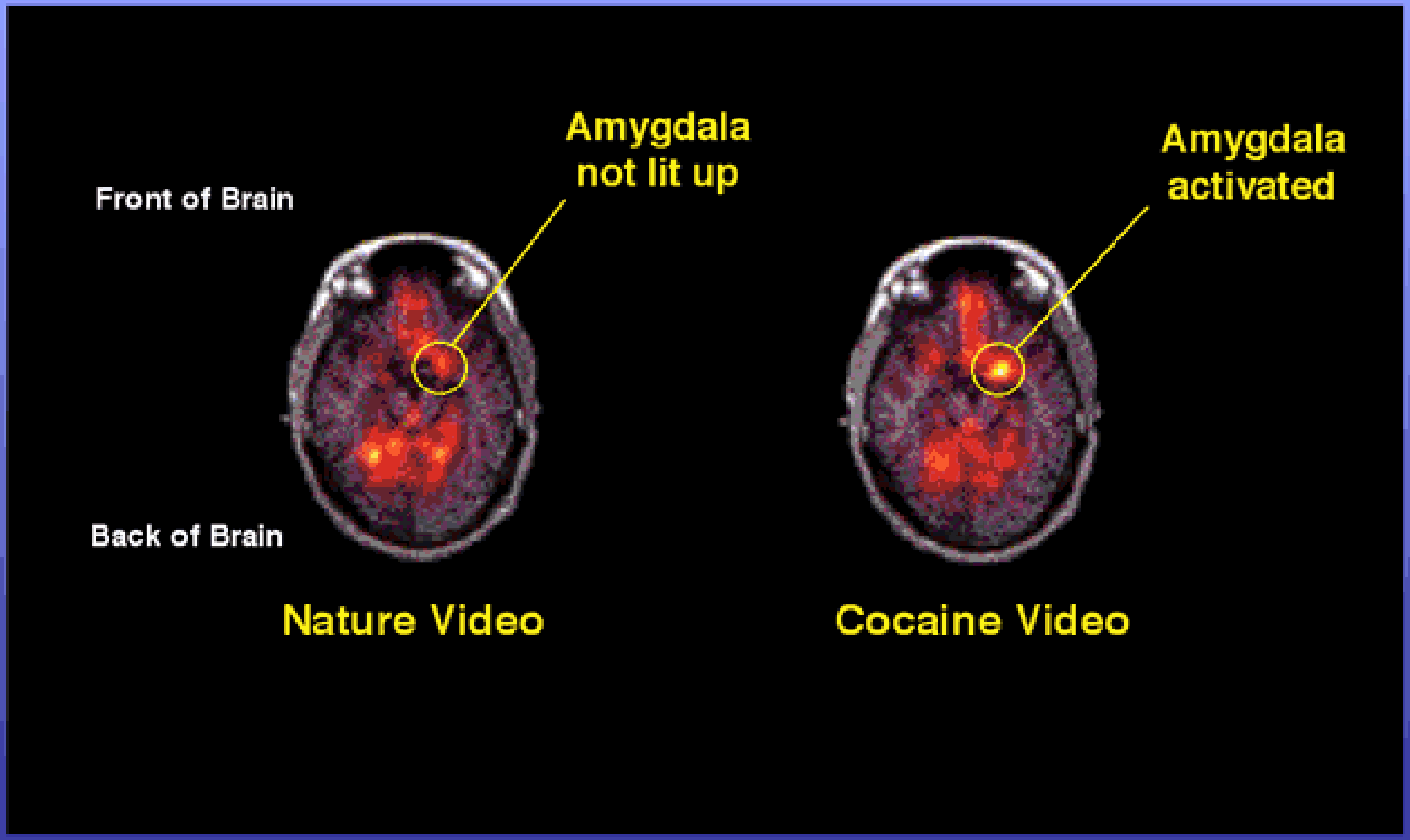
The Role of Memory

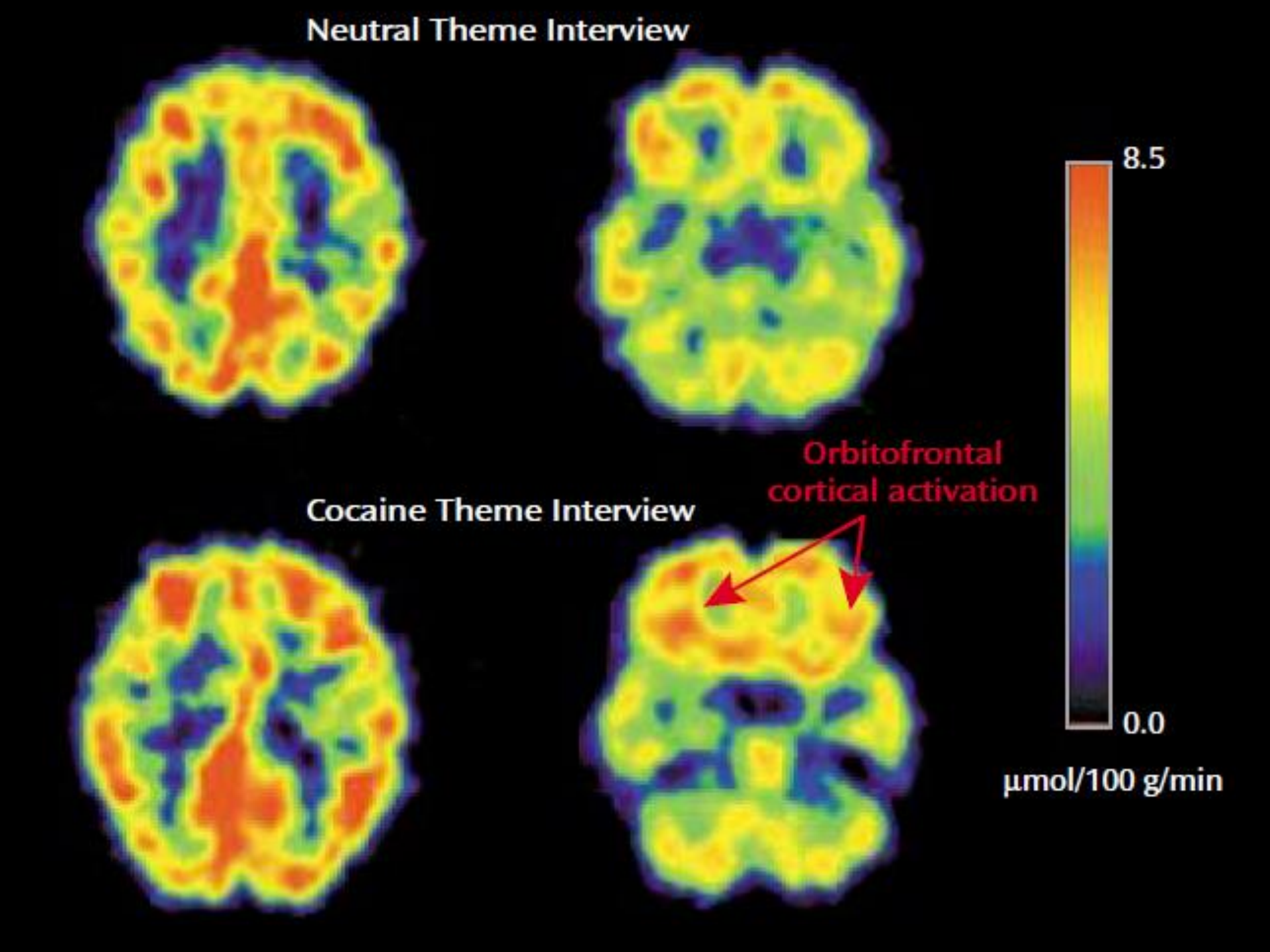
- Memory plays a significant role in:
  - Continued use
  - Attempts to achieve and sustain abstinence

