Motivation, Dopamine & Habits

Huberman Lab Keypoints

Episodes in this pack: 18

How to Improve Motivation & Overcome Procrastination | Dr. Masud Husain

Guest: Dr. Masud Husain
Date: 2026-08-24 · Duration: 2:20:21
URL: https://www.youtube.com/watch?v=58-k4F7-AoA

KEYPOINTS

1. Motivation has a specific biology, and when it breaks you get apathy, which is different from depression.
Husain, an Oxford professor of neurology and cognitive neuroscience, says he once thought of motivation as personality, until a patient about 15 years ago showed him otherwise. Apathy is a loss of drive to act, and an antidepressant did nothing for that patient. Depression and apathy can overlap, but they are not the same thing.

2. The brain constantly weighs effort against reward, and apathetic people need a bigger reward to act.
Husain frames every choice as a cost-benefit calculation: is this reward worth this much effort? In his experiments, apathetic people and patients still worked for high rewards but refused low-reward options that motivated people accepted. Their problem is a raised threshold, not an inability to want things.

3. The basal ganglia link motivation to action.
These deep brain structures, especially the ventral striatum and nucleus accumbens, date back to the lamprey, roughly 360 million years old. In such animals they connect drives like hunger or sex to the actions that satisfy them. Damage here can cut the link between wanting and doing.

4. For some people, simply deciding costs extra brain energy, which Husain calls an activation-energy barrier.
When people had to decide whether a reward was worth an effort, the ventral striatum and medial frontal cortex lit up. Unexpectedly, these regions were more active in apathetic students than motivated ones. Husain reads this as apathetic people burning more brain fuel just to make the same decision, so at home they may skip the decision altogether.

5. Two levers raise motivation: lower the effort or change the reward.
You can break a task into smaller parts so the first step seems less formidable, or reframe the incentive so it feels novel, social or meaningful. Husain says this simple principle may be enough for many people to work out what to change.

6. Planning ahead cuts the cost of decisions you'd otherwise make on the fly.
Since every decision costs effort, making them one by one through the day can feel burdensome. Planning the day or week in one sitting may lower total activation energy for some people, though Husain notes it suits some people better than others.

7. Dopamine drives the vigor of action, not just pleasure.
Researchers increasingly see Parkinson's slowness (bradykinesia) as partly a loss of motivation to act, not purely a motor problem. Husain also notes dopamine supports working memory and executive control, citing Patricia Goldman-Rakic's classic work. He resists the popular 'dopamine hit' framing of everyday activities.

8. Stimulants follow an inverted-U curve: they may help low performers and can make high performers worse.
Husain reads the psychopharmacology literature as showing only small boosts for people starting from a low baseline. Already-high performers risk getting worse, so he tells his university students to think twice about stimulants for grades. Huberman raises escalating nicotine-pouch use, from one pouch to a canister a day, as likely just maintaining baseline rather than boosting cognition.

9. Having Alzheimer's pathology does not guarantee dementia, and lifestyle and psychological factors shape resilience.
Plaques and tangles start building up 10–15 years before symptoms. Husain lists exercise, controlled blood pressure and cholesterol, avoiding diabetes, limiting alcohol and not smoking. He adds that purpose, social connection and curiosity matter almost as much: people who keep or grow their social networks, stay open to new pursuits, or wake with a sense of purpose show lower dementia risk across studies, after adjusting for confounders.

10. Attention may not be trainable in general, but you can stop degrading it.
Husain says there is little evidence you can intrinsically train attention. The brain has limited capacity, so external stimuli and internal chatter compete for selection. What you can do is remove distractions.

EXAMPLES

1. 'David', the financier who stopped caring.
A highly social finance worker in his 30s suddenly became apathetic, lost his job, couldn't be bothered to claim benefits, and sat in a chair all day while friends cooked and prompted him to shower. He wouldn't listen to music because setting up the speakers took 5 minutes. MRI showed two tiny strokes in the basal ganglia.

2. Levodopa failed but ropinirole worked.
Husain's team first slowly increased levodopa, the drug from Oliver Sacks' Awakenings, with no change. They switched to ropinirole, which directly stimulates dopamine D2/D3 receptors. Three months later David arrived showered, with a haircut and suit, a new job and a new girlfriend, so changed that Husain didn't recognize him in the waiting room.

3. The Parkinson's patient in a burning house.
The classic clinical observation is that a Parkinson's patient who barely moves can run out of a house they realize is on fire. Husain's reading is that the motivation signal surges enough to engage the action system.

4. Rewards speed up eye movements in Parkinson's, and dopamine boosts them further.
With colleague Sanjay Manohar, Husain showed that offering more reward for fast eye movements raised eye-movement speed in Parkinson's patients, as in healthy people, and adding dopamine medication raised it further. Incentive and

dopamine together increase vigor.

5. The 'teach me' trick.

Huberman describes a social-media parody skit: a man gaming ignores his partner's request to hang pictures, but leaps up when she asks him to show her how. Husain says the incentive changed from a chore to the reward of teaching, dropping the barrier to near zero.

6. WWII radar operators and the vigilance decrement.

British studies of radar operators watching dull screens for German aircraft showed that sustained attention fades over time even in healthy brains. In ADHD, a key signature is more variable responses over time, which Husain suspects might improve if motivation for the task were higher.

OTHER RELEVANT

1. Lower the first step.

For a task you keep avoiding, shrink it into subcomponents or attach a different reward, such as novelty, teaching someone or a social payoff, rather than relying on willpower.

2. Cut distractors at the source.

Husain's practical tools: turn off notifications, close email while you're doing focused work, and reduce distracting noise in your environment.

3. Build 'chop wood, carry water' effort.

Huberman argues you find your passion by getting good at effort in things you aren't passionate about, rather than waiting for passion to pull you, as David's case showed. Doing some mildly disliked but harmless tasks builds that capacity.

4. Be cautious with stimulants and nicotine.

If you're already performing well, the inverted-U suggests stimulants for study may backfire, and responses vary between individuals. Talk to a doctor, and don't assume more is better.

5. Protect cognition with both the physical and social basics.

Manage blood pressure, blood sugar, cholesterol, alcohol and smoking, and keep relationships, curiosity and purpose, especially around retirement, when colleagues and roles fall away.

Master Self Control & Overcome Procrastination | Dr. Kentaro Fujita

Guest: Dr. Kentaro Fujita
Date: 2026-05-11 · Duration: 2:27:49
URL: https://www.youtube.com/watch?v=e89rVf4Pf0k

KEYPOINTS

1. Self-control is a trade-off between smaller-sooner and larger-later rewards
Fujita uses Walter Mischel's Stanford 'marshmallow test' (1960s–80s) as the textbook example. A child can eat one marshmallow now or wait for the experimenter to return and get two. How long the child waited became the classic measure of delay of gratification, and follow-ups linked longer waits with better grades, income, friendships and health and lower incarceration.

2. The marshmallow findings are contested but not dead
A large replication with 4-year-olds found the expected correlation, but it disappeared after controlling for 30–40 covariates such as socioeconomic status. That was a fair concern, since the original Stanford daycare children were mostly well-to-do. Yuko Munakata's team reanalyzed the same data using fewer, theory-driven covariates and found waiting still predicted later problem behavior. Fujita's takeaway: setup matters, especially whether the child trusts the experimenter to deliver.

3. Self-control is not a muscle that runs out
The 2000s 'ego depletion' boom claimed one effortful task (such as writing with your non-dominant hand) weakens performance on the next (such as the Stroop color-word task). Multi-lab replications gave mixed results. The failed one was led by the theory's originators, which was seen as damning, and Fujita says the field's consensus is that the effect does not reliably occur.

4. Willpower training barely works; strategy training does
Fujita defines willpower as effortfully suppressing an impulse. Training it with thousands of Stroop trials or a week of using your non-dominant hand produces small, highly variable gains, and many people gain nothing. The children who waited longest did not just grit it out. They covered their eyes, turned away, or imagined the marshmallows as puffy clouds or framed pictures. These strategies can be taught.

5. Self-control is distance-dependent: 'why' far away, 'how' up close
When a goal is far off, hypothetical or about someone else, people think abstractly about why it is desirable. When it is imminent, they think concretely about how to do it, which for hard things is unpleasant. In Fujita's lab, people who first spent time thinking about why they pursue their goals (even unrelated goals) showed better self-control on a later task than those who thought about how.

6. Hot cues can help, not just cool ones
Mischel's model held that you should 'cool' emotional thinking about temptations. When Huberman suggests picturing a cockroach on the cake or fearing showing up to an exam unprepared, Fujita calls the point profound. For short-term battles, the immediate downsides or upsides work; for long-term battles, think in long-term outcomes. Different tools suit different people, which is why he and Ethan Kross describe a 'self-control toolkit.'

7. Self-control conflicts shouldn't be a fair fight
Stack multiple 'whys' behind a goal: health, setting an example for your kids, proving you can do it, becoming the person you want to be. Success then feeds self-efficacy in a virtuous cycle, while giving up can trigger a downward spiral of 'I'm not capable.' Fujita adds that this kind of reflection can take as little as a minute.

8. Abstinence and moderation each have costs
Consistent streaks carry their own motivational pull, but they make behavior rigid: one lapse ends the streak and can collapse the goal. Abstinence also pre-decides choices and avoids backsliding. Moderation, planned occasional indulgence with the goal in mind, is not the same as a rationalized lapse. Abstinence suits all-or-none goals like fidelity; a study break before an exam suits moderation.

9. People misjudge which strategy shows self-control
Initial findings from Fujita's lab, with his student Fung Lai, show people rate someone who abstains as having more self-control than someone who moderates. Fujita says moderation is in principle the harder skill, and suspects this bias leads people to choose rigid plans that do not fit their goal or personality.

10. We pursue many 'invisible' goals at once
Society trains single-goal pursuit, sacrificing everything for one aim. That can be productive, but people actually juggle work, family, friends, health and creativity. Fujita suggests deliberately dividing effort across these goals may serve all of them better and relates to burnout.

EXAMPLES

1. The 15-minute wait nobody finished
Fujita calls it the 'dirty little secret' of the original studies: no child waited the full 15 minutes. Researchers simply timed how long each lasted. Later versions shortened the wait to 10 minutes, which is easier.

2. Thinking like Batman
In a study involving Angela Duckworth and University of Minnesota researchers, children chose a costume such as a Batman cape and cowl and asked 'What would Batman do?' during a self-control task. They outperformed children who did the task normally. Simulating someone else's mind creates psychological distance.

3. Fujita's 500-day Apple Watch streak

His unbroken ring-closing streak became motivating in its own right. It also had him on a treadmill in the middle of the night just to protect the pattern, which he calls 'really stupid' and an example of rigidity.

4. David Goggins' harsh self-talk

Huberman notes that Goggins listens to negative social media comments while running and berates himself to keep going. Fujita says it clearly works for Goggins, but other people need other tools.

5. Huberman's half-hearted HIIT session

Short on time, he let himself do the first two of eight assault-bike rounds 'semi-lazy.' By rounds three and four his motivation had climbed, showing the barrier was the idea of the effort rather than the effort itself.

OTHER RELEVANT

1. Rehearse your whys before temptation hits

Because the concrete 'how' mindset dominates in the moment, deliberately recall the abstract reasons you care just before high-risk situations. Tiredness, anger and alcohol push you toward here-and-now thinking.

2. Create distance physically or mentally

Remove or cover the temptation, talk to yourself in the third person ('What does Ken want to do?'), a tactic from Ethan Kross's work, or ask what someone you admire would do.

3. Stop waiting for perfect conditions

People are endlessly creative at justifying indulgence ('too sunny, not sunny enough'). Optimization culture can become another excuse. Start in imperfect conditions and expect to warm up.

4. Choose abstinence or moderation to fit the goal

Use firm rules for goals that one lapse would destroy. Allow planned breaks where an occasional lapse doesn't undo progress, and consider whether you prefer black-and-white rules or variety.

How Dopamine & Serotonin Shape Decisions, Motivation & Learning | Dr. Read Montague

Guest: Dr. Read Montague
Date: 2026-02-02 · Duration: 2:41:25
URL: https://www.youtube.com/watch?v=VPi_eWiaqdg

KEYPOINTS

1. Dopamine is primarily a learning signal, not a pleasure chemical
Montague, a computational neuroscientist, says the old 'dopamine equals pleasure' view has given way to dopamine as a learning signal. Its fluctuations control learning, and it also plays roles in motivation, movement and possibly feeling states. He stresses that how dopamine's effects on learning relate to how you feel is much less well understood.

2. Dopamine encodes changes between successive predictions, not just outcome versus expectation
The 1972 Rescorla–Wagner rule compares an outcome to an expectation, but reality mostly gives long stretches with no feedback. Rich Sutton and Andy Barto's temporal difference rule learns from the gap between one prediction and the next. Using Sutton's example: on Wednesday you predict two inches of rain on Saturday, and on Thursday you update to ten inches. That change in expectation, before any outcome arrives, is what dopamine appears to encode, and the same rule lets learning chain back through cues.

