

Why Did This Happen to Me?

Theories of Addiction

Kaylin A Klie, MD, MA, FASAM
Associate Professor, Depts. of Family Medicine, Psychiatry, & OBGYN
University of Colorado School of Medicine

Objective

- Discover multiple theories that have shaped our understanding of substance use disorder—and why this matters



“Why Did This Happen to Me?”

- Evolving phenomenon of substance use disorder, that defies a single definition
- How we help a person answer this question has profound implications for their recovery trajectory
- Building on the positive psychology of self-discovery and cultivating “compassionate curiosity”

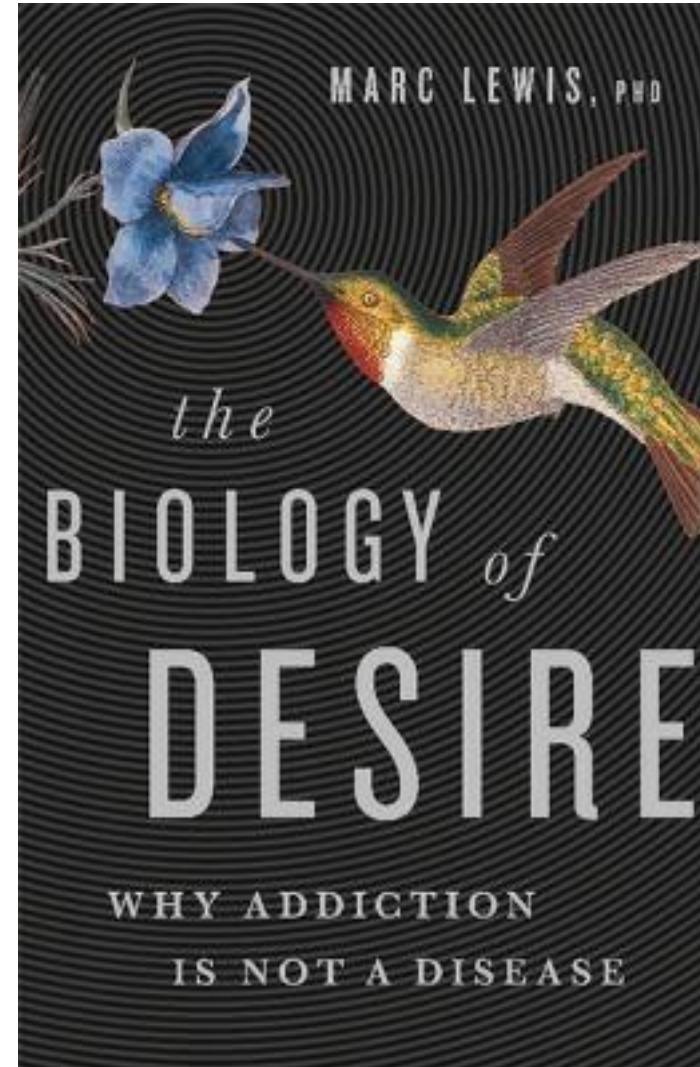


Three Broad Categories

- Chronic Disease
- Learning Theory
- “Self-Medication”/Adaptive Environmental- Trauma Response

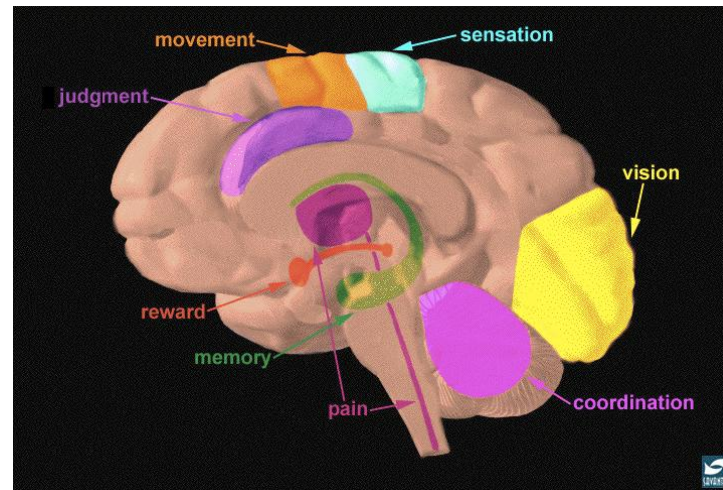
Implications for:

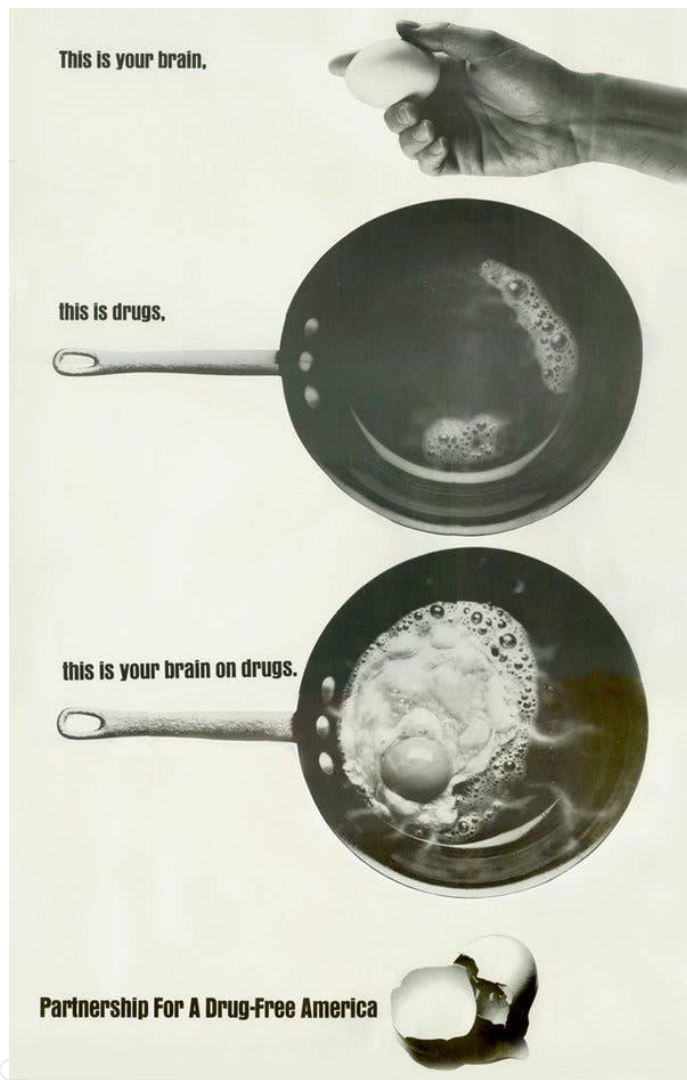
- Research
- Funding
- Policy
- Treatment



Conceptualization: Chronic Disease

“Addiction is a treatable, chronic medical disease involving complex interactions among brain circuits, genetics, the environment, and an individual’s life experiences. People with addiction use substances or engage in behaviors that become compulsive and often continue despite harmful consequences.”
(ASAM)

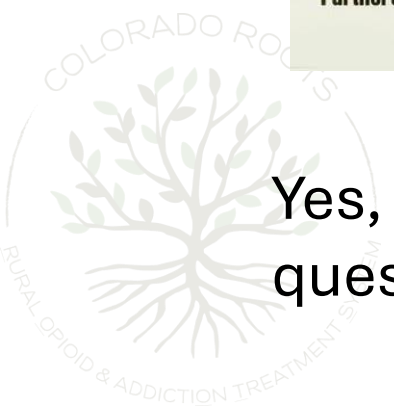




Please Consider:

- Addiction neurobiology research has traditionally focused on white, cis-gender men and male non-human animals
- Effects of sex, gender, race and ethnicity on the neurobiology of addiction is widely unknown
- Few studies have been designed with a primary aim of studying the above variables

Yes, I have so many questions.