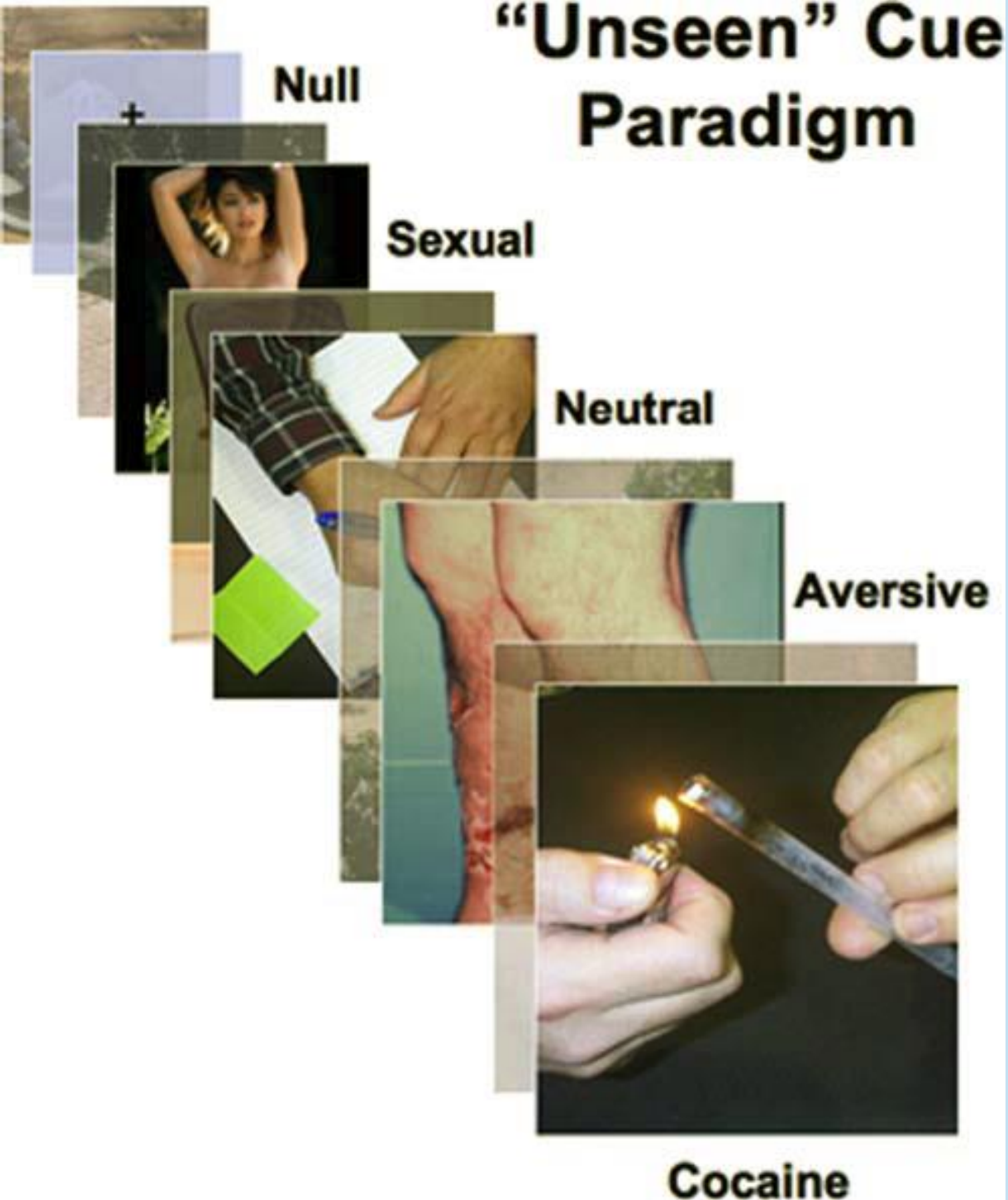
The Role of Memory in Addiction

- The brain records the pleasurable experience through connections to memory and emotion in the amygdala and hippocampus (euphoric recall)
  - As a result, dopamine activity increases, not only during a rewarding or pleasurable experience, but also in anticipation of one

The Memory of Drugs




Neutral Theme Interview
Cocaine Theme Interview
Orbitofrontal
cortical activation
8.5
0.0
µmol/100 g/min