3. The brain's learning algorithm is the one behind modern AI breakthroughs
Around 1990, Montague, Peter Dayan and their adviser Terry Sejnowski found that Wolfram Schultz's recordings of dopamine neurons matched Sutton's algorithm 'figure by figure'. The same temporal difference approach later underpinned DeepMind's Go programs, including AlphaGo Zero, trained from scratch without expert input. Montague calls it the only case he knows of an algorithm 'crawling out' of the brain into software that then surpasses us. It is seen in honeybees, fruit flies and songbirds as well as humans.

4. Dopamine both teaches and sets how motivated you should be
Following Todd Braver, Jonathan Cohen and Matt Botvinick, fast dopamine fluctuations carry the prediction errors that drive learning, and a slower envelope across them can indicate how much to want something. Huberman notes that infinite-scroll platforms exploit this by constantly updating expectations so you stay in foraging mode. 'Dopamine hits' are real, but Montague calls the phrase 'blunt' and incomplete.

5. Parkinson's shows dopamine's role in valuing actions
Each side of the brainstem has roughly 80,000 dopamine neurons that make hundreds of millions of connections. By the time Parkinson's symptoms appear, 70–75% are lost, so the signal becomes too noisy to read. Montague describes Parkinson's as a 'flat value function': nothing looks more valuable than anything else, and since moving costs energy, the system 'actively freezes'.

6. Dopamine and serotonin act as opponents in humans
Montague's group says it is the only one recording sub-second dopamine and serotonin levels in conscious humans, piggybacking with consent on electrodes placed in patients for surgery. In economic games, when things go well dopamine rises and serotonin falls; when they go badly the reverse happens. Serotonin seems linked to learning about negative events and to 'active waiting', and Rob Malenka's rodent work shows learning requires this opponency.

7. SSRIs may push serotonin into dopamine terminals
A roughly 20-year-old paper in Neuron (senior author John Dani) found that after weeks on an SSRI, rodents' dopamine transporters were pulling serotonin into dopamine terminals. Montague's hypothesis is that putting the 'negative juice' in 'positive' terminals could blunt reward from good events. He emphasizes that SSRIs have helped many people and are a life-changer for some, that the response is highly variable, and that human follow-up is lacking.

8. Hunger and severe stress can flip dopamine's meaning
Mark Andermann's rodent work at Harvard shows that in starvation states, dopamine in the amygdala encodes punishment prediction errors rather than reward. Montague frames this as rational in an emergency, when staying alive matters more than chasing rewards. He also cites an Israeli study showing judges' rulings varied depending on whether they had eaten.

9. Harsh feedback is a poor teacher because it causes overgeneralization
A cataclysmic negative event teaches the nervous system to fear anything resembling the context, which is the PTSD pattern. Montague argues that rulers on knuckles or very negative training of animals teach badly; small nudges work better. His abused rescue dog's world stayed 'inverted', with basic safety acting as the only reward.

EXAMPLES

1. Huberman's friend and dating as foraging
A friend repeatedly gets very excited about new matches, then wants out weeks later. Huberman describes the 'sawtooth' of updated expectations and advises collecting data more slowly, for example by seeing someone more often for two weeks before deciding.

2. ADHD-like and focused honeybees
Montague's collaborator Brian Smith at Arizona State measures neuromodulators in bees. Bees with one octopamine-to-tyramine ratio get distracted after the waggle dance and explore more; others fly straight to the nectar. Colonies need both exploration and exploitation. Montague suspects stimulants for ADHD help by stabilizing brain states and thought sequences.

3. A friend's relationship and a slowly recalibrating baseline
After brutal relationships, Huberman's friend spent about three years in a calm, healthy one feeling 'like a cat in a room full of

rocking chairs' before he could flourish. Montague agrees that the system needs sustained safety before it stops working for survival and can work for rewards again.

4. L-dopa and voices

Blocking dopamine receptors reduces schizophrenia's voices, and Montague says he could find an L-dopa dose that makes a healthy person hear voices or feel paranoid. He still calls single-chemical theories of depression and schizophrenia incomplete.

5. The phone in another room

Huberman cites a paper finding that a phone face-down on the table or in a bag still lowers cognitive performance, which recovers when the phone is in another room. He keeps social media on an old phone locked away for 22 hours a day.

OTHER RELEVANT

1. Use sports to train losing and staying calm

Montague made all five of his children do a sport. Wrestling teaches you to manage panic with your air cut off, and track meets with 60 kids in an event teach you to handle losing after doing your best. His children's school has a no-cut policy; there were 45 kids on the tennis team.

2. Learn to reward yourself for resisting

The dopamine system can make resisting feel good. Taken to an extreme, that is part of anorexia, the deadliest psychiatric illness. In healthy forms it looks like Montague relishing hill sprints while 'soft guys' slept, or Huberman finding reward in long-horizon work where the big payoffs come every couple of years.

3. Sleep resets the system

Montague sees sleep as computational cleanup: erasing, consolidating, recycling transmitters and restoring homeostasis. Two nights without it transform motivation and dopamine dynamics.

Best Ways to Build Better Habits & Break Bad Ones | James Clear

Guest: James Clear
Date: 2026-01-05 · Duration: 2:35:19
URL: https://www.youtube.com/watch?v=bdsc3Spm6Sw

KEYPOINTS

1. Mastering the start is the biggest lever in habits
Clear, author of 'Atomic Habits', says the single biggest theme he sees is mastering the first 5 minutes, or even the first 30 seconds, of choosing to start. His trainer's class had eight sign-ups on a cold, rainy day and only two showed up. The edge was simply being willing to be uncomfortable for the 5–10 minutes of getting out the door. People who dream up big plans and make starting hard tend to fail.

2. The four laws of behavior change
Make it obvious (visible, easy to notice), make it attractive, make it easy (reduce the number of steps), and make it satisfying, so the habit is tied to reward or positive emotion. Clear says his approach is 'not to prescribe but to empower': lay out the whole toolkit and let people choose the screwdriver, wrench or hammer that fits their situation.

3. Consistency is adaptability
Clear's writing habit changed shape over time. For three years he wrote 2,000-word articles twice a week at about 20 hours each. Then for three years he wrote the book. Now he writes a weekly newsletter that takes about 2 hours and reaches around 3 million readers. His rule: don't have time, do the short version; don't have energy, do the easy version. Just don't put up a zero.

4. Bad days count more than good days
A 20-minute workout of a couple of sets of squats on a bad day reinforces showing up more than a great session does. Set your baseline at what you can do on bad days and scale up on good ones. Huberman adds that chasing the perfect 'flow' state, with stimulants and focus hacks, can undermine the plain consistency that 'enlarges ability' and raises the ceiling on performance.

5. Habits are learning, so practice builds them
Both frame habits as self-directed neuroplasticity. Your brain will learn habits whether you design them or not, so the real question is whether you control which ones it learns. Huberman links Clear's examples to chunking: learn one right step, then stack the next.

6. Identity-based habits: every action is a vote
Instead of asking 'What do I want to achieve?', ask 'Who do I want to become?'. Each workout is a vote for being someone who doesn't miss workouts. Over 3–12 months, you cross an invisible threshold where the habit becomes part of your story. Then you fight to keep it: 'I run because I'm a runner, not because I have a half marathon in 3 months.'

7. Growth doesn't require self-criticism
Clear wrestled with whether you have to be dissatisfied to be driven. His image is an acorn that never berates itself for not yet being an oak and keeps growing anyway. An ex-girlfriend's advice, 'Flow, don't fight', pushed him to find versions of his work where the effort itself is the reward.

8. Never miss twice
Slipping once is a blip. The danger is letting one miss turn into three months off. Eat the pizza on day nine of a diet, then get back on track the next day. Clear mentions Gretchen Rubin's idea of splitting the day into four quarters, so a bad morning doesn't write off the whole day. Rebounding quickly beats perfect 'optimal window' thinking.

9. Bad habits run the four laws in reverse
Phones are always visible, attractive, frictionless and rewarding. That's why checking became a habit in days without any effort. Clear inverted the laws while writing the book: make bad habits invisible, unattractive, difficult and unsatisfying. Phones also blend the context for many habits on one screen, which makes them hard to separate.

10. Your social environment may matter most
If Clear could add one thing to 'Atomic Habits', it would be more on social environment. We are all in groups with shared norms, and habits that go with the grain of the group are easy to keep. You don't need to 'fire your friends'. Find or create a space where your desired behavior is normal, such as a yoga studio if no one at home does yoga.

EXAMPLES

1. Mitch's 5-minute gym rule
A reader wasn't allowed to stay at the gym longer than 5 minutes: drive there, do half an exercise, drive home. After about 6 weeks of going four days a week, he figured he might as well stay longer. Clear connects it to Ed Latimore's line: 'The heaviest weight at the gym is the front door.'

2. Phone in another room until lunch
From about 9 a.m. to noon, Clear leaves his phone down the hall. It's 30 seconds away, but he never goes to get it. He moved Audible alone to his home screen, later took email off his phone, and has used blockers like Freedom and Self-Control.

3. Two honest pages
One exercise: write the story of your past year twice, once with only the losses and once with only the wins, without lying on either. Then ask which story you'll carry. Clear replayed his best plays with his dad after every baseball season. He previews the good parts of the school day with his son before drop-off.

4. Cold-emailing 300 people

With no authors or entrepreneurs in his family, Clear cold-emailed about 300 people in his first 6 months, and about 30 agreed to chat. He later hosted gatherings of like-minded writers and found that everyone said yes because they were all waiting for someone to organize it.

OTHER RELEVANT

1. Build a bad-day version of every habit

Decide in advance the minimum version you'll do when you're short on time or energy, and treat that as success.

2. Schedule keystone habits early

The earlier in the day you do something, the better the odds it happens. Identify which hours you actually control and which habits are upstream of good days. For Clear, that is working out, reading even 5 minutes, and writing. Huberman suggests protecting 1–3 hours before sleep from heavy eating.

3. Make reaching the goal, not winning

Clear says sports taught him that 'the secret to winning is learning how to lose'. Approach new habits with curiosity, as reaching rather than pass/fail. Huberman cites choreographer Twyla Tharp: fail a lot in private so you don't fail in public. That is harder now that everything is filmed.

How to Overcome Inner Resistance | Steven Pressfield

Guest: Steven Pressfield
Date: 2025-10-20 · Duration: 2:15:02
URL: https://www.youtube.com/watch?v=cpKsogGdem4

KEYPOINTS

1. Resistance grows with the importance of the work
Pressfield stands by the line 'The more important to your soul's growth, the stronger the resistance will be.' When you conceive a book, film or business, you don't get a surge of inspiration. You get waves of Resistance with a capital R: procrastination, distraction, the urge to go to the beach. The resistance tracks how much the work matters to your evolution, not its commercial value. If you're torn between three or four projects, he says to do the one you're most afraid of.

2. The tree and its shadow
His image: a tree appears in a sunny meadow and immediately casts a shadow. The tree is your dream and the shadow is the resistance, and the two are directly proportional. So a massive feeling of 'I'm not good enough, I want to quit' is a good sign: it tells you the tree is big. Choose the big tree, not the little one.

3. Train the body as a rehearsal for the work
At 82, Pressfield arrives at the gym at 4:45 a.m. To him the gym is less about fitness than about rehearsing resistance. He hates getting up that early, it will hurt, and he's afraid of injury and embarrassment. Facing that first means that by the time he sits at the keyboard, nothing else that day feels as hard. On the Sundays he skips, he notes, he doesn't feel good about himself.

4. Bank 'little successes' and capture ideas immediately
He cites Braveheart screenwriter Randall Wallace, who stacks small morning wins to build momentum before writing. Both men agree that ideas arriving during workouts vanish 'like a dream'. Pressfield dictates them into his phone right away, and Huberman avoids social media and texting during training so those ideas can surface.

5. Dive straight in, and don't judge the day's pages
Asked how often his mind drifts to the news in the first ten minutes of writing, Pressfield says never, although it took years to get there. He plunges in, writes about an hour, takes a laundry break, and writes another hour. His inner critic almost never appears now. He never rereads the day's work, telling himself that quality will come in later drafts.

6. Think in multiple drafts
Top Gun's original writer, Jack Epps, taught him to 'always think in multiple drafts': you can only fix one thing per draft. Pressfield takes a book through 13–15 drafts, the last seven or eight with only slight changes, which frees each day's session from perfectionism.

7. Stop at the point of diminishing returns
He once wrote four hours a day and now writes about two, which he believes produce as much. When typos and mistakes appear he stops without guilt, as with an extra gym set that will only hurt you. He quotes Steinbeck that squeezing out a little more at the end of a long day is 'the falsest kind of economy' because you pay for it the next day. He also follows Hemingway's habit of stopping when he knows what comes next, which eases the next morning's entry. Huberman adds that resistance-training data favor the intensity of the first one or two hard sets, as the nervous system gets better at recruiting effort.

8. A sealed work environment
There's no internet, music or phone use beyond dictating a note. Sessions are usually 11 a.m.–1 p.m. and shift by two hours at most. His chair isn't comfortable, and he thinks it shouldn't be. Huberman calls a famous writer's advice to buy a super-comfortable chair 'terrible', arguing that a focus on optimizing comfort is itself a trap, and points out that his podcast started in a closet.