Brain Disease Model

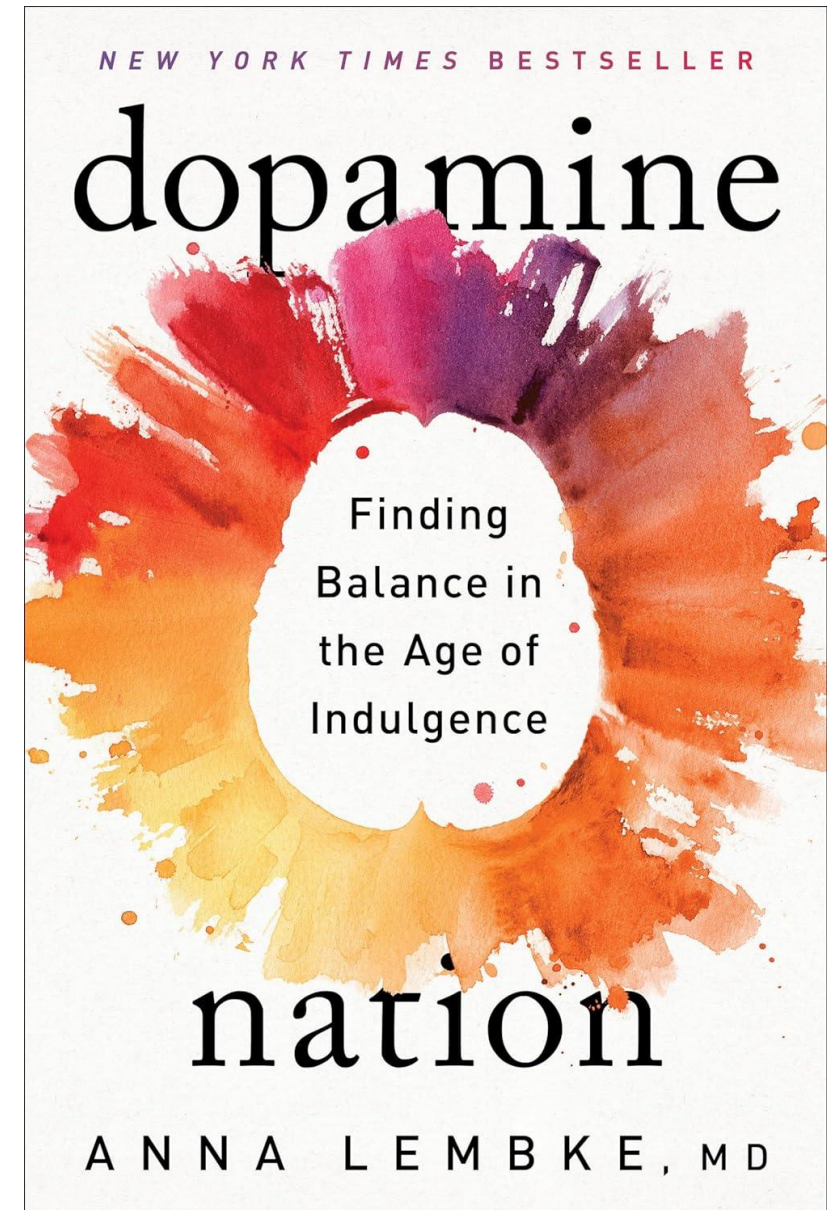
- Substance use causes acute and chronic changes in the brain
- “Neuroadaptations”
 - Behavioral changes of substance use disorder
 - Show some recovery with abstinence
- Contributes genetic understanding both of individual vulnerability and multigenerational pattern of substance use in families
- Help reduce stigma?
 - Health care systems are set up, and providers trained, to identify, diagnose, treat, and monitor disease
 - Pushes on the “moral failing” conditioned bias that resides within most of us
- Help us develop targeted treatments?
- Heterogeneity of behavioral symptoms indicate heterogeneity in neurobiological response to substance exposure

Dopamine

- 1950s:
 - electrical intracranial self-stimulation animal studies discovered dopamine as a neurotransmitter
- 1970s-1980s
 - Dopamine responsible for natural rewards
 - Increases in dopamine in response to substances
- 1990s
 - The “decade of the brain”
 - Substances “hijacking” the brain’s reward system
 - Significant advances in neuroimaging
 - For a blast from the past: [Bill Moyers PBS Special from 1998](#)

Dopamine 2.0

- The Pleasure-Pain Balance (dopamine homeostasis)
- Pleasure Paradox: The pursuit of pleasure alone leads to anhedonia
- Need for higher reward activities in a culture that is saturated with stimuli (opponent process on a societal level?)
- Deeper understanding of how behavioral addictions work, producing similar or the same neurobiological changes in the brain, without any substance exposure at all...