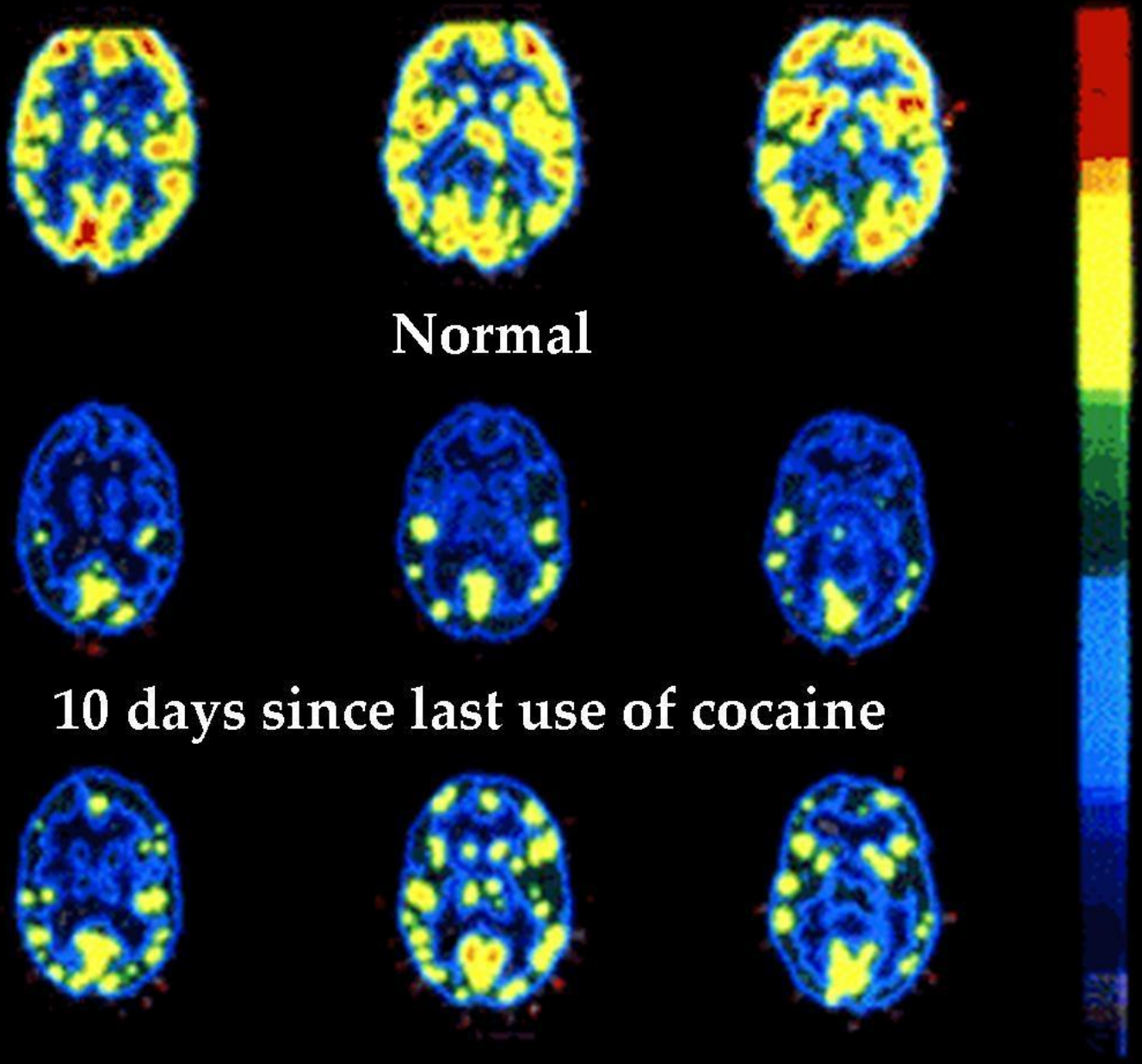


- Slides were presented randomly for 33 msec followed by 467 msec neutral slides
- 33 msec escapes conscious detection
- Despite no conscious recognition, the limbic system showed activation in response to the slides.