9. Turn pro
Pressfield's breakthrough was flipping from amateur to professional thinking. A pro shows up every day, stays all day or its equivalent, plays hurt like Jordan or Kobe Bryant, and doesn't take success or failure personally. An amateur folds at adversity and checks how they feel. A professional does it anyway.

10. The people closest to you may resist your calling
Most people have a calling they aren't pursuing, he says, so your effort can feel like a reproach to them: 'If Andrew can do it, why can't I?' That can lead to undermining framed as concern, such as 'we don't want your children starving.' Huberman adds that people mock those who eat well or sleep early because it highlights their own choices. He also names anger and numbing out, through certain social media, news, alcohol and ultra-palatable food, as resistance sold to us 'for free', paid for with our time.

EXAMPLES

1. The invocation of the Muse
Pressfield's mentor Paul Rink, who knew Steinbeck and Henry Miller, typed out the invocation of the Muse from T.E. Lawrence's translation of the Odyssey on a Remington manual typewriter. Pressfield recited it aloud every morning for about 50 years. The page was lost when his house burned in the recent fires (he and Huberman were neighbors, and both their homes were lost), but he knows it by heart. He believes ideas come from 'someplace else' and the artist's job is to get out of the way.

2. 'You're a professional'

As a new truck driver in North Carolina, Pressfield dropped a trailer carrying about $300,000 of industrial equipment. His boss Hugh Reeves took him to a Durham hot dog place and told him that whatever internal drama he was going through, his job was to deliver the load.

3. 'Pulling the pin'

Picking fruit in Washington State to fund a book, Pressfield learned the fruit tramps' phrase for quitting too soon, taken from uncoupling railcars. He realized he'd pulled the pin on everything, including his marriage. A fellow picker and Korean War Marine named John wouldn't let him quit before the season ended.

4. A brutal first review

The first film he worked on, a King Kong movie, drew a Daily Variety review that said it hoped the writers' names weren't real 'for their parents' sake'. He never rewatched it. His friend Tony Keelman told him he was 'in the arena'. Rink's advice was to start the next one today. The War of Art and Gates of Fire each took years to find readers, and he published his first book at 52.

5. Honor as fuel

His family was the struggling branch among successful relatives, and proving them wrong to honor his father drove him more than thoughts of mortality. His former advertising boss Phil Slott told him life is long, not short, so at 82 he plans as if he has a 20-year career left.

OTHER RELEVANT

1. Pick the project you fear most

Use the size of your resistance as the guide to which work matters.

2. Expect an unbalanced life

Pressfield says pursuing a calling 'with both feet' cost him things, including not having children. He doesn't regret it, quoting The Godfather Part II: 'This is the life we've chosen.'

3. Further reading

Huberman recommends The War of Art, Do the Work and Gates of Fire. Pressfield's next novel, The Arcadian, due next June, follows the final life of his recurring soldier Telamon of Arcadia from A Man at Arms.

How to Make Yourself Unbreakable | DJ Shipley

Guest: DJ Shipley
Date: 2025-10-06 · Duration: 3:42:36
URL: https://www.youtube.com/watch?v=WwRc2SEo-VI

KEYPOINTS

1. Mental health often follows physical capacity
Shipley, a retired Tier 1 Navy SEAL, says his lowest points came when injuries and surgeries cut him off from training. As strength coaches rebuilt him physically, his mental health 'naturally' recovered. He frames his training as being for the group: once the team, now his family.

2. Stack 'micro-wins' with a fixed morning sequence that starts the night before
Clothes laid out, water bottle filled, pills and toothbrush ready. His alarm goes off at 5 a.m. whenever he went to bed, even after landing on a red-eye at 2:30 a.m. He then follows the same order every day: unplug the phone, brush his teeth, take his pills, dress left sock then right. By his first cup of coffee he has done about 25 things within his control, so nothing feels frantic.

3. Structure exists because things can knock you off course
Huberman points out that operators build routines not because they are unflappable, but because they know they are context-dependent. Shipley guards his 7 a.m. workout ('unracking at 0700') against chats and drop-ins because he knows how missing it cascades through his day. He says he has rarely taken five days off in 20 years for fear his mental health would drop.

4. Compartmentalize with deliberate transitions
From 5 to 10 a.m. he is 'selfish' to be selfless later. From 10 to 6 he thinks only about work. On the 12-minute drive home he puts the phone on do not disturb, plays calming music (Chris Stapleton), and rehearses greeting each daughter and his wife. He reminds himself he has only about three hours to be a full-time dad and husband, and will 'fake it' if needed so the first interaction is positive.

5. Know the difference between hurt and injured
Training for decades builds body awareness precise enough to tell a doctor exactly where a problem is. Huberman describes carrying Cam Hanes's 72-lb rock up 1,000 feet with a strained hamstring: it hurt, but it wasn't an injury, and knowing that line is what keeps you from losing months to a real injury.

6. BUD/S selects for tolerating misery, not for looking the part
Shipley says he arrived as a 6'1", 145-lb skateboarder who barely passed screening, alongside 'freaks' like Coleman Ruiz. Of more than 200 in his class, fewer than 20 graduated. Physically impressive candidates often quit in the cold surf, while less-fit men who simply didn't care how miserable it was made it. His frame: 'You bought the ticket, you get the whole show.'

7. Ibogaine and 5-MeO-DMT broke a cycle nothing else touched, in his telling
After a skydiving injury, an electrocution, medical retirement, up to 60 pills a day and being suicidal, Shipley followed Marcus and Amber Capone (Veteran Solutions) to a supervised clinic in Mexico. He says none of his four ibogaine sessions brought up combat. Instead they replayed his childhood, then put him in his family's position, including feeling his seven-year-old's fear of him. His final 5-MeO-DMT session produced what he calls ego death, followed by love and clarity.

8. Huberman's caveats on psychedelic treatment
These treatments are not legal in the U.S., require medical supervision, and Huberman says there is no reasonable or safe recreational use of them. He frames them as tools for brain plasticity, notes that Stanford's Dr. Nolan Williams is scanning veterans who undergo them, and describes a bipartisan push, including former Texas governor Rick Perry, toward FDA approval. Shipley stresses that the medicine is 'not a cure-all': you must restructure your life afterward.

9. 'Dials, not switches'
Shipley says he could have done the SEAL job and still been a full-time father if he had learned to turn his operator mode up and down gradually rather than flipping it on and off. His fear before treatment, shared by many operators, was losing his edge. He says the medicine instead improved his ability to move between roles.

EXAMPLES

1. The nightly 20-minute walk with his wife
Every night after dinner, rain or shine except a downpour, they walk about a mile with no phones: she talks for the first 10 minutes and he talks for the second. He credits it with the best his marriage and health have been. Huberman adds that a consistent wake time supports sleep rhythms and growth hormone release.

2. Rebuilding a pull-up after shoulder surgery
After a dislocation that 'came through my armpit', 31 days of inpatient rehab and a drop from about 215 to 180 lb, Shipley refused to hang from a bar. Coach Vernon Griffith held his knees and lowered him gradually over weeks, then progressed to a band and to free hangs. At 215 lb he now does sets of 20–25 strict pull-ups.

3. A five-day training week
Monday is a pull day with trap-bar deadlifts, pull-ups and grip work. Tuesday is heavy pressing. Wednesday covers rotation and anti-rotation work, plyometrics, carries and short sprints at the start. Thursday is a 'brutal' leg day with a belt squat and heavy lunges and split squats. Friday is arms and accessories. Sprints of 200–300 m go at the end two or three days a week, since running them first 'zaps' the lift.

4. His all-round fitness test
The tiers include a broad jump (minimum your height, 'standard' about 8 ft, his goal 10 ft); bodyweight bench press reps

(10/15/20+); strict pull-ups (10/15/20+); a farmer's carry with half your bodyweight in each hand; trap-bar deadlift sets of five from 1.5× bodyweight upward; an 800 m run; and a plank (2, 2.5 or 3 minutes).

5. Coming home after treatment

He confessed past wrongs to his wife expecting to lose her. Instead she took off his sunglasses and collapsed into his arms. He now hosts groups going for treatment, including veterans, pilots and civilians.

OTHER RELEVANT

1. Try two 20-minute walks a day for a week

Shipley's challenge is a walk in the morning before the kids are up and another after dinner, for seven days. He says the world won't fall apart on day eight.

2. Mind your intake, not just your food

Following Griffith, he treats what you see and hear, from scrolling to music choice, as part of your diet, and keeps the phone out of his training and family blocks.

3. Test yourself regularly

He suggests retesting about every three weeks. A drop in performance is a cue to check sleep, nutrition and workload before pushing harder.

Tools for Overcoming Substance & Behavioral Addictions | Ryan Soave

Guest: Ryan Soave
Date: 2025-04-21 · Duration: 3:07:32
URL: https://www.youtube.com/watch?v=J7yn4tJEmJU

KEYPOINTS

1. Addiction is a solution to something, and that solution becomes the problem
Soave, chief clinical officer at Guardian Recovery, sees substances and compulsive behaviors as relief from an underlying stressor. He quotes Dr. William Silkworth, an early supporter of Alcoholics Anonymous: people drink because they like the effect alcohol produces, and 'that effect is relief.' The clinical question then becomes what the person is trying to get relief from.

2. Ask whether you have it, or it has you
Clinically, the terms are substance or alcohol use disorder, rated by severity. Soave notes that not everyone who meets the criteria at one point in life is permanently an addict, though they probably shouldn't 'gamble with it.' He applies the question beyond drugs, to TV, exercise and work. Bingeing Netflix on a plane is different from bingeing to avoid a stressful day and then losing sleep.

3. Detox comes first, and early sobriety often feels worse
Treatment starts with medical and nursing assessments, and sometimes a trip to the ER, because stopping alcohol abruptly can cause seizures and death. Once the substance is gone, people have to face life without their 'medicine,' so they often feel worse at first. Soave likes it when patients arrive fighting. Like an arrow pulled further back, that tension can carry them further than patients who just tick boxes.

4. Recovery has to build a life, not just remove something
Cutting something out isn't sustainable if it was serving a purpose. Recovery means learning to notice sooner when you're out of balance and to return to peace faster, again and again. Soave borrows a definition of humility from Bill Wilson: an honest recognition of who and what we've become, followed by a deep desire to become who we can be.

5. We confuse discomfort with threat
Soave calls this possibly our biggest psychological challenge. He compares it to a sailor who assumes calm seas mean he's on course and rough seas mean he's off course, and keeps changing direction. A skilled sailor decides whether to go through a storm or around it. Distress tolerance means being able to choose a response rather than simply react.

6. Build calm proactively, before you need it
The 'gap between stimulus and response' is hard to find in the moment, so Soave schedules regulation practices whether or not he needs them that day. He compares it to therapy: the second-best time is during a crisis, and the best time is when you're not in one. Huberman adds that learning to notice the fast bodily signs of adrenaline helps you spot a stress wave earlier, as in the idea 'stilling leads to seeing.'

7. Gambling is the addiction where the next hit promises to fix everything
Someone using heroin doesn't believe the next dose will solve their life, but a gambler down $300,000 can believe one bet will. Soave says he has seen research suggesting gambling addicts have very high suicide rates. He's alarmed by unregulated offshore sites and crypto betting reaching kids, and by how saturated sports broadcasts now are with betting ads.

8. Stimulant addiction is mostly psychological, and that makes it hard
Unlike alcohol, opioids or benzodiazepines, stimulants don't require a physical detox, yet quitting them is 'really hard' because of a mental obsession. Huberman notes that smoking crack or injecting cocaine raises dopamine fastest, and that the speed of the rise matters as much as the peak.

9. Some people are 'addicted' to intensity
Soave describes special forces veterans whose training is largely nervous-system training: doing skills under extreme stress and sleep loss. At home, ordinary life can feel flat, and high-adrenaline risk-taking only brings them up to baseline. He calls it a drive and Huberman calls it intensity addiction, but both describe a nervous system calibrated very high.

EXAMPLES

1. The 30-day litmus test
Huberman admits he has worked 10–16 hours a day, five or six days a week, since he was 19. Their test is whether you could take 30 days away from something without falling apart. Soave adds that you should tell a therapist or trusted friend how it's going, because it's hard to be honest with yourself.

2. The emotional weather forecast
Each morning: (1) note gratitude, including for something that challenges you; (2) sketch the day's plans, such as school run, three flights, business dinner; (3) name your current emotional state, including fears, resentments, guilt or shame; (4) predict which 'liabilities' could flare, such as impatience or control; and (5) choose what to strive for, such as patience or kindness. Like packing a raincoat, it won't stop you getting wet, but it's there when you need it.

3. A mother changed only one thing
Between two parts of a yoga nidra training in Florida, a stressed single mother of two young boys did nothing differently except practice nidra twice a day. When she returned she said, 'my boys changed.' Soave suspects the boys were the same, and she had built the tolerance to handle ordinary boy behavior.