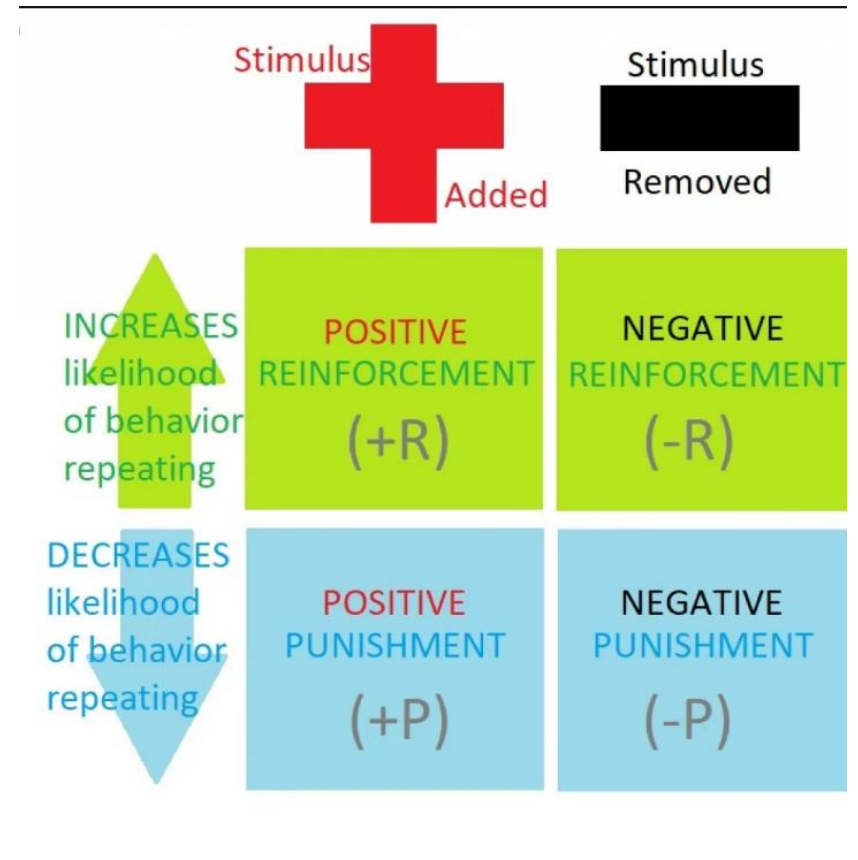


Still Dopamine?

- More recent dopamine studies challenge all these previous findings, including human neuroimaging studies
- Medications that target dopamine “reward system” have not demonstrated substantial help for people with SUDs
- Dopamine is much more nuanced than just “reward”, and other systems that have been overlooked are garnering more attention:
 - Endogenous opioid system
 - Endocannabinoid system
 - GLP1 system
 - Combination of multiple transmitters working simultaneously across multiple brain areas