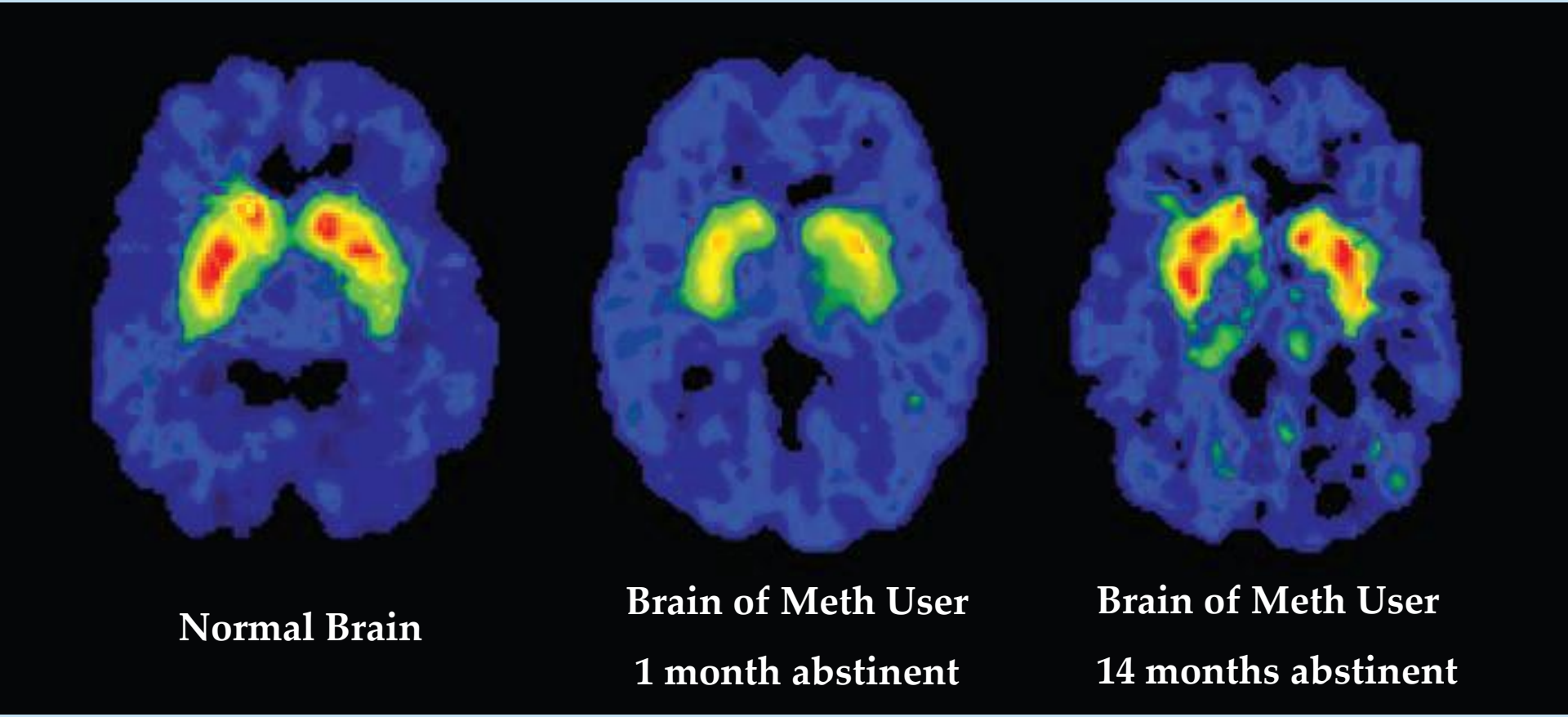
Judgement/Decision Making

Judgement/Decision Making

Judgement/Decision Making


Normal
10 days since last use of cocaine
100 days since last use of cocaine

Recovery of Brain Functioning with Prolonged Abstinence

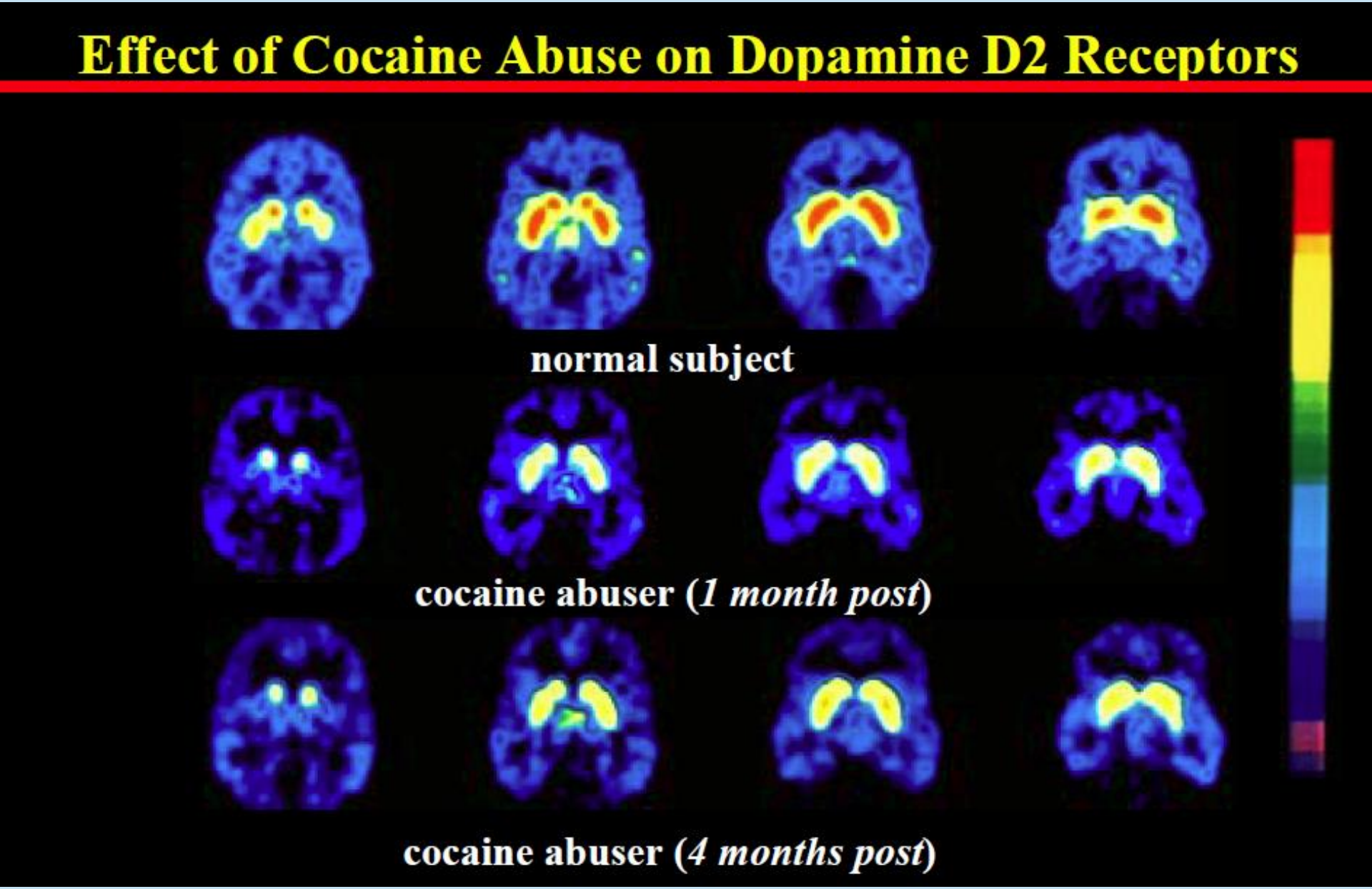


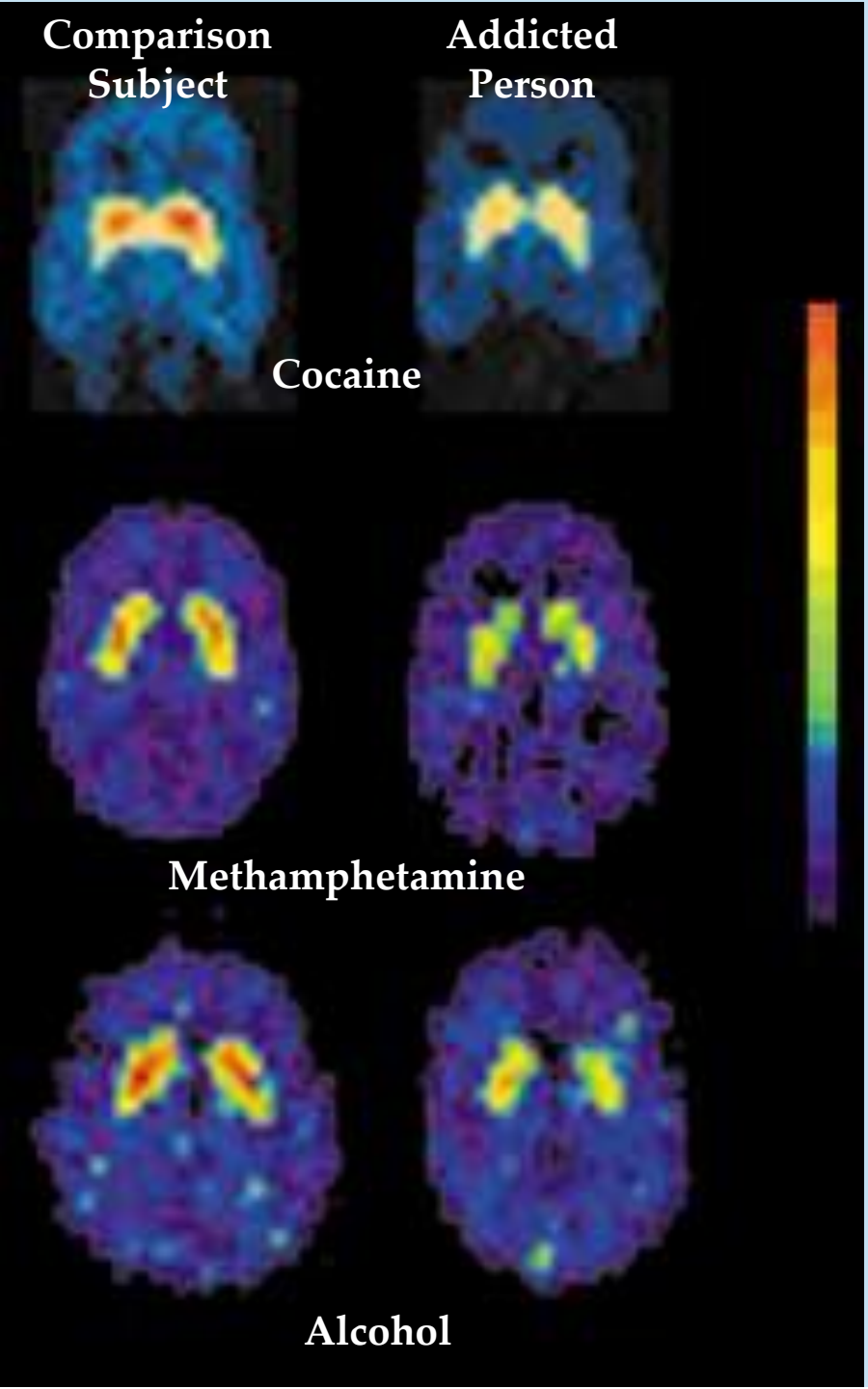
Normal Brain

Brain of Meth User
1 month abstinent

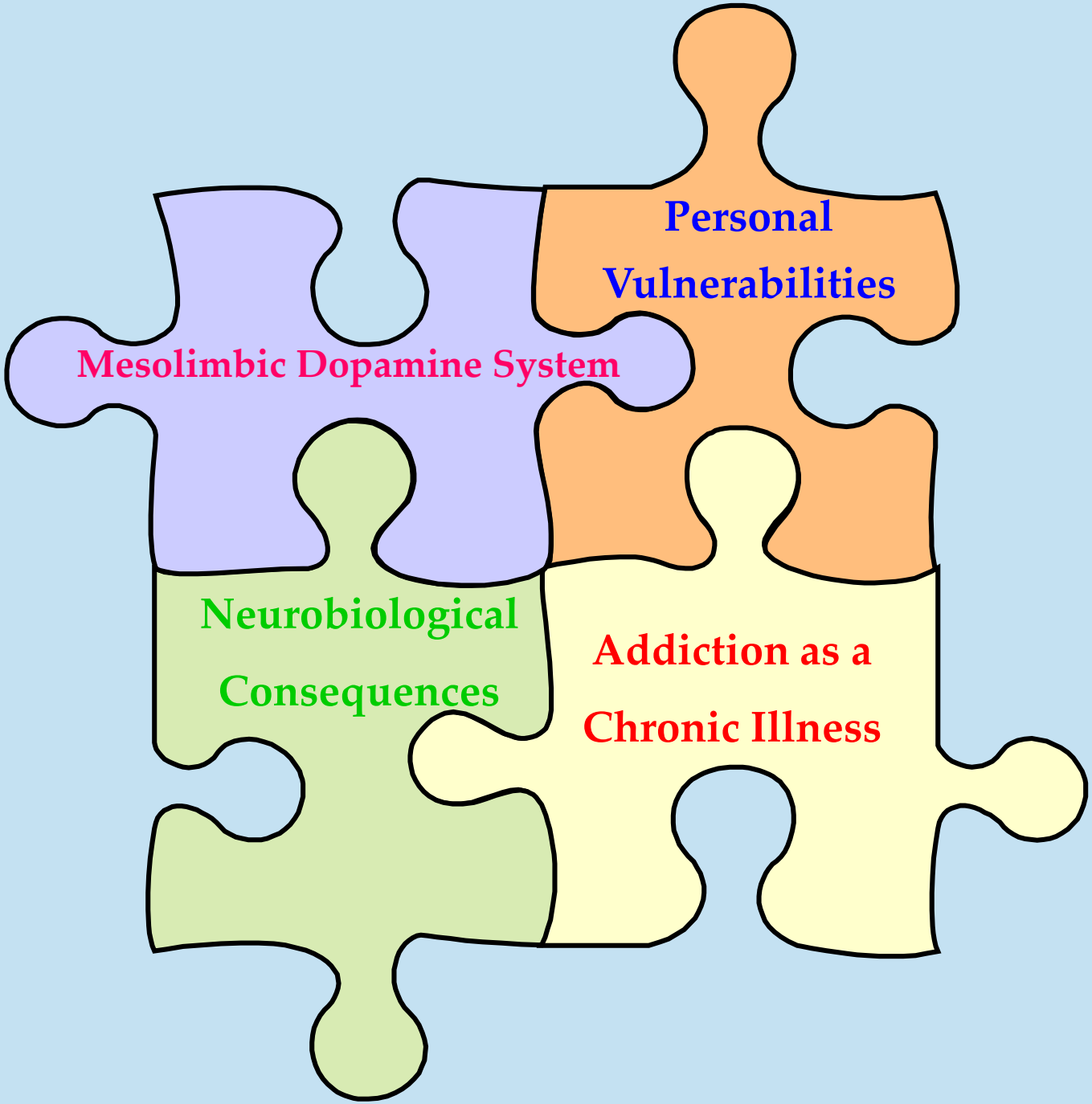
Brain of Meth User
14 months abstinent

Effect of Cocaine Abuse on Dopamine D2 Receptors





Dopamine D2 Receptor Availability


Personal
Vulnerabilities
Mesolimbic Dopamine System
Neurobiological
Consequences
Addiction as a
Chronic Illness

Addiction as a Chronic Illness

- Historically, treatment of severe and persistent AOD problems has resembled interventions for acute health conditions (e.g., traumatic injuries, bacterial infections)

Implications

- For persons with hypertension & diabetes
  - A recurrence of symptoms (relapse) following treatment cessation is considered evidence of treatment effectiveness
  - This is used to justify devoting resources to continuing treatment
- For persons with alcoholism and addiction
  - A recurrence of symptoms (relapse) following treatment cessation is considered evidence of treatment failure
  - This is used to justify not investing further resources into treatment
  - Treatment needs to shift from an acute care model to recovery oriented systems of care

Implications

Video Recap

- American Chemical Society: The Science of Addiction

Overview

- Healing Transitions (formerly The Healing Place of Wake County) is a 501(c)(3) homeless shelter that offers:
  - Overnight emergency shelter
  - Non-medical detoxification; and
  - A long-term, 12-step based, peer run recovery program for persons with alcoholism and other drug addictions