4. Opioids and the poppy
The same flower gives us surgical pain relief that Soave believes has saved more lives than it has cost, and heroin and

fentanyl. US overdose deaths went from about 50,000, which surpassed car-crash deaths, to roughly 100,000 a year. Teens now die from counterfeit 'Xanax' or 'Valium' pills laced with fentanyl.

5. Powerlessness as the first step

Only the first of AA's 12 steps mentions alcohol. The rest are a 'design for living.' Soave frames admitting powerlessness as like a kid who stops picking fights with the five biggest guys on the block every day: once you see where you can't win, you can find real power elsewhere.

OTHER RELEVANT

1. Schedule yoga nidra or NSDR

Soave's preferred timing for 20–35 minute sessions is morning and late afternoon, then evening, then whenever you can. His treatment programmes started each day with an hour of nidra. Regular practice makes it faster to move from a dysregulated state to a regulated one.

2. Watch for HALT

Hungry, angry, lonely, tired: these are the states that raise relapse risk, often several at once. Soave has heard anecdotally that diabetic alcoholics who keep their blood sugar stable relapse less often, and he says early research suggests GLP-1 drugs may reduce cravings, though he doesn't know of on-label use for addiction.

3. For porn or similar compulsions, define your own sobriety

Admit the problem, decide with a therapist, sponsor or group what sobriety means for you (often stopping completely), then add accountability, such as blocking software or a partner who approves the sites you visit. Huberman notes that fast, repeated dopamine spikes carve a groove and deliver less and less satisfaction over time.

4. Helping someone you love

Talk to them without shaming them, treating them as a sick friend rather than a bad person. Get support yourself through Al-Anon or a treatment center, and offer to go with them to an open 12-step meeting, which anyone can attend. You can just say 'pass' if it's your turn to share.

How to Unlock Your Potential, Motivation & Unique Abilities | Dr. Adam Grant

Guest: Dr. Adam Grant
Date: 2023-11-27 · Duration: 3:12:22
URL: https://www.youtube.com/watch?v=3gtvNYa3Nd8

KEYPOINTS

1. Procrastination is emotion avoidance, not laziness
Grant says the research is clear that procrastinators are not dodging effort — people often clean their whole house to avoid a task. What they avoid is the negative emotion a task stirs up: boredom for him (he delays admin, scheduling and grading), fear, anxiety or impostor feelings for others, or confusion about where to start. Naming the specific emotion is the first step.

2. Strategic delay isn't procrastination
Procrastination is technically delaying despite an expected cost. Huberman described waiting for a deadline because time pressure sharpens his focus; Grant said that is a strategy, not procrastination, because he sees a benefit rather than a cost. Grant himself is a 'precrastinator' who finished his thesis months early.

3. Moderate procrastination produces the most creative ideas
With doctoral student Jihae Shin, Grant found an inverted-U: people who procrastinate sometimes were rated more creative than rare or chronic procrastinators. Diving in immediately locks you into first ideas with no incubation; chronic delayers rush the easiest idea at the last minute. The middle group still has time to use ideas that kept working in the back of their minds.

4. The creative benefit requires intrinsic interest
Moderate delay only fuelled creativity when people were intrinsically motivated by the problem. If a topic bores you, you never open the folder, so there is no background processing or unexpected connections. Grant now starts projects early but won't commit to an idea until it has incubated for weeks — for a book, at least a month before drafting.

5. When the work isn't interesting, borrow motivation from purpose
Not every task can be made intrinsically motivating. Curiosity drives the 'how'; purpose comes from the 'why'. Grant cites 'boring but important' research in which students who saw how learning would let them help others studied more persistently and earned better grades. For a dreaded chore, connect it to an outcome you care about.

6. Ask for advice, not feedback
Requests for feedback attract cheerleaders, who applaud your best self, and critics, who attack your worst. Asking 'what advice do you have for next time?' turns people into coaches who look forward and name something to repeat or fix. Grant cites a meta-analysis by Kluger and DeNisi spanning a century of research: feedback helps when it focuses on the task rather than on the self, whatever its tone.

7. The 'I'm not biased' bias is the mother of all blind spots
Emily Pronin's research on the bias blind spot shows people believe they are more objective than others, which blocks them from seeing any bias at all. Grant notes that people who score high on cognitive ability tests can be more prone to it, having been told all their lives they think well. We are also blind to our own strengths.

8. Task order changes how good you are at the next task
A colleague's experiment and field data showed a contrast effect: the more passionate you are about task one, the worse you perform if task two is boring. Grant stopped starting his day with the most exciting work. He now opens with a moderately interesting warm-up and saves an exciting task to look forward to.

9. Potential depends on three underrated character skills
Grant's list: becoming a 'creature of discomfort' (seeking out the awkward and unpleasant), being a sponge that absorbs and filters information, and being an imperfectionist who knows when to aim for excellence and when good is enough. Instilling a growth mindset isn't enough without scaffolding: temporary support that is gradually removed as you learn to climb on your own.

EXAMPLES

1. YouTube-tempted procrastination experiment
To randomly assign procrastination, participants doing creative tasks had one, four or eight entertaining YouTube videos on screen. Those tempted moderately generated the most creative ideas — a lab replication of the inverted-U first seen in survey data from a Korean company.

2. Leslie Perlow's 'quiet time' engineers
Engineers given protected no-interruption blocks before noon (Tuesday, Thursday and Friday in one version) showed 65% above-average productivity. Grant says the days don't matter; the shared commitment to a boundary does. He suggests protecting the first and last hours for deep work and putting meetings after lunch, when people were about 30% less likely to multitask.

3. 72 email checks a day
Citing Gloria Mark, Grant says the average person checked email 72 times a day before COVID. Brigid Schulte calls this 'time confetti': uninterrupted time sliced into fragments that kill both output and enjoyment.

4. The Air Force generals and the 'second score'
At around 25, Grant taught generals and colonels, led with his credentials, and got brutal reviews ('more knowledge in the audience than on the podium'). Using Sheila Heen's 'second score' — rate yourself on how well you take the first score — he opened the next session with 'what could I learn from a professor who's 12 years old?' The room laughed, and the feedback was night-and-day different.

5. The daughter who gave advice back

Before a play, Grant's shy daughter asked for advice, and he asked what she had told him weeks earlier: look for a smiling face. Grant calls this the 'coach effect'. Lauren Eskreis-Winkler's work shows that people randomly assigned to give advice end up more motivated and confident than those who receive it.

OTHER RELEVANT

1. Use a 0–10 rating and many reviewers to filter criticism

Grant asks several people to rate an idea from 0 to 10 (no one says 10). Sevens and eights mean refine it; twos and threes mean rethink or reposition it. Getting more reviewers stings less, because idiosyncratic comments stand out from problems five people share.

2. Keep a 'to-don't' list

Grant's list includes no scrolling social media and no phone after 9 p.m.; he opens apps only to post or read comments. He keeps it in a Word document. Both he and Huberman favour handwritten notes for capturing ideas.

3. Do a reflected best-self portrait

Ask 10–20 people from different parts of your life for a story about when you were at your best, then look for patterns. It reveals strengths you overlook because they come naturally.

4. Set a failure budget

Grant aims to start at least one project a year that doesn't succeed. Succeeding on 90% of projects is a great year; 100% means you aimed too low. Confidence comes from doing, not before it — which is how he decided to start his podcast despite doubts.

5. Taper after peak experiences

Huberman described a stadium-level musician friend who does a menial task, even cleaning up at the venue, right after leaving the stage, so ordinary life at home doesn't feel jarring.

How to Increase Your Willpower & Tenacity | Huberman Lab Podcast

Date: 2023-10-09 · Duration: 2:07:59
URL: https://www.youtube.com/watch?v=cwakOgHIT0E

KEYPOINTS

1. Tenacity and willpower are not habits
Huberman separates them from habit execution, which is reflexive. Tenacity and willpower are what it takes either to do something you don't want to do by default, or to resist something you do. He puts tenacity and willpower at one end of a continuum and apathy and depression at the other. Motivation is the engine that moves you along it. 'Just do it' or 'just don't' fails sometimes for everyone, he says, even David Goggins or Courtney Dauwalter.

2. Everything rides on autonomic function
Whatever the theory, willpower drops when you're sleep-deprived, in physical or emotional pain, hungry, sick, overtrained or ruminating, such as replaying an argument or ignoring a splinter in your foot. No simple metric yet tracks sympathetic–parasympathetic balance; resting heart rate gives only a hint. Without sleep and stress management, he says, the later tools won't help much.

3. The ego-depletion experiments
Roy Baumeister's group placed participants in a room with radishes and the smell of freshly baked cookies. Those who had to resist the cookies then gave up sooner on a puzzle that, unknown to them, couldn't be solved. Those who only resisted radishes persisted much longer. This produced the idea that willpower is a limited resource that gets depleted.

4. Glucose as the limiting fuel, and why it's controversial
Because the brain is among the body's most metabolically active organs and runs mainly on glucose (or ketones on a ketogenic diet), Baumeister's group proposed blood glucose as the depleted resource. Replications and meta-analyses split. Some confirm the effect and others refute it, partly over statistical power.

5. Beliefs change the effect of glucose
In a PNAS paper titled 'Beliefs about willpower determine the impact of glucose on self-control' from Carol Dweck's group, participants did back-to-back Stroop-style tasks with a sugar drink or a taste-matched artificially sweetened drink. Glucose improved performance only in people who believed willpower is a limited resource. Those who saw it as non-limited performed well without the glucose.

6. Baumeister's rebuttal
With three or more demanding challenges in a row, rather than two, sipping glucose did help sustain performance, even though his group conceded that beliefs matter. Huberman says the tools work whichever camp you're in.

7. The anterior mid-cingulate cortex (aMCC) is the hub
Over two dozen studies point to this paired frontal-lobe structure, about a third of the way back from the forehead. It is more active in successful dieters and smaller or less active in obesity and clinical depression. Super-agers, people over 60 with the cognition of people decades younger, have a larger aMCC than their peers. In anorexia nervosa it is hyperactive at rest and when presented with food. Lisa Feldman Barrett's lab framed it in a review titled 'The tenacious brain'.

8. Allostasis: allocating resources toward goals
The aMCC receives inputs from autonomic, motor and dopamine and serotonin reward systems. Huberman frames it through allostasis: beyond keeping balance (homeostasis), the brain allocates bodily resources toward goals. It can trigger and respond to dopamine release.

9. Hard things, not easy ones, build it
In Colcombe and colleagues' 2006 study, 60- to 79-year-olds did three one-hour sessions a week of aerobic training for six months, working up to about 60–75% of maximum heart rate (roughly zone 3). Their aMCC and anterior white matter held steady or grew. A stretching and calisthenics group of equal time showed no such change and no VO2 max gain. The new exercisers had to summon effort; Huberman's point is that if you already train, you need to add something harder.

10. Reward yourself after the hard thing
A recent animal study in Neuron described stress relief as a natural resilience mechanism. The relief after a stressor ends is itself rewarding, and adding a reward afterwards increased the ability to get through future stress. Huberman suggests occasionally rewarding yourself, in healthy ways, after doing the hard thing.

EXAMPLES

1. 'A storm in the distance'
Stanford's Josef Parvizi stimulated the cingulate of awake surgery patients (Neuron, 2013, 'The will to persevere induced by electrical stimulation of the human cingulate gyrus'). aMCC stimulation produced a feeling of a storm ahead that the patients had to go into and knew they could get through, along with changes in heart rate and breathing. Sham stimulation produced nothing.

2. Micro-sucks
Pick small, safe things you don't want to do: one extra set, 100 jumping jacks after a hard run, a cold shower or plunge when you'd rather go home, five minutes of sitting still to review a language lesson instead of grabbing your phone, or not checking texts during a workout.

3. Build on a strength baseline
Huberman cites a working minimum of about six hard sets per muscle group per week to maintain or build strength. He notes a strong correlation between muscle strength and cognitive function, especially with age. Once that is routine, micro-sucks

layered on top keep challenging the aMCC.

4. Learning something hard as an adult

Taking up an instrument or a second or third language engages the aMCC, but only if it's genuinely a challenge you resist. Reflexive habits don't.

5. Problems with no answer

Huberman recalls graduate qualifying exams in which examiners kept asking until he said 'I don't know'. Endeavors with no finish line, in martial arts, music, academics or relationships, keep building tenacity, and super-agers are always engaged in something hard.

OTHER RELEVANT

1. Sleep and stress first

Fix sleep before adding willpower drills, since autonomic depletion undercuts everything else.

2. Check your beliefs

Treating willpower as non-limited may help you through back-to-back challenges. For long strings of demanding tasks, fueling may still matter.

3. Know when to turn it off

Huberman notes that, as in eating disorders, we also need to learn to switch this resistance system off.

Harnessing Passion, Drive & Persistence for Lifelong Success | Tony Hawk

Guest: Tony Hawk
Date: 2023-07-31 · Duration: 2:15:19
URL: https://www.youtube.com/watch?v=VOfwbcveP84

KEYPOINTS

1. Love of the activity came first; there was no career to aspire to
Hawk found skateboarding around age 10 and quit Little League mid-season once he saw skaters 'flying on magic carpets' at Oasis skatepark in San Diego. He turned pro at 14, when first place paid about $150, and after a year and a half had $600 saved, which he spent on a moped. Huberman uses this to argue that excellence almost always rests on loving the thing itself, not on a goal of fame or money.