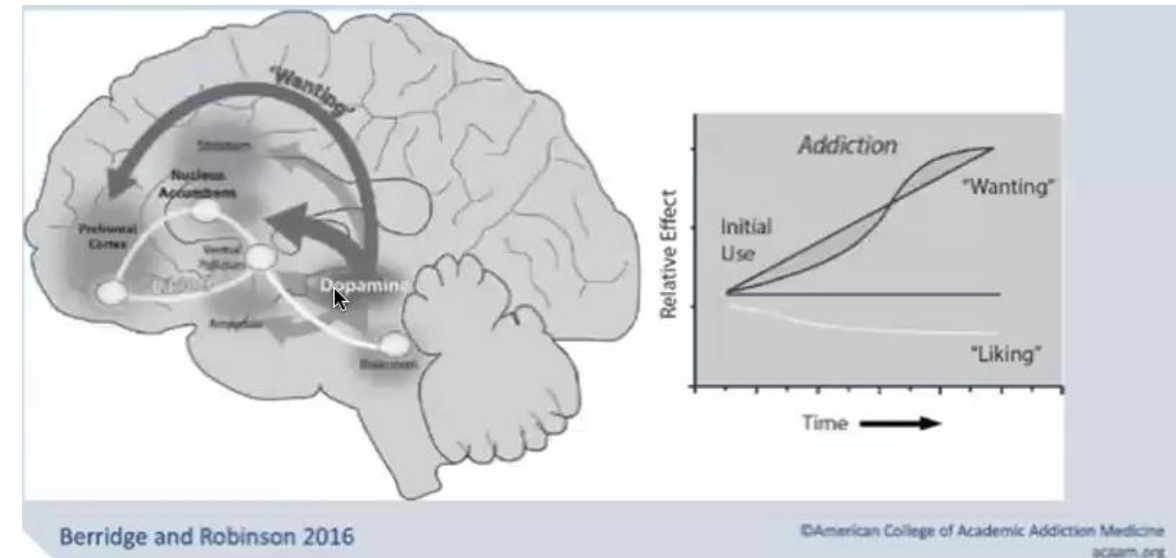
Conceptualization: Learning Theory Model

- Positive Reinforcement: “Reward” likely most powerful in initial phases of use
 - Intermittent Reward among the most powerful behavioral conditioning
 - Timing, set, and setting matters
- Negative Reinforcement
 - Encourages the behavior to continue by preventing or removing painful stimuli
 - Different than punishment: punishment tries to extinguish the behavior by providing consequence (criminal justice system)



Incentive Sensitization Theory (1990s)

- Repeated exposure to substances changes brain incentive salience to stimuli
 - Conceptualizing the meaning or salience of environmental stimuli associated with substance, as well as the substance itself
 - The nature of these neuroadaptations render brain circuits hypersensitized “what fires together, wires together”
 - “Wanting” and “Liking” are two separate concepts—and experiences (at least in animal models)
 - So even as a person loses the “liking” of substance use, they are hypersensitized to environment and substance use and experience increased “wanting”



Aberrant Learning Theory (1990s-early 2000s)

- Substances as “instrumental reinforcers” –operant conditioning
- “Incentive salience” -classical conditioning
- Dopamine affects stimulus-reward learning that shapes behavior, prioritization, and motivation
- Shift to thinking about substance use as compulsive or habitual behavior
 - Habit: incredibly important facet of brain function, “time saver” or brain muscle memory
 - Compulsions: more severe form of habitualized behavior that rises to level of distress

What is Choice?

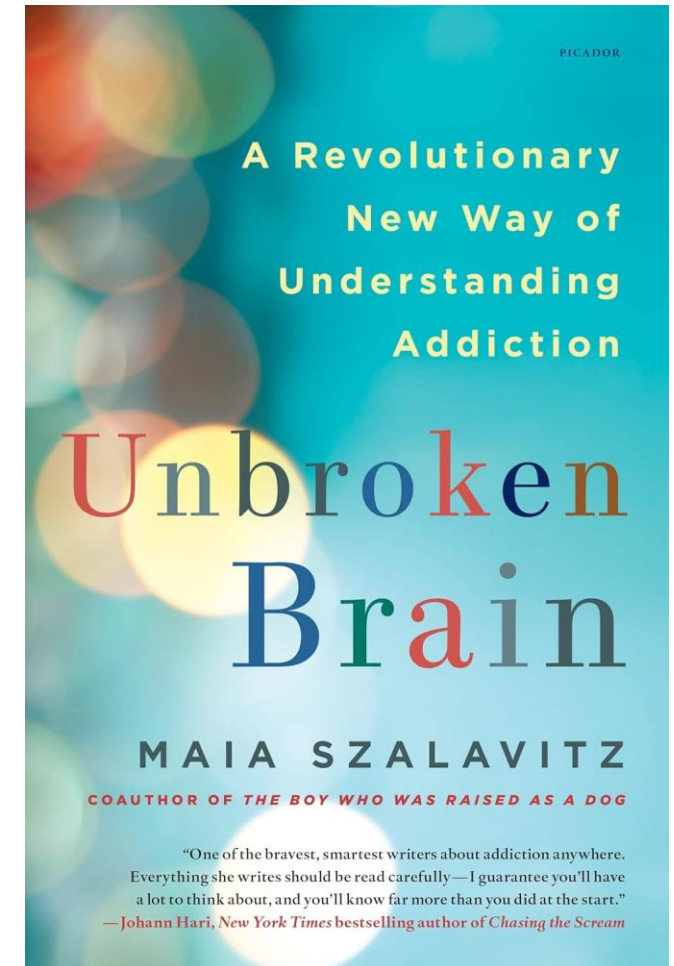
- Volition? Will?
- Between good and bad? What about in an environment with very little good?
- Brain making the choice as substrate that is impacted and shaped by innumerable experiences and responses, both conscious and subconscious, environment, genetics, social roles and expectations, etc.

