

Drowning in dopamine: Finding balance in an age of excess.

Six key facts

In the past five years, global wellness industry has expanded at roughly twice the rate of the global economy. According to McKinsey, the global wellness market was worth \$1.5 trillion in 2021. Recent research, conducted by the management consulting giants, revealed that people view the construct of “wellness” as consisting of six key facets, namely health, fitness, nutrition, appearance, sleep, and mindfulness.