2. Drive and discipline outweigh natural talent
Hawk says he was 'gangly' and slamming constantly as a beginner, nobody's idea of a natural. He has watched naturally gifted skaters fail to use their gifts, and driven, sloppy-looking skaters like Andrew Reynolds, who tried every trick, become 'the boss'. He gives drive as much weight as talent, 'if not more'. Huberman adds that in science too, the people who keep showing up when others leave tend to win out.

3. New tricks come from combining pieces he has already mastered
Hawk does not 'throw caution to the wind'. He breaks a trick into parts he has done in other forms, such as the entry, the grind and the landing, then works on timing until they fit. At today's technical level, though, a make can come from a tiny unconscious adjustment, so some tricks, like his 360 shove-it to 5-0 fakie, he has landed only once and cannot reliably repeat.

4. Ideas arrive in the drowsy state before sleep and in mundane moments
Hawk sometimes wakes at night to write down a trick idea. He came up with the half-cab body varial to backside blunt for the X Games in Japan while falling asleep, made it twice alone on his ramp after weeks of preparation, and landed it on his last run. Huberman highlights this liminal state between wakefulness and sleep as fertile ground for ideas, and Hawk adds that showers and walks work too.

5. Dreams can track recovery, and REM paralysis explains 'can't move' dreams
Before his injury Hawk often dreamed he could not skate, as if the ramp were carpet. During recovery his dreams shifted to being able to do all his tricks again. Huberman explains that in REM sleep the brain is highly active while the body is paralyzed and cannot release adrenaline, which may be why people feel they want to move but cannot.

6. A late growth spurt changed his skating
Hawk was so small that at 16 police assumed he was 13, and he wore elbow pads as knee pads, inspired by a photo of Steve Caballero. He shot up around 17, gaining height and strength and suddenly going about eight feet out rather than four, while bowls 'looked smaller'. Huberman notes that a longer arc of puberty and late growth correlate with a longer life.

7. Ignoring medical advice turned a femur break into a non-union fracture
Hawk broke his femur on a low-speed 540, a trick he had done for nearly 40 years, and initially rushed back. Stepping off his board on a mini ramp, he felt the bone shift, then spent seven to eight months in denial, compensating by putting about 75% of his weight on his back foot. X-rays finally showed the bone had never joined and kept separating. A non-union specialist reoperated and ordered two months of no movement, and Hawk followed it.

8. Avoiding the party culture was a performance decision
Early skating culture defined itself against team sports, with drinking, smoking and fast food. Hawk stayed out of it because he watched peers 'party their skills away'. Training then meant Stacy Peralta buying spaghetti the night before a 1983 contest; today pros have trainers and sponsors pay for support. Hawk credits a doctor of physical therapy for getting him back after the injury.

9. Hard lessons, not early fame, made him financially prudent
His father co-signed on property at 17, but by 1991–92 the four-acre ramp property was draining him during skating's slowest years. He took equity out to start Birdhouse in 1992, sold the house, and lived on Taco Bell and Top Ramen while taking any demo or stunt-double job. He traces his shrewdness and punctuality to that period.

EXAMPLES

1. Turning down a $500,000 buyout on the video game
Pitches for a skate game were rejected; at Midway he was asked why anyone would buy a skateboarding video game. Activision later showed him a prototype built on the engine of a Bruce Willis game. He spent about 18 months testing builds, and around 1998, before release, he declined a half-million-dollar buyout of royalties. He calls letting it ride the best financial decision he ever made; the series ran to about 10 games.

2. Landing the 540 again with his wife as the only spectator
To get the trick back after surgery, Hawk stopped drinking, adjusted his diet, and spent sessions just finding the spin and landing zone. He had a heart-to-heart with his wife, who did not want to live through another injury. He did the trick head-high on purpose, because on his 14-foot ramp more air means more time to adjust.

3. The first backside varial
Alone at Oasis, Hawk landed the first backside varial below the coping. He says the feeling of creating something new is 'the buzz I've been chasing ever since'. Huberman calls it a chemical fingerprint of progress.

4. Frank Hawk's contest organizing
His father ran contests unpaid for kids who were 'kind of lost'. That included taking in a stranded 14-year-old Huberman

around 1989; Huberman says the family's warmth showed him what a healthy family looked like.

5. Equal events changed women's skating

Hawk credits pioneers like Cara-Beth Burnside, Patti Hoffman and Elissa Steamer. The road to the Olympics required equal divisions, and Vans Park Series offered equal prize money. He names Lyn-Z Adams (Hawkins Pastrana) as the first woman to land a 540 on vert.

OTHER RELEVANT

1. Be the expert on yourself while still obeying experts

Huberman's read of Hawk's recovery is to follow specialists on the non-negotiables, like two months of immobilization, while setting your own expectations for how fast you can return, rather than anchoring to average timelines.

2. Use a warm-up run as a daily diagnostic

Hawk admits he never stretched or meditated, but he always does a routine run of basic tricks to judge stiffness and decide what to adjust that day. Huberman compares this to a surgeon's checklist.

3. Make risk safer by choosing your environment

At 55 and taller and slower than before, Hawk avoids eight-foot pools with no landing zone and skates his big vert ramp, his 'happy place'. Going bigger can be the safer option when it buys time and space.

4. Give kids their own scene

His son Riley felt the pressure of his father's shadow, drifted away, then found his own crew in high school and turned pro. Hawk now acts as chauffeur and filmer for his kids, and his Skatepark Project has helped fund nearly 1,000 public skateparks in underserved areas.

How to Shape Your Identity & Goals | Dr. Maya Shankar

Guest: Dr. Maya Shankar
Date: 2023-07-24 · Duration: 2:33:56
URL: https://www.youtube.com/watch?v=X8Hw8zeCDTA

KEYPOINTS

1. Anchor your identity to why you do things, not what you do
Shankar, a cognitive scientist and host of A Slight Change of Plans, introduced herself as a violinist first and Maya second until a torn hand tendon ended her career hopes as a teenager. Defining herself by the 'what' left her with nothing when it disappeared. Stripping the violin down to its core, she found that what she loved was emotional connection, which runs through her academic work, her White House role and her podcast.

2. Identity foreclosure and identity paralysis
Identity foreclosure is when parents, peers and culture impose a path on you early, narrowing what you think you can do; asking children 'what' rather than 'who' they want to be reinforces it. Identity paralysis is the stuck, disoriented state that follows when an identity is suddenly lost, where you cannot even imagine a future. Her remedy is to find your 'throughline': the underlying features of what you loved, and new places to express them.

3. We hate uncertainty more than bad outcomes
Shankar cites studies where people were more stressed by a 50% chance of an electric shock than by a 100% certain one. Change brings uncertainty, so people cling to a suboptimal status quo. Reducing your 'need for cognitive closure', the drive for clear, definitive answers, and becoming more open to mystery and awe is linked in research to greater well-being and resilience through change.

4. The end-of-history illusion distorts how we predict change
Dan Gilbert's work shows people readily admit they changed a lot over the past decade but assume who they are now is who they will stay. So we imagine our present selves facing a future diagnosis or move, forgetting that change will change us. Shankar recommends auditing yourself during a big change, because effects spill into every area of life.

5. Awe requires vastness and a need to update your model of the world
Drawing on Dacher Keltner at UC Berkeley, awe needs perceived vastness, physical or conceptual (Times Square, or a book about the mind), plus a 'need for accommodation': fitting new information into your existing model of the world. That updating is what opens the mind. Awe can also be negative.

6. Framing goals as approach rather than avoidance is usually more motivating
'Eat healthier foods' is an approach goal; 'avoid junk food' is an avoidance goal. Succeeding at an approach goal brings pride and boosts motivation and perseverance, while succeeding at an avoidance goal brings mere relief. Approach goals are also easier to measure, since you can count salads but not cookies resisted. Some people, Shankar notes, are genuinely more driven by fear.

7. Owning the goal fuels motivation
Citing Ayelet Fishbach (University of Chicago) and research showing people prefer their own judgment over a better-performing algorithm that excludes them, Shankar says goals set by others undercut agency. With a coach or boss, ask for a set of options and choose your own targets, for example whether today is heavy deadlifts or squats.

8. Motivation sags in the middle of a goal
Motivation peaks at the start and rises again near the finish (the goal-gradient effect), with a lull in between. Because you cannot eliminate middles, shorten them by setting weekly rather than annual goals.

9. The peak–end rule shapes whether you come back
Per Daniel Kahneman and Amos Tversky, we remember experiences mostly by their most intense moment and their ending. In cold-water and colonoscopy studies, adding a few slightly less unpleasant minutes made people rate the whole experience better, and colonoscopy patients were more likely to return for follow-ups. Applied to a brutal workout, end with a few slightly easier minutes. If you love intensity, finishing hard may work better for you.

EXAMPLES

1. Walking into Juilliard unannounced
Passing the building, her mother suggested they go in. Within an hour Shankar was auditioning for a top teacher, who said she wasn't ready but invited her to a five-week summer boot camp in Colorado. She was admitted that fall. Later she cold-emailed the White House to propose a behavioral science adviser role, and was hired into it.

2. 'Earned' versus 'eligible'
With one email and almost no budget, her team told veterans they had 'earned' an employment and education benefit rather than being 'eligible' for it. That single word raised uptake by 9%, which she attributes to the endowment effect: we value what we own or have earned.

3. Temptation bundling
From Katie Milkman (Wharton): pair a chore with something you enjoy, such as podcasts during laundry. The key is to forbid the treat elsewhere; Shankar saves a favorite album for lifting weights only, so it keeps its pull.

4. Distancing to find blind spots
Ethan Kross's research suggests thinking about a problem in the third person, as if advising a friend, adds objectivity and dampens activity linked to hostility. When venting, ask the friend to act as a 'cognitive adviser' who pokes holes in your story rather than just soothing you.

5. Learning by ear first

Shankar's first teacher, a concertmaster who had never taught before, let her mimic and play pieces rather than drill scales. Her technique suffered later, but she believes skipping straight to the fun parts helped her fall in love with the instrument.

OTHER RELEVANT

1. Set goals in the state you'll pursue them

Hot–cold empathy gaps mean that Sunday-afternoon you over-promises for 6 a.m. you. Set gym goals at the gym.

2. Build in slack and use fresh starts

Give yourself an 'emergency reserve', say three skip days a month, so a slip doesn't end the goal. Launch new habits at milestones like a move, a new job, the new year or even a Monday, when old cues are disrupted.

3. Let the positive feedback count too

Huberman admits scanning comments only for negatives. Shankar's advice is to stay open to criticism without making being right the source of your pride.

How to Enhance Performance & Learning by Applying a Growth Mindset

Date: 2023-07-17 · Duration: 1:41:24
URL: https://www.youtube.com/watch?v=aQDOU3hPci0

KEYPOINTS

1. Praising intelligence can backfire
Huberman starts with Claudia Mueller and Carol Dweck's late-1990s paper, 'Praise for intelligence can undermine children's motivation and performance'. More than 100 children received intelligence feedback ('you're so smart, so talented'), effort feedback ('you tried really hard, you kept going after a wrong answer') or no specific praise. The intelligence-praised children later chose easier problems so they could keep earning the label, while the effort-praised children picked harder problems that would teach them more.

2. The performance effect runs in both directions
All the children started at similar levels. On a second problem set, the control group scored about the same as before, say 75% if they had scored 75% the first time. The intelligence-praise group's scores dropped significantly, and the effort-praise group's rose significantly. Effort-praised children also took on more problems overall.

3. Identity praise also invites dishonesty
When asked to report their scores to other children, publicly or even privately on paper, those given intelligence praise were more likely to inflate them, even when they were already in the top bracket. Huberman calls this an underappreciated cost of telling people they are gifted.

4. Timing doesn't rescue identity praise
Telling someone 'you're so smart, you'll ace this' before an exam, or 'you're so talented' after a perfect score, both undermine later performance. Effort praise helps whether it comes before or after. It must be genuine, though: praising effort that didn't happen fails because people know when they are being lied to.

5. Effort and attention are what you can truly control
Huberman finds 'control what you can control' irritatingly vague and makes it concrete: the two things inherent to you and your nervous system are where you place your attention and how much effort and persistence you apply. Unlike labels, effort verbs transfer across domains. A good memory doesn't make you a good musician, but a habit of practising and analysing errors goes wherever you do.

6. Growth and fixed mindsets show up in how the brain handles errors
In an EEG (event-related potential) study by Mangels and colleagues, with Dweck as senior author, people answered trivia questions, rated their confidence and were then told whether they were right. When told they were wrong, people with a fixed view of intelligence showed a larger error-related P3 signal over the anterior (rostral) cingulate, linked to emotional and bodily responses. Growth-mindset participants' activity shifted toward regions associated with cognitive appraisal: they turned attention to understanding the mistake.