“The debate (between disease and choice) may hinge on the issue of control. If you don’t have control over your substance use, then you have a disease, and if you do have control (but aren’t using it), then addiction is a choice. The leak in the logic is the assumption that choice is a deliberate, rational function we can apply at will.”

(The Biology of Desire, pg 22)

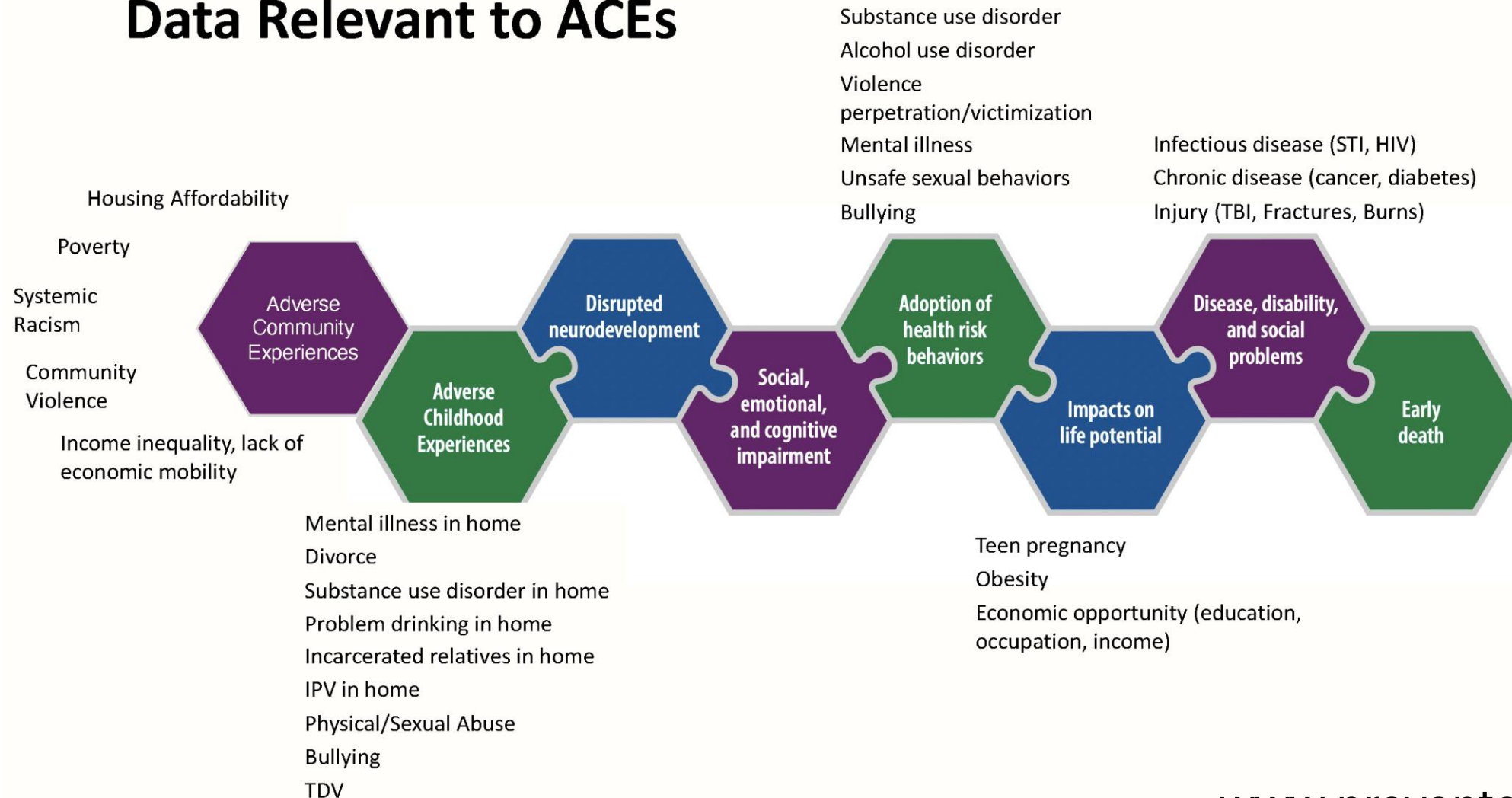
Learning Model Theory

- Substance use is Both + and – reinforced
 - Positive: provides novel experiences, euphoria, potentially connection and community
 - Negative: removes painful, intolerable experiences
 - Physical symptoms (withdrawal, chronic pain, insomnia)
 - Emotions (guilt, shame, depression, anxiety)
 - Trauma (ongoing or past)
 - Poverty, Racism, Classism, Systemic Oppression



Conceptualization: Environmental Adaptation/Trauma Response

Data Relevant to ACEs



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THE BOY WHO WAS RAISED AS A DOG

