

Dopamine

- it's dragons all the way up
 - reward the striving
- Huberman: "society will select for people that self-regulate"
- Huberman: "Dopamine is the only currency that matters"
- Tom Bilyeu: "Nature has hard-wired you and will punish you relentlessly if you don't do hard things"

Neuro-chemistry

- Lembke's model: presence/release and absence/withdrawl must balance
- there's tonic (baseline) presnce + phasic (acute) response timelines
- variation in density of receptors (D1, D2, etc)
 - long-term response: downregulate in cronically high dopamine state
 - also genetic and dietary components encourage/discourage synthesis
- evolutionary purpose: to motivate action, to crave + desire
 - without dopamine rats go catatonic and die, unmotivate to get easily available + sweet food
 - not specifically a circuit of plain vs pleasure
- dopamine mediates learning
 - occurs after initial stimulus to record the reward - subsequently spikes *before*, in *anticipation* driving a prediction error that drives (motivates) corrective action (e.g. taking the drug)

Addiction

- the dopamine feedback circuit is agnostic
 - addiction can be chemical or behavioral
 - addict experiences less pleasure the more dopamine they chronically seek (saturates the circuit)
- we all have a propensity
 - our only choice is what we addict ourselves to
 - any change (pos or neg) away from baseline is stressful, a signal in the circuit
- for anything you enjoy, *expect* a cooling off effect after (dopamine reduction to baseline)
- our world is super-stimulus (processed food, internet novelty, gaming, etc)
 - makes real life bland by comparison

Psychology (grit)

- Jordan Peterson: "meek will inherit the earth", meek = those who have swords, know how to use them, but keep them sheathed
 - must work and train to be capable of doing terrific things
- Jordan Peterson: clean your room, Navy Seals assess surroundings
 - always seeking ways to improve your environment, work to make world better
- Jordan Peterson: maps of meaning, our aim determines what we see
 - dopamine circuit determines where we aim, what to pursue
- Jordan Peterson: bible, learning concept of the future == delayed gratification
 - dopamine circuit mediates reward (anticipatory craving, enjoyment doing, elated achieving)
 - dopamine calibrates an internal clock (enjoyment = faster, boredom = slower)
- Andrew Huberman: make pursuit its own reward
 - ex: David Goggins (difficulty *is* the goal)
 - you need dopamine *during* the tough activity, to motivate continued effort + endure the strain
 - DO NOT reward the anticipation (ex: energy drink before workout or adderall before study) means lower dopamine *during* the exercise
 - DO NOT reward the achievement (ex: a celebratory drink), it disassociates the exercise from the reward, leading to distraction (reward fantasy) *during* the exercise
 - beware exogenous (extrinsic reward + chemical) layering because they reach beyond natural levels, reducing pleasure of the activity itself by comparison
 - (me) when pursuit == reward then means == ends

Dopamine is a motivation circuit.

- As children, it helps us learn by seeking novelty.
- As adults we are too smart and find shortcuts to get the pleasure without corresponding work, so that same novelty-seeking circuit keeps us shallow and hurts our ability to grow [concept/Deep Work](#).
- related to prediction error, novelty (that's why it flattens out with repeated experience)
 - dopamine release = actual reward - expected reward

ADHD

Craving Stimulation

- strong internal motivation for stimulation in the moment vs achieving goals
- generally deficient in dopamine => stronger motivation toward stimulating activities, collapse of motivation after the surge+reward

- have difficulty choosing mundane tasks with long-term gratification
- all substances or behaviors that can ultimately result in dependencies (nicotine, caffeine, alcohol, opiates, sex, porn, gambling, reckless driving, sky-diving, compulsive purchasing, etc) have the ability to increase the release of impulse-reinforcing dopamine, and reduce the impulse-inhibiting effects of serotonin.
- much of the treatment for ADHD involves learning to psych out the brain (e.g. artificial sense of urgency, to make mundane tasks more attention demanding)

Research

The Acceleration of Addictiveness

Technological progress means making things do more of what we want

- two defs normal are now quite separate: (1) stats average (2) what works best
- tech is throwing off new addictions faster than we can form social antibodies/resistance

[ACX: Microaddictions]

<https://astralcodexten.substack.com/p/microaddictions?s=r>

- hedonic adaption can be *fast*, ~20mins
- addiction = *disproportionate* focus on a reward activity, so that it excludes others
- loss of choice, via habit ritual/recurrence, a progressive narrowing of activity to the *one* that gives reward

(comment) If the environmental cues that have predicted the drug are there, but the drug is not, you just get the negating effects that constitute the withdrawal symptoms, which are always the opposite of the drug effects.