7. You can switch modes in the moments after a mistake
Everyone has a fixed mindset in some area, especially when embarrassed about being confidently wrong. Huberman's point is that you don't have to suppress the feeling. You can add attention to the error, asking what led to it and digging in, which gradually outweighs the emotional hijack. If emotions are too high, it's fine to wait a day or two before analysing.

8. How you view stress changes how your body responds
Alia Crum's paper 'Rethinking stress: The role of mindsets in determining the stress response' gave people one of two short, true lectures: that stress is harmful or that stress improves health and vitality. Huberman stresses that this isn't placebo or deception. Those taught that stress can enhance performance showed shorter cortisol release, better cardiac stroke volume and more peripheral blood flow, and could see more anabolic hormonal effects. Chronic, sleep-disrupting stress remains harmful.

9. Growth mindset plus stress-is-enhancing mindset work synergistically
David Yeager (UT Austin, a former Dweck student) and colleagues published 'A synergistic mindsets intervention protects adolescents from stress' in Nature in July 2022. Across six experiments with imagined, laboratory and real classroom stress, students who learned both mindsets showed better peripheral blood flow, altered cortisol responses and more challenge-oriented thinking. Notably, a single 30-minute session worked, compared with earlier programmes of four to eight sessions.

EXAMPLES

1. What effort praise sounds like
Instead of 'you're a great athlete', try 'I loved that after you missed the shot you sprinted back on defence'. Instead of 'you're brilliant', try 'you went back to the problem sets and talked with classmates until you understood what went wrong'. Huberman says this matters most after a success, when labels are most tempting.

2. The Trier Social Stress Test
In one experiment in Yeager's paper, students prepared and delivered a speech to evaluators who frowned and crossed their arms, then did mental arithmetic, while researchers measured heart rate, blood pressure and salivary cortisol. Students given the mindset training responded more like people facing a challenge than a threat.

3. The letter to a future learner
When no growth-minded teacher or mentor is available, write a letter on an index card or a sheet of paper to the next person trying to learn your skill. Explain growth versus fixed mindset and how stress can enhance performance. This self-teaching exercise, used in one of Yeager's studies, improved the writers' own performance.

4. Seek help on both errors and wins

People who keep improving tend to ask others why they fell short and also why they did well, because outside observers often see contributing behaviours you miss.

OTHER RELEVANT

1. Teachers and students together

The best results come when both adopt these mindsets; teachers then see students as less fixed, and students see themselves that way too.

2. Why 'the mind is like a muscle' misleads

Lifting gives you a pump, a preview of future growth. Learning gives the opposite: frustration, poor performance and sometimes a headache while you're learning. Huberman suggests imagining a muscle that shrinks during training and then rebounds larger, with sleep as the recovery that consolidates the gains.

3. Self-examination prompt

List what you are good and bad at, why, and how much of your identity rests on those labels; it shows where you have attached yourself to outcomes instead of process.

How Your Brain’s Reward Circuits Drive Your Choices | Dr. Robert Malenka

Guest: Dr. Robert Malenka
Date: 2023-07-10 · Duration: 2:50:03
URL: https://www.youtube.com/watch?v=RI112zW8GDw

KEYPOINTS

1. The reward circuit evolved to tag what matters for survival
Malenka, a Stanford psychiatrist and neuroscientist, describes dopamine neurons in the ventral tegmental area (VTA) projecting to the nucleus accumbens. This system marks food, water, sex and social contact as worth pursuing again. Drugs of abuse 'trick' it into treating an experience as vital for survival, which is why they can generate such compulsive repetition.

2. Route of administration drives addictive liability
You can't become addicted to something you never take, and how you take it matters. Smoking or injecting cocaine or methamphetamine gets the drug into the brain almost instantly and produces a rapid, powerful dopamine surge in the accumbens lasting seconds to minutes. Malenka links this to the crack epidemic and today's meth crisis. He notes our brains didn't evolve to handle drugs that potent, or synthetic opioids like fentanyl.

3. Drugs remodel reward synapses using normal learning machinery
Work from Malenka's lab and others shows cocaine, methamphetamine, morphine and heroin cause powerful plasticity at synapses onto dopamine neurons and accumbens neurons. The changes resemble those used in adaptive learning and memory. The circuit is highly plastic and can become sensitized to particular experiences.

4. Who becomes addicted is a mix of genes and environment
Many people use a substance without developing a problem. Malenka attributes the difference to genetics, current environment and the environment you grew up in, all of which shape the reward circuitry. Availability of a substance in a society also strongly shapes which addictions become widespread.

5. Reinforcing is not the same as rewarding; wanting is not liking
Something is reinforcing if it makes you repeat the behavior, and rewarding if it actually feels good. Kent Berridge and Terry Robinson's 'wanting versus liking' distinction explains a friend's description of cocaine: 'I hate it, but I want to do it again.' The same pattern shows up in destructive relationships. Huberman suggests 12-step programs may work partly by building a liking for sobriety that outcompetes the wanting.

6. Cues tied to powerful experiences can trigger cravings for decades
Because reward circuitry is closely linked to memory, places and contexts become reinforcing in their own right. Malenka tells of smoking for a few weeks in Paris at around 20, then not smoking after returning home. Forty years later, he still craves a cigarette every time he goes back to Paris.

7. Oxytocin and serotonin make social interaction reinforcing
Building on decades of prairie vole work by Larry Young and Tom Insel showing that oxytocin in the accumbens supports pair bonding, Malenka's lab found oxytocin there promotes sociability in mice by triggering serotonin release. Oxytocin also modulates dopamine neurons in the VTA. Malenka acknowledges a recent paper questioned oxytocin's role in pair bonding, and urges weighing it against 30 years of contrary evidence and its own methodological limits.

8. MDMA's pro-social and addictive effects may use different systems
MDMA reverses the serotonin and dopamine transporters, the 'vacuum cleaners' that normally clear these molecules, so they pump the molecules out. It favors serotonin roughly 70/30 or 80/20. Malenka's hypothesis, supported so far in mouse empathy models, is that its addictive liability runs mostly through dopamine while its pro-social and empathogenic effects run through serotonin, notably the 5-HT1B receptor in the accumbens.

9. Gambling is uniquely tied to hope
Casinos employ people to tune slot-machine payout schedules for maximum return visits. Huberman relays a gambling addict's insight: unlike an alcoholic or cocaine user, a gambler believes the next bet could change everything for the better.

EXAMPLES

1. Bystander mice catch pain
In work published in Science with Monique Smith (now at UC San Diego), an uninjured 'bystander' mouse that spent one hour with a mouse in modest hind-paw pain then showed pain behaviors itself for roughly 4–20 hours. Smell is likely part of the signal: bedding from mice in pain had a similar effect. Malenka calls these assays behavioral antecedents of empathy.

2. Social transfer of pain relief
When two mice were in pain and one received morphine, the untreated mouse that spent time with the now pain-free one also showed analgesia. Malenka relates this to the human idea of social buffering of pain: his own neck pain bothers him less when he's socially engaged.

3. R- versus S-MDMA
MDMA comes in two mirror-image forms. Other labs' work suggests S-MDMA interacts more with dopamine and R-MDMA more with serotonin. MindMed, on whose scientific advisory board Malenka sits (he disclosed this), is preparing a trial of one form for sociability deficits. MAPS, founded by Rick Doblin, has run small MDMA studies in high-functioning people with social anxiety.

4. Huberman's own MDMA trial participation
Huberman says he participated in an MDMA trial and found it very pleasant. He stresses it isn't for everyone and remains a Schedule I drug, so possessing or selling it can lead to prison.

OTHER RELEVANT

1. Respect how fast-acting a drug or behavior is

The faster and bigger the dopamine hit, as with smoking, injecting or highly engineered products like cigarettes and slot machines, the higher the addictive liability. Abstaining from first exposure is the one guaranteed protection.

2. Expect cue-triggered cravings and plan for them

Places, people and routines linked to past use can provoke cravings years later. Anticipating these triggers, rather than being surprised by them, is part of staying abstinent.

3. Build rewards around the alternative

Because wanting and liking can be pulled apart, recovery approaches that make sobriety or the new behavior genuinely enjoyable may weaken the pull of the old one.

4. Treat psychedelic and MDMA therapy with cautious optimism

Malenka is excited by these drugs as powerful probes and potential therapies acting on specific receptors: 16 serotonin receptor types, 2A for psilocybin and LSD, 1B for MDMA's social effects. He urges appropriate caution, rigorous trials and respect for current legal status.

5. On autism language

Malenka argues for respecting adults who don't want to be labeled as having a brain disorder, while recognizing that many children, some severely impaired, need help and research. His suggestion is to ask people what they prefer.

Leverage Dopamine to Overcome Procrastination & Optimize Effort

Date: 2023-03-27 · Duration: 1:58:49
URL: https://www.youtube.com/watch?v=K-TW2Chpz4k

KEYPOINTS

1. Motivation depends on peaks relative to your baseline
Huberman uses a 'wave pool' analogy. Your baseline dopamine is the water level that sets your general motivation and well-being, and peaks are waves rising from it. The two aren't independent. At baseline, dopamine neurons in the ventral tegmental area and nucleus accumbens fire about three to four times per second. Peaks come from bursts in that mesocorticolimbic circuit, and every big peak is followed by a drop below the prior baseline.

2. Craving is a dip below baseline, and reward prediction error sets the outcome
Thinking of a sandwich triggers a small peak, then a dip below baseline that you feel as wanting, which drives you to go get it. When you get it, your brain compares what you received with what you expected. Better than expected produces a bigger peak, and as expected returns you to baseline. A closed deli or a lousy sandwich drops you further below baseline. Feedback along the way (texts answered, progress made) keeps adjusting dopamine during pursuit, like a scoreboard.

3. Easy, steep peaks drain the pool and narrow pleasure
Because peaks are followed by troughs, and troughs trigger more craving, chasing fast, effortless dopamine sets up a vicious loop. Baseline falls, pleasure shrinks and pain grows. That's how addiction to substances and behaviors develops, which Huberman calls a pleasure-pain imbalance.

4. How much different things raise dopamine
Huberman cites approximate increases above baseline: food anticipation and eating roughly double dopamine. Caffeine produces roughly a doubling in prefrontal signaling, based mostly on animal data. Nicotine raises it about 150%, cocaine about 1,000% and methamphetamine 1,000–10,000%. Video games vary widely, five- or tenfold in enthusiasts and nothing (or even a decrease) in people like him who don't care for them. He stresses these are relative and individual.

5. Build baseline through daily foundations first
The 'water in the pool' comes from quality sleep, morning sunlight (5–10 minutes on clear days and longer when overcast, without sunglasses), nutrition including tyrosine-rich foods such as Parmesan cheese, and regular movement, whose circuits themselves engage dopamine. Non-sleep deep rest (NSDR, similar to yoga nidra) has been shown to raise dopamine reserves by up to 65%, while classic focused meditation isn't known to raise dopamine. These need renewing roughly every 24 hours.

6. Cold water gives a long-lasting rise in baseline
A study Huberman cites from a European physiology journal found that cold-water immersion up to the neck substantially increased dopamine and other catecholamines, roughly doubling them or more for hours. For a short-exposure, long-release approach, Huberman suggests 30 seconds to 2 minutes at roughly 37–55°F. Start warmer than you think you need and ease in over days. Do it early in the day, but not within about six hours after strength or hypertrophy training, because it can blunt those adaptations.

7. L-tyrosine can raise baseline, but use low doses
Tyrosine is the precursor for dopamine synthesis. Studies show it improves working memory in multitasking settings, with or without stress, when taken about an hour beforehand. One study's dose would have been about 10 g for Huberman's roughly 100 kg body weight, which he does not recommend. Others found effects from 500 mg to 1,500 mg taken 30–60 minutes before a task. He suggests starting at 250–500 mg early in the day, watching combinations with caffeine and other stimulants, and noting any crash.

8. Mucuna pruriens behaves more like a spike than a baseline lift
This velvet-bean extract is about 99% L-DOPA, the Parkinson's treatment. Huberman, who has tried it, says it can boost alertness, mood and perhaps libido and motivation. But it tends to produce a big peak followed by a crash that can include depressive symptoms, which is the opposite of a sustainable baseline increase.

9. Stacking dopamine sources erodes motivation
Huberman recounts years of combining caffeine and yerba mate with supplements like phenylethylamine and L-tyrosine plus music before workouts, then exporting the routine to grant writing and lab work. The peaks felt great, but over time he got troughs on days off and his love of training and science faded. He wrongly blamed 'adrenal burnout,' which he says doesn't exist as such. He now does many workouts and work sessions with only his usual baseline caffeine.

EXAMPLES

1. The children's drawing study
Researchers observed preschoolers who chose to draw in their free time, then began rewarding them for drawing. When the rewards stopped, the children spent less free time drawing than before. Parallel adult studies showed the same effect. External rewards for something you already enjoy can undermine intrinsic motivation.

2. Post-peak 'postpartum' slumps
After big experiences, such as a vacation, a night out partying or the birth of a child, a dopamine trough is common. Huberman notes that clinical postpartum depression has many causes, including hormonal ones, but the phrase is also used loosely for any post-peak drop in baseline.