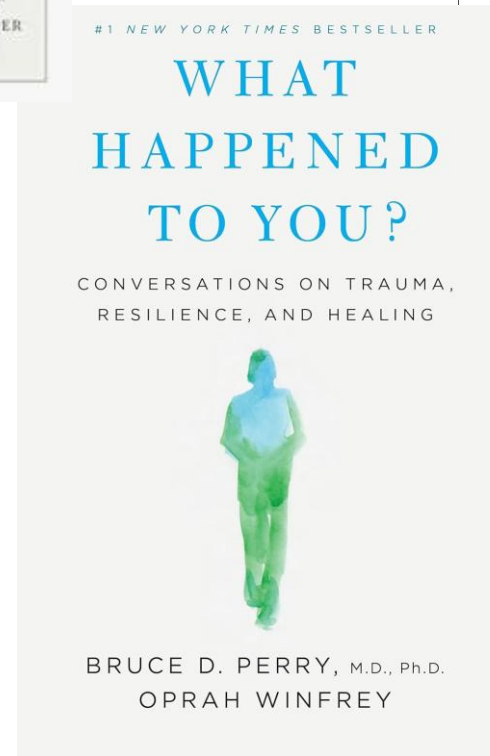
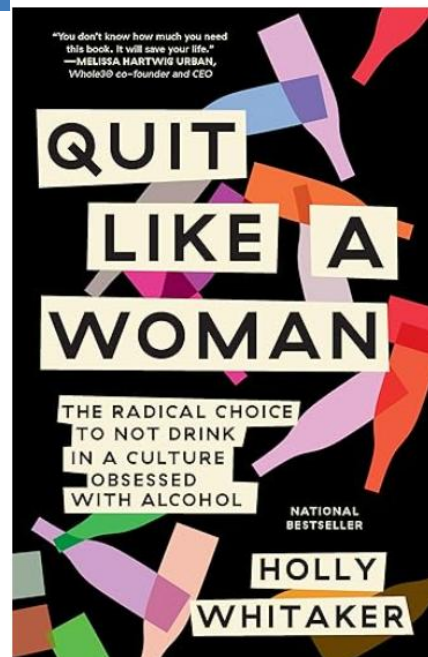
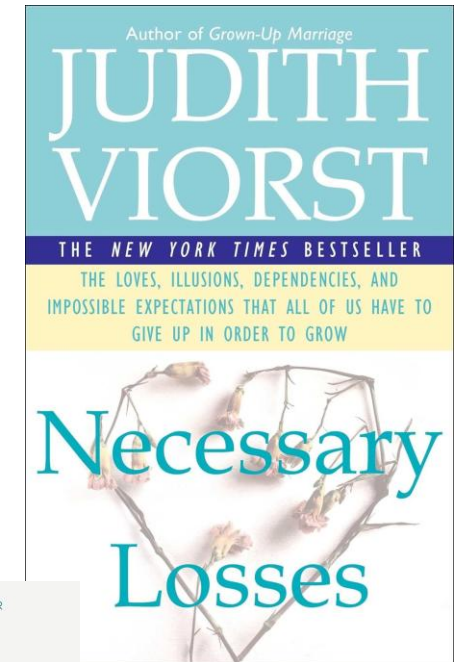
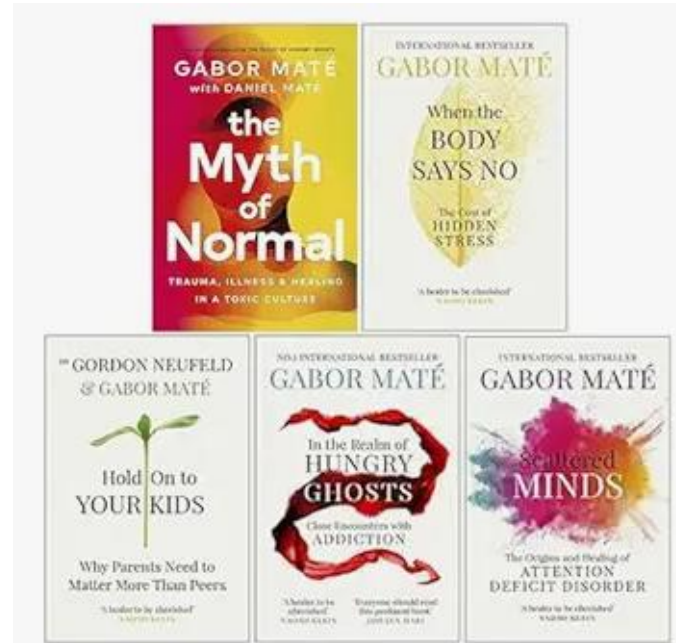
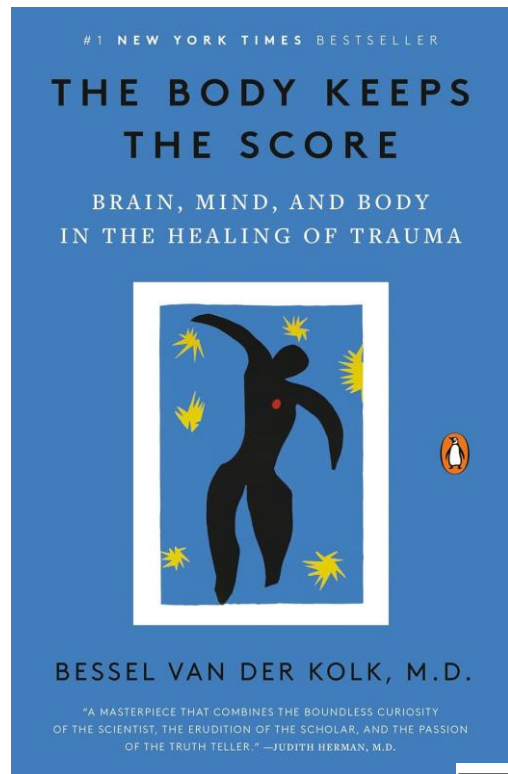
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What Traumatized Children
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Extra Credit (highly recommended) ☺



Thank you!

Questions?

Comments?

Cases?

Kaylin.Klie@cuanschutz.edu