This Is How You Use DOPAMINE As A SUPERPOWER In Your Life | Anna Lembke

- focus on the *striving* > reward
- Having isn't satisfactory
We are *designed* for seeking, will rapidly habituate to new normal after any achievement/aquistition

- "Nature has hard-wired you and will punish you relentlessly if you don't do hard things" pursue with integrity, can't fake the pursuit
- also a really good example of cooperatively navigating disagreement

[Change Your BRAIN By Using These Hacks to Increase Your DOPAMINE | Dr. Andrew Huberman](#)

- craving itself is mediated by dopamine (anticipation) so can be a pleasure do *not* obtain the goal, dopamine as reward is dangerous (addiction)
- pursuit == the reward (dopamine producing state)
analogy: means consistent with ends
- "society will select for people that self-regulate"
- This knowledge of knowledge (how our brains work to produce our behaviors) enables intervention
- dopamine influences our perception of time
- Huberman has 25 no-go's per day, tracking his denials as an exercise
ex: no phone for 1st hr of the day, instead want to receive/process info from sleep
- "Dopamine is the *only* currency that matters"

[The Definitive Guide to Dopamine Fasting 2.0: The Hot Silicon Valley Trend](#)

- **stimulus control**
 1. Put the stimulus (like your phone) away or make it harder to access.
 2. Engage in an alternative activity that is incompatible with the stimulus (e.g. hard to do sports and stress eat at the same time)
 3. Use website-blocking [software](#) or social accountability to prevent yourself from cheating.
- **exposure and response prevention CBT**
 1. Notice when the impulses arise, and what thoughts and feelings you're experiencing in that moment.
 2. Practice "[urge surfing](#)": watch the desire to engage in the conditioned response come and go without giving into it.
 3. Repeatedly returning to whatever you are doing on instead, with a spirit of non-judgement.
- **6 most common behavioral addictions**
 1. pleasure eating (try intermittent fasting, diet change)
 2. internet/gaming (avoid movies, games, soc media scrolling)
 3. gambling/shopping (avoid completely)
 4. porn/masturbation (find a long-term partner)
 5. thrill/novelty (abstain)

6. recreational drugs (abstain)

Controlling Your Dopamine For Motivation, Focus & Satisfaction | Huberman Lab Podcast #39

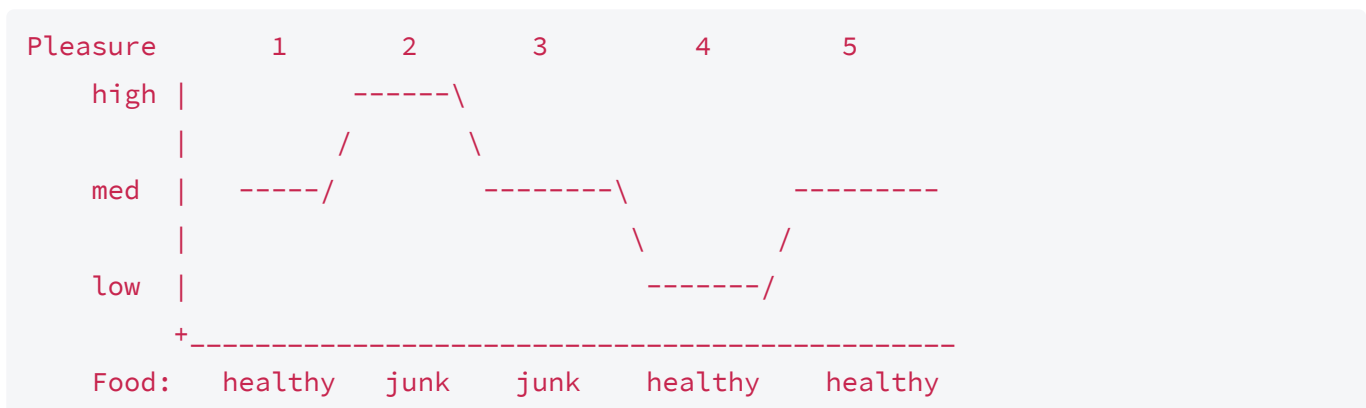
- dopamine circuit is *motivating*
 - pos. feedback for confirmation bias
 - encourages pursuit of food, sex, etc
 - generalizes (both substance and behavior)
- circuit measures the marginal change
 - deprivation of dopamine now -> more pleasure later (ex: intermittent fasting)
 - saturation (porn, processed food, etc) leads to IRL being unappealing
- do not *consistently* layer dopamine activities (ex: music + workout + energy drink)
 - instead layer randomly (flip a coin)
- giving yourself extrinsic *rewards* can de-motivate the activity
 - ex: gold star after producing a drawing
 - trains doing the activity *for* the reward, dissociates neural circuitry from the activity
- growth mindset: striving is the end goal, associate effort/friction/challenge as pleasurable
 - efficient productivity: release dopamine *during* the effort
 - tell yourself that you enjoy it *while* you are doing it
- when to spike dopamine?
 - NOT before the effort
 - NOT after the effort
 - YES during the effort
- stimulants
 - cold water bath can raise baseline 2.5x (similar to cocaine)
 - pharmacology:
 - Mucuna Pruriens (L-dopa), L-Tyrosine, Phenylethylamine w/Alpha-GCP, Huperzine A
 - social interaction -> up dopamine + up oxytocin