3. Procrastination as trough-avoidance
When stuck, people often switch to tasks they don't normally enjoy, like suddenly cleaning the house, because those are less

painful than the trough they're in. That reinforces avoidance.

4. Growth mindset's 'yet'

Huberman cites Carol Dweck at Stanford and David Yeager at UT Austin. The core of growth mindset is reframing 'I can't do it' as 'I can't do it yet.' Huberman extends it into making effort itself the reward.

OTHER RELEVANT

1. To break procrastination, deepen the trough on purpose

If the basics are in place and you still can't get going, do something safe that 'really sucks,' such as a cold shower or ice bath (if you cringe just thinking about it, that's your tool), or a few minutes of the task itself. A steeper descent produces a faster, stronger rebound in dopamine and motivation. Keep a short list of about five such activities.

2. Use brief meditation as an effort tool

For people who find it hard, 5–10 minutes of meditation is effortful enough to work as a 'painful' reset available almost anywhere.

3. Tell yourself the effort is the reward

Subjectively attaching reward to the friction of effort, rather than only to the outcome, recruits the same dopamine system and helps sustain long pursuits. Avoid layering external rewards onto activities you already enjoy.

4. Be cautious with supplements and prescriptions

Prioritize behaviors first. Prescription and over-the-counter compounds that raise dopamine vary by individual metabolism, and any big peak brings a matching trough.

Tools for Setting & Achieving Goals | Dr. Emily Balcetis

Guest: Dr. Emily Balcetis
Date: 2022-08-01 · Duration: 1:38:18
URL: https://www.youtube.com/watch?v=7YGZZcXqKxE

KEYPOINTS

1. Most motivation tactics take effort themselves, which is why people burn out
When asked how they pursue goals, people mention pep talks, reminding themselves why it matters, and Post-it notes. NYU social psychologist Emily Balcetis points out that each of these is a goal to maintain in its own right, so motivation fades well before the halfway point. Her lab looked for strategies that ride on something automatic. Vision fits: sighted people look at the world without trying, and the way we look can be changed.

2. Elite sprinters narrow their attention like a spotlight
Balcetis expected elite runners at a Brooklyn YMCA, including a 400 m Olympic gold medalist, to monitor everything around them. Instead they described locking a narrow 'spotlight' onto a target, like the finish line, a sign ahead or the shorts of the runner in front, as if wearing blinders. Glancing around, they said, often hurt their race. Among hundreds of competitive New York Road Runners, those who used narrowed focus more often ran faster.

3. Narrowed focus makes the goal look closer, an 'illusion of proximity'
When people spotlight a target, they judge it as nearer, measured both in estimated feet and with visual matching tasks. Looking closer to the finish triggers the goal-gradient effect. In 1940s–50s experiments, hungry rats ran faster and harnessed mice pulled harder as they neared food, spending energy they could barely spare. People also push harder when the end seems close.

4. Long-distance runners switch to narrow focus around the halfway point
Constant spotlighting is tiring, so experienced distance runners look around more early on. They shift to narrow focus about halfway through a 10K and use it most intensely for the final push. The middle of any goal is where people struggle most. Balcetis trains people to picture a circle of light on a single spot, such as their lane's crossing point or a stop sign, then pick the next target once they reach it.

5. Vision boards can backfire by making the goal feel achieved
Gabriele Oettingen's NYU research found that vividly imagining how great life will be after reaching a goal lowers systolic blood pressure, a marker of the body's readiness to act, physical or mental. The fantasy works like a goal already met. Balcetis isn't telling people to drop dream boards, which help clarify what they want, but says goal setting can't stop there.

6. Effective goal setting has three stages: the vision, concrete steps, and obstacles
After defining the big picture, break it into short-horizon plans, like what you can do in the next two weeks. Oettingen's often-overlooked third stage is listing likely obstacles and a Plan B, C and D in advance. In a crisis you'll be short on time and resources, and anxiety may cloud your judgment, so you want the next step already decided. 'You don't look for life jackets once the boat is sinking.'

7. Your body state changes how the world looks
Other labs have shown that distances look farther and hills steeper to people who are chronically fatigued, older, overweight or wearing heavy backpacks. Balcetis argues this is a hidden barrier to exercise: if the walk your doctor recommends looks harder, you're set up for failure before starting. The good news is that the spotlight strategy worked equally well regardless of fitness or weight.

8. We trust vision more than any other sense, rarely realizing it can be wrong
Vision takes up more cortex than any other sense, and when sight and sound conflict we side with sight. We get corrected about what we hear, taste or touch, but rarely about what we see, which is why illusions like 'the dress' or the horse/seal drawing feel so jarring. That naive trust is why changing how you look can be a powerful lever.

9. Micro-goals must be challenging but believable
A goal of one jumping jack gives no satisfaction because there was never any doubt. Huberman does 100 jumping jacks each morning, but a beginner does better with sets of 10 or 25, getting a small hit of accomplishment at each milestone to carry them through the next hard stretch. There is no universal number; set goals realistically but with some inspiration.

EXAMPLES

1. Ankle-weight walking study: 27% faster, 17% less pain
Ordinary participants wore ankle weights equal to about 15% of body weight and did high-knee walking to a finish line. Those trained to narrow their focus moved 27% faster and rated the exercise as 17% less painful than those told to look around naturally, despite identical weight, distance and room.

2. Sugar vs. Splenda Kool-Aid
In a double-blind study, participants drank Kool-Aid sweetened with either sugar or Splenda, and none could tell which. Blood glucose was confirmed after 10–15 minutes. Those given real energy perceived the exercise finish line as closer. Balcetis also found that simply believing you're energized can have similar effects.

3. Michael Phelps's leaking goggles
At the 2008 Beijing Olympics, going for his eighth gold in the 200 m butterfly, Phelps's goggles filled with water. Because his coach had made him practice with loose or no goggles, he already had a plan: count strokes per length. He won, an example of preparing for obstacles ahead of time.

4. Learning drums with data instead of memory

As a new mother, Balcetis set herself the goal of performing one rock song on drums at a public show. Memory told her she was failing. A month of random prompts from the Reporter app showed she had practiced far more than she remembered and that her emotional ratings were trending up.

OTHER RELEVANT

1. Try the spotlight technique on your next walk or run

Pick a visible target, like a stop sign two blocks ahead, imagine a circle of light on it and tune out the periphery until you reach it, then choose the next one. Save the most intense use for when you're tiring or for the final stretch.

2. Track progress objectively

Because memory 'levels and sharpens' the past, use logs or prompt apps to judge whether you're on pace for a deadline. The 1 Second Everyday app, which stitches one-second daily clips into a montage, is another visual way to see your year.

3. Stimulants and arousal narrow the visual window, with caveats

Huberman notes that arousal widens the pupils and narrows visual attention, and that a reasonable amount of caffeine could help. Balcetis gave up caffeine because it made her jittery and anxious; she drinks decaf for the ritual and finds that belief alone can produce similar effects.

4. Attention training may help mood, but it isn't a cure

In depression and anxiety, attention tends to catch on negative, worldview-confirming cues. In interventions where people spend about 10 minutes searching a grid of faces for smiling ones, self-efficacy and energy improve temporarily. Balcetis stresses this doesn't treat the condition itself.

Optimize & Control Your Brain Chemistry to Improve Health & Performance

Date: 2022-07-11 · Duration: 2:09:00
URL: https://www.youtube.com/watch?v=T65RDBiB5Hs

KEYPOINTS

1. Each sleep stage runs its own metabolism
Huberman opens with a Cell Reports study (first author Nora Nowak) that measured nearly 2,000 breath metabolites every 10 seconds through the night. Sleep states regulated more than half of them. The switch from sleep to waking lowered fatty-acid oxidation, slow-wave sleep raised it, and REM transitions shifted TCA-cycle intermediates. His takeaway is that full-length sleep, with slow-wave sleep early in the night and REM late, may tune daytime metabolism. Losing even an hour mostly cuts REM, which he says affects emotional stability and glucose metabolism.

2. Four neuromodulators set your brain state
Dopamine (motivation), epinephrine (alertness), acetylcholine (focus) and serotonin (well-being and satiety) change the likelihood that whole circuits fire. Their fast actions last seconds to about an hour, and their slow actions last hours to weeks, setting the baseline any tool works against.

3. The day has three neurochemical phases
In Huberman's framework, phase one (roughly 0 to 9 hours after waking) is when dopamine and epinephrine are at their highest. Phase two (about 9 to 16 hours) sees them fall while serotonin rises. Phase three (about 17 to 24 hours) should be sleep, with large organized swings in dopamine, serotonin and acetylcholine and little epinephrine. So a small push raises motivation in the morning, while getting focused at 9 pm takes stronger or combined tools.

4. Hormones tend to travel with particular neuromodulators
Painting broadly, Huberman says testosterone and dopamine tend to rise together in both sexes. Cortisol pairs with epinephrine, and oxytocin and prolactin pair with serotonin. Acetylcholine has no clear hormonal partner.

5. Morning sunlight and steady caffeine raise dopamine's effect
Early-day light to the eyes triggers dopamine release and, per a study he cites, increases expression of the DRD4 dopamine receptor gene. Regular moderate caffeine, about 100 to 400 mg a day, increases D2 and D3 dopamine receptors, separate from its immediate effects on alertness. Huberman cuts caffeine off around 2 pm and certainly by 4 pm, because it disrupts sleep architecture even when you can fall asleep.

6. Bright light at night suppresses dopamine
Citing Samer Hattar at the NIMH, Huberman says bright light of any color during phase three (roughly 10 pm to 4 am for a typical sleeper) activates a circuit involving the habenula that lowers dopamine. The effect isn't limited to melatonin, and it can carry into the next day. Keep middle-of-the-night lighting dim or off.

7. Movement, breathwork and cold release epinephrine
The locus coeruleus releases epinephrine across the brain, separately from the adrenals, and is tied to action in both directions: moving raises it, and its activity makes you want to move. Any exercise early in the day boosts energy for hours. Huberman suggests delaying caffeine 90 to 120 minutes after waking to blunt the afternoon crash. Cyclic hyperventilation (about 25 deep breaths, a brief breath-hold with lungs empty, repeated) reliably raises adrenaline, but people prone to anxiety or panic should be cautious.

8. Acetylcholine marks circuits for plasticity
Acetylcholine from the nucleus basalis highlights active synapses for later strengthening, and release from sites at the back of the brain filters which sensory signals reach awareness. He cites work from the labs of Michael Silver, Michael Merzenich and Michael Kilgard showing that raising acetylcholine before and during learning makes changes more likely to stick.

9. Serotonin's strongest behavioral levers are touch and gratitude
Physical contact with loved ones, including hugs, hand-holding, cuddling and petting a dog, increases serotonin transmission. On gratitude, Huberman says receiving it, and even watching others give and receive it, activates serotonergic circuits more than giving it. He calls these power tools rather than soft advice.

EXAMPLES

1. The 2019 night-owl reset trial
A randomized trial in Sleep Medicine had night owls wake and sleep 2 to 3 hours earlier, fixed within 15 to 30 minutes every day including weekends. They maximized outdoor light before noon, dimmed evening light, kept meal times consistent, had no caffeine after 3 pm, took no naps after 4 pm or longer than 90 minutes, and exercised in the morning. Participants reported less depression and stress and showed better reaction times and grip strength.

2. Cold water and sustained dopamine
Huberman cites the 2000 Šrámek study, in which sitting neck-deep in 60°F water for up to two hours produced long-lasting increases in dopamine and other catecholamines. He says later work suggests colder water (about 45 to 55°F) for as little as 30 seconds to a few minutes may also work. His guide is cold enough to be uncomfortable but safe, for 1 to 10 minutes, and ice isn't required. He notes Anna Lembke's patient who used cold exposure while coming off addictive drugs.

3. The cheese effect
Tyrosine-rich foods such as some meats and Parmesan support dopamine synthesis. People taking MAO inhibitor antidepressants who eat aged cheeses rich in tyramine can get migraines and spikes in blood pressure. Huberman uses it to show why anyone on dopamine-related medication should be careful.

4. Alpha-GPC, TMAO and garlic

Huberman takes 300 mg of alpha-GPC before training or work three to four times a week, often with caffeine and phenylethylamine. He notes that a few studies link long-term heavy use to higher stroke risk and says the data are still out. His blood work showed a rise in TMAO, and on a tip from Dr. Kyle Gillett, 600 mg of garlic (allicin) brought it back down.

5. 5-HTP versus myo-inositol

Huberman tried 5-HTP (people commonly take 300 to 500 mg) before bed twice. Each time he slept deeply for 1 to 3 hours, then woke and couldn't get back to sleep, so he dropped it. In contrast, 900 mg of myo-inositol 30 to 60 minutes before bed, taken every third night or so, has noticeably deepened his sleep and made it easier to fall back asleep. He contrasts that with the 5 to 18 g daily doses in human anxiety studies, where gut discomfort causes dropouts.