Guiding Principles of Healing Transitions

- Low threshold for engagement
- Services on demand
- Attraction is critical
- As many times as it takes
- Hand up, not hand out program
  - You do a little, we do a little. You do a lot, we do a lot

References

- American Chemical Society. The Chemistry of Addiction. http://www.brainfacts.org/diseases-disorders/addiction/articles/2015/the-chemistry-of-addiction/
- Clear, J., 40 Years of Stanford Research Found That People With This One Quality Are More Likely to Succeed. http://jamesclear.com/delayed-gratification
- Childress A. R., Ehrman, R.N., Wang, Z., Li, Y., Sciortino N, et al (2008) Prelude to Passion: Limbic Activation by "Unseen" Drug and Sexual Cues. PLoS ONE 3(1): e1506.doi:10.1371/journal.pone.0001506
- Durazzo, T. C., Tosun, D., Buckley, S., Gazdzinski, S., Mon, A., Fryer, S. L. & Meyerhoff, D. J. (2006). Cortical Thickness, Surface Area, and Volume of the Brain Reward System in Alcohol Dependence: Relationships to Relapse and Extended Abstinence. *Alcoholism: Clinical and Experimental Research*, 35(6).
- Farmer, R. L. (2009). *Neuroscience and Social Work Practice: The Missing Link.* Los Angeles: SAGE.

References

- Fowler, J. S., Volkow, N. D., Kassed, C. A., & Chang, L. (2007). Imaging and the Addicted Human Brain. Science & Practice Perspectives, 3(2) 4 – 16.
- Goldstein, R. Z. & Volkow, N. D. (2002). Drug Addiction and Its Underlying Neurobiological Basis: Neuroimaging Evidence for the Involvement of the Frontal Cortex. American Journal of Psychiatry, 159(10), 1642 – 1652.
- Gordh, A. & Soderplam, B. (2011). Healthy Subjects with a Family History of Alcoholism Show Increased Stimulative Subjective Effects of Alcohol. Alcoholism: Clinical and Experimental Research, 35(8), 1 – 9.
- Harvard Mental Health Letter (2007). Addiction and the problem of relapse. January.
- Martinez, D., Orlowska, D., Narendran, R., Slifstein, M., Liu, F., Kumar, D., Broft, A., Van Heertum, R., Kleber, H. D. (2010). Dopamine Type 2/3 Receptor Availability in the Striatum and Social Status in Human Volunteers. Biological Psychiatry, 67(3), 275 – 278.

References

- McCauley, Kevin. The Brain and Recovery: An Update on the Neuroscience of Addicition. April 01, 2017. http://www.dawnfarm.org/event/the-brain-and-recovery-an-update-on-neuroscience-of-addiction/
- McLellan, A. T., Lewis, D. C., O'Brien, C. P., & Kleber, H. D. (2000). Drug Dependence, a Chronic Medical Illness: Implications for Treatment, Insurance and Outcomes Evaluation. *Journal of the American Medical Association, 284*(13), 1689 – 1695.
- National Institute on Drug Abuse Slide Teaching Packets. Retrieved September 5, 2005 from http://www.nida.nih.gov/pubs/teaching/default.html.
- National Institute on Drug Abuse (2003). Social Environment Appears Linked to Biological Changes in Dopamine System, May Influence Vulnerability to Cocaine Addiction. *NIDA Notes, 17*(5).
- Oscar-Berman, M. & Bowirrat, A. (2004). Relationship between dopaminergic neurotransmission, alcoholism, and reward deficiency syndrome. *American Journal of Medical Genetics, 132B*(1), 29 – 37.

References

- Ray, L. A., & Hutchison, K. E. (2004). A Polymorphism of the μ-Opioid Receptor Gene (OPRM1) and Sensitivity to the Effects of Alcohol in Humans. Alcoholism: Clinical and Experimental Research. 28(12), p. 1789 – 1795.
- Volkow, N. D., Fowler, J. S., & Wang, G. J. (2003). The addicted human brain: insights from imaging studies. The Journal of Clinical Investigation, 111(10), 1444 – 1451.
- Volkow, N. D. (2004). Imaging the Addicted Brain: From Molecules to Behavior. The Journal of Nuclear Medicine, 45(11), 13N – 24N.
- Volkow, N. D., Wang, G. J., Begleiter, H., Porjesz, B., Fowler, J. S., Telang, F., Wong, C., Ma, Y., Logan J., Goldstein, R., Alexoff, D., Thanos, P. K. (2006). High levels of dopamine D2 receptors in unaffected members of Alcoholic families: Possible protective factors. Archives of General Psychiatry, 63(9), 999-1008.