The Neuroscience of Addiction - with Marc Lewis

- disease model isn't helpful, 12 steps not helpful
 - plenty of people escape their addictions, though it takes a long time
 - cocaine 4yrs, alcohol 6yrs, tobacco 25yrs
 - loss of empowerment, belief in cronicity, fatalism and surrender -> less able to change
 - no matter how far you drive, you won't escape the ditch (attractive drug) on the side of the road, but it's better to have lines (environment) to guide you safely
- where in the brain does it go wrong

- brain scans across addictions (alcohol, binge eating, internet) show deficit of grey matter density in one particular area (dorsal anterior cingulate), convergent zone for decision-making and conflict resolution
- addiction is a learned skill
 - generalizes: behavior + substance
 - brain has efficiently discovered how to obtain dopamine
 - strong attraction -> repetition -> deep learning, trapped by "now appeal" and loss of self-control
- reinforcement cycles
 - environmental trigger -> craving -> drug imagery -> craving
 - craving -> planning for acquisition -> imagining -> craving
 - planning for acquisition -> action + seeking
 - trigger <-> drug use: anticipation -> relief -> learning -> loss -> anticipation
- brains can change, train new habits!
 - CBT
 - dialectical behavior therapy
 - motivational interviewing
 - psychodynamic therapy
 - mindfulness + meditation
 - contingency management
 - compassion-focused therapy
 - social support + scaffolding

The pleasure trap: Douglas Lisle at TEDxFremont



1. start with ordinary environment
2. introduce superstimulus (junk food)
3. dopamine circuit hedonically adjusts (a new baseline)
4. reverting to normal, doing the *right* thing now *feels* wrong, the circuit is 180deg off
5. endure a painful withdrawal (~1-2weeks) and another hedonic adjustment recovers normalcy

ADHD & How Anyone Can Improve Their Focus | Huberman Lab Podcast #37

- normally the default mode and task mode networks are out-of-phase, anti-correlated
 - ADHD: they appear correlated
- Low Dopamine Hypothesis
 - unnecessary firing of neurons that are unrelated to task at hand
 - choice drugs of ADHD all high-dopamine (amphetamines, nicotine, caffeine, sugar)
 - led to treatment: adderal, ritalin, modafinil (each also used to treat narcolepsy)
- medicating children, boosting their ability to focus, allows the neuroplastic brain to adjust (learn) that pattern
- ADHD has more attentional blinks (a first success prevents a second success, esp when looking for two different things), they have overfocus
- practice "open monitoring", e.g. "panoramic vision" watch a wider area
- practice interoceptive meditation, just one session had permanent effect
- blinking & time perception
 - dopamine controls rate of blinking -> determines sense of time
 - higher dopamine -> fast blink -> fine slicing -> slow motion -> slow passage of time
 - ADHD, low dopamine, underestimate of time intervals, loose track of time, showing up late
 - fixation focus training activity can train blinking, <https://www.mdpi.com/1660-4601/17/13/4780>

Why Self-Discipline is so Hard

- Odin's self-sacrifice hanging from Yggdrasil -> future orientation
- impulsive curiosity => Pandora's Box + Eve's Apple
- Sapolsky's [library/books/Behave](#)
 - monkey learns to associate light cue with raisin reward
 - gets more dopamine from the light in *anticipation* of the raisin vs the reward itself
- Dopamine => encourages action w.r.t. a goal
 - immediate reward: limbic target
 - delayed reward: frontocortical targets
 - brain part that gets the most determines the action (gratify now vs later)
 - repetition of action + reward => habit
 - to change habit, must change the individual, the environment, or both
- ADHD: bias towards *act now*
 - childhood of adversity -> underdeveloped frontal cortex -> difficult to delay gratification

- Bruce Alexander's Rat Park and meth & cocaine addict studies by Carl Hart => presence of better alternative choices matters

How to Want Less

The secret to satisfaction has nothing to do with achievement, money, or stuff.

- Dopamine: In fact, our natural state is dissatisfaction, punctuated by brief moments of satisfaction. You might not like the hedonic treadmill, but Mother Nature thinks it's pretty great. She likes watching you strive to achieve an elusive goal, because strivers get the goods—even if they don't enjoy them for long.
- The eastern view of art: a sculpture where artist removes superfluous material, Buddhist who removes the cravings