OTHER RELEVANT

1. Order of operations

Huberman's rule is behavior first, then nutrition, then supplements, then prescription drugs if there's a clinical need, under a physician. Don't throw every tool at a system at once. Keep a kit and use what fits the time of day and your goal. Talk to a doctor before changing supplements, especially if you take medication for depression or mania.

2. Dopamine supplements: how he uses them and what he avoids

He avoids Mucuna pruriens, which he describes as about 99% L-DOPA, because it causes a sharp crash afterwards. He uses L-tyrosine at most about once a week at 500 to 1,000 mg; it acts within 15 to 45 minutes and lasts roughly 30 minutes to two hours. Phenylethylamine at 300 to 600 mg is faster acting. He stresses that sensitivity varies widely. B6 can lower prolactin, but excess has been linked to peripheral neuropathy.

3. Simple focus and food tools

Stare at a visual target at your working distance for 30 to 60 seconds before a work session to narrow your attention. Choline sources include beef liver, eggs, beef, soy, chicken, fish, mushrooms and kidney beans. Tryptophan sources include turkey, whole milk, canned tuna, oats, cheddar, nuts, seeds and chocolate. He notes that post-feast sleepiness is mostly from overeating, not tryptophan.

4. Serotonin supplements need caution

Cissus quadrangularis at 300 to 600 mg increased serotonin by roughly 30 to 39% in an obesity study. Huberman says it may need cycling, and there's little good data on how. With anything serotonergic, watch for reduced appetite or libido, and never use supplements to replace prescribed SSRIs without your physician.

The Science of Making & Breaking Habits

Date: 2022-01-03 · Duration: 1:50:38
URL: https://www.youtube.com/watch?v=Wcs2PFz5q6g

KEYPOINTS

1. There is no fixed number of days to form a habit
Huberman cites a 2010 study (first author Lally) on the habit of walking after dinner. People took anywhere from 18 to 254 days to form it, judged by doing it about 85% of the time with little mental effort. Being slow to form one habit does not mean you will be slow with others.

2. 'Limbic friction' is the activation energy a habit requires
Huberman coined the term for the conscious, top-down effort needed to override an autonomic state that blocks a behavior. That state can be too tired or unmotivated for an energetic habit like cardio, or too anxious and wired for a calming one like meditation. It is more concrete than 'motivation' because it points to specific circuits and a state you can assess.

3. Habit strength depends on context-independence and low limbic friction
Drawing on Wendy Wood and Dennis Rünger's review 'Psychology of Habit' (Annual Review of Psychology), a strong habit happens the same way whether you are at home or traveling, and takes little activation energy. The goal is automaticity. Brushing your teeth is the model: most people do it even after a terrible night.

4. Linchpin habits are enjoyable ones that make other habits easier
For Huberman, cardio and resistance training three to four times a week each, typically early in the day, make sleep, alertness, hydration and better food choices easier. Linchpin habits are always ones you enjoy.

5. Walking through a habit's steps once makes it markedly more likely
Procedural memory holds the sequence of steps needed for an outcome, like a recipe. Mentally rehearsing every step of a new habit (walk into the kitchen, turn on the espresso machine, pull the shot) even once shifts the likelihood of doing it from unlikely to very likely over time, according to the psychology literature. Mechanistically this is Hebbian learning: NMDA receptors respond to strong input by recruiting more receptors, lowering the firing threshold of the neurons the habit will use.

6. Task bracketing in the dorsolateral striatum anchors habits
The basal ganglia contain go and no-go circuits for doing and not doing things. Recordings in animals and humans show that the dorsolateral striatum is active at the start and end of a habitual behavior rather than during it, bracketing the task. Strong bracketing is what makes a habit happen even when you are tired, distracted or overwhelmed.

7. Anchor habits to brain-body states, not clock times
Huberman says a fixed time helps in the short term, but over the long term the nervous system generates behavior based on state: activation, focus and fatigue. So he divides the day into phases tied to their neurochemistry, rather than rigid times.

8. Reward prediction error can be extended around a habit
Dopamine rises in anticipation, rises most for unexpected rewards, and falls below baseline when an expected reward is withdrawn, for example checking your phone at minute 50 of a 60-minute writing block. Huberman's 'dopamine spotlighting' means honestly anticipating the hard start and the good feeling afterward, so the whole time window, including the brackets, gets associated with reward. He stresses that you cannot lie to yourself about enjoying the hard parts.

9. Breaking a habit requires weakening its circuits (long-term depression)
Huberman says reminders and sticky notes work only in the short term. Shocks and monetary penalties work when people are monitored but fail when people police themselves. Because the neurons for a bad habit fire together reflexively, the practical lever is the moment right after you catch yourself doing it.

EXAMPLES

1. Phase 1 (0–8 hours after waking): high-friction habits
Norepinephrine, epinephrine, dopamine, cortisol and body temperature are naturally elevated. Morning sunlight within 30 minutes, exercise, cold exposure, caffeine, fasting and tyrosine-rich foods (or, for some, supplements like alpha-GPC or L-tyrosine; consult a doctor) push the state further. Place the habits that take the most activation energy here.

2. Phase 2 (about 9–14/15 hours after waking): low-friction habits
Dopamine, norepinephrine and cortisol taper while serotonin rises. Dim and lower your lights, get some low-angle sunlight, use NSDR, heat or sauna. Use this phase for mellower habits you already partly do, like journaling, practicing a hard piece of music or language study. Huberman mentions ashwagandha for lowering cortisol but cautions against using it for more than about two weeks without a break.

3. Phase 3 (16–24 hours after waking): consolidation
The rewiring triggered during the day happens in deep rest and sleep. Keep the room dark and cool (core temperature drops by about 1–3 degrees), go to bed fed enough not to wake hungry, and avoid caffeine late in the day.

4. The 21-day habit installation and testing system
List six new daily habits but expect to complete only four or five, with no punishment and no compensating the next day for a 'habit slip'. Think in two-day chunks, then reset. After 21 days, add nothing new; spend the next 21 days checking which habits have become automatic, and add more only once all six are reflexive.

5. Bob Knight's graduate school rule
Huberman recalls UC Berkeley neurologist Bob Knight telling him not to adopt any routine you cannot keep up at least five, ideally six, days a week. Knight added that the routine may need updating every four or five years.

OTHER RELEVANT

1. Follow a slip with 'positive cargo'

When you catch yourself in a bad habit, such as reflexively picking up your phone, immediately do a short, easy positive behavior: drink water, do some breathwork, or spend five minutes on language practice. This turns a closed loop into an open one that is easier to interrupt. Huberman compares it to adding new notes after a piano chord you keep playing by reflex.

2. Map your own habits first

Note which habits are easy, which are hard and which you want to break, how context-dependent each is, and how much limbic friction each takes. Then assign them to phases of the day.

3. Know the limits

Huberman acknowledges that breaking bad habits is genuinely hard. He treats true addictions as a separate, more serious problem and points to his episode with Dr. Anna Lembke.

Controlling Your Dopamine For Motivation, Focus & Satisfaction

Date: 2021-09-27 · Duration: 2:16:31
URL: https://www.youtube.com/watch?v=QmOF0crdyRU

KEYPOINTS

1. Dopamine is about motivation, craving and pursuit, not just pleasure
Huberman frames dopamine as the molecule of wanting and seeking. It is also essential for movement, which is why the loss of dopamine neurons causes Parkinson's and Lewy body dementia symptoms. It acts through two main circuits: a movement pathway and the mesocorticolimbic reward pathway, whose prefrontal component assigns meaning and subjective value to what you're doing.

2. What matters is peaks relative to baseline
Your sense of motivation depends on your tonic baseline and the peaks above it. After a big peak, dopamine falls below baseline, partly because the readily releasable pool of dopamine is depleted. Your dopamine history matters: how high your last peak was shapes how good the next experience feels.

3. Typical dopamine increases above baseline
Averages from animal microdialysis and human blood measures that Huberman cites: chocolate about 1.5x baseline; sex (pursuit and act) about 2x; smoked nicotine about 2.5x, briefly; cocaine about 2.5x; amphetamine about 10x. Running for someone who loves it is about 2x, but exercise you dislike may raise it little or not at all, because subjective enjoyment shapes release.

4. The pleasure-pain balance explains craving
Drawing on Dr. Anna Lembke's work, Huberman explains that every pleasurable peak is followed by a slightly larger dip below baseline, which we experience as wanting more. Chasing that dip with more of the same substance or behavior deepens the depletion. Huberman suspects some apparent ADHD is actually a lowered baseline from overindulgence.

5. Layering stimulants on activities raises the bar for enjoying them
Pre-workout drinks, energy drinks, favorite music and caffeine stacked on top of exercise or study produce a big peak. They also increase the number of conditions needed to enjoy that activity next time, until you need 'twice as much coffee and three times as much music' just to get out the door.

6. Caffeine modestly raises dopamine but upregulates its receptors
Huberman cites a 2015 study (Volkow et al.) showing regular caffeine increases the density of D2/D3 dopamine receptors, so you feel more of dopamine's effects. The caveat: that same upregulation appears to make MDMA more neurotoxic, so caffeine and MDMA are a dangerous pairing. Huberman notes the MDMA neurotoxicity literature itself is contested, including a retracted early Science paper.

7. Rewarding effort itself is the neural basis of growth mindset
Citing Stanford colleague Carol Dweck, Huberman argues you can train the prefrontal part of the reward circuit to release dopamine during friction and effort, not only at the goal. Focusing only on the end reward makes the process more painful and less efficient, and undermines your willingness to do it again.

8. Night light and melatonin may suppress dopamine
Huberman cites work associated with Samer Hattar and David Berson showing that bright light between about 10 p.m. and 4 a.m. can lower dopamine for days. He also cites a 2001 Nishiyama study finding a significant dopamine drop 60 minutes after melatonin. He agrees with Matt Walker that melatonin is generally not advisable except for jet lag.

EXAMPLES

1. Cold water raised dopamine 2.5x for hours
A European Journal of Applied Physiology study immersed people to the neck in water at 32°C, 20°C or 14°C for up to an hour. Adrenaline and noradrenaline rose immediately. Dopamine rose slowly from about 10–15 minutes and reached about 250% of baseline, comparable to cocaine's peak, but stayed elevated for up to three hours with no crash. Cortisol rose transiently, especially in the coldest water.

2. Mucuna pruriens is essentially L-DOPA
This velvet bean contains the direct dopamine precursor. Huberman cites at least five studies showing it can reduce Parkinson's symptoms much like L-DOPA, a couple showing it lowers prolactin, and four showing improved sperm count, quality and motility. The rise is intense and is followed by a crash, which is why Huberman personally avoids it.

3. L-tyrosine: the 1983 specificity study
A study in the Journal of Clinical Endocrinology and Metabolism compared tyrosine and tryptophan. Tyrosine raised dopamine within about 45 minutes, for roughly 30 minutes, while tryptophan raised serotonin instead, a specificity that argues against placebo. Typical doses are 500–1,000 mg. Huberman uses it occasionally (once a week, sometimes twice), never as a daily habit.

4. A listener's 30-day screen fast
Huberman describes a young man addicted to video games who, after the episode with Anna Lembke, quit his phone, games and social media for 30 days. By day 29 his concentration and mood were much better, though the first 14 days were very hard. This is how the releasable pool of dopamine replenishes.

5. Huberman's PEA and alpha-GPC stack
For occasional intense mental work, about once a week or every two weeks, he takes 500 mg phenylethylamine (also found in chocolate) with 300 mg alpha-GPC. It gives a sharp, transient lift of about 30–45 minutes that he finds smoother than

tyrosine and much milder than Mucuna. He stresses this is right for him and that you should check with your doctor.

OTHER RELEVANT

1. Randomize your rewards like a casino does

Intermittent, unpredictable reward schedules sustain motivation best. Before a workout or study session, flip a coin to decide whether to add music, caffeine or company. Keep big peaks rare, and vary the dopamine you get from activities you do often. A fixed schedule like 'every third time' doesn't work because it's predictable.

2. Use cold deliberately and safely

Showers, ice baths or cold streams all work, and the dopamine release follows whether you calm yourself, psych yourself up or distract yourself. Earlier in the day is better. The effect fades as the cold stops feeling novel and challenging. Avoid exposures long enough to cause hypothermia; the hour-long study had monitoring.

3. Recovering from depletion means abstaining

If your baseline has dropped from overuse of a behavior or substance, the path back is cold turkey or tapering, not more of it. Expect the first couple of weeks to feel worst.

4. Prescription and supplement cautions

Wellbutrin (bupropion) raises dopamine and norepinephrine and helps many people with depression or quitting smoking. It avoids SSRI sexual side effects but can blunt appetite and raise anxiety, so it must be dosed with a psychiatrist. People with schizophrenia, psychosis, bipolar disorder or anxiety should avoid Mucuna and tyrosine. Huperzine A raises acetylcholine and indirectly dopamine; Huberman hasn't tried it.

5. Dim lights at night, and consider yerba mate

Avoid bright light from roughly 10 p.m. to 4 a.m. to protect dopamine. Huberman notes a couple of studies suggesting yerba mate may protect dopamine neurons in damage models, while cautioning that more research is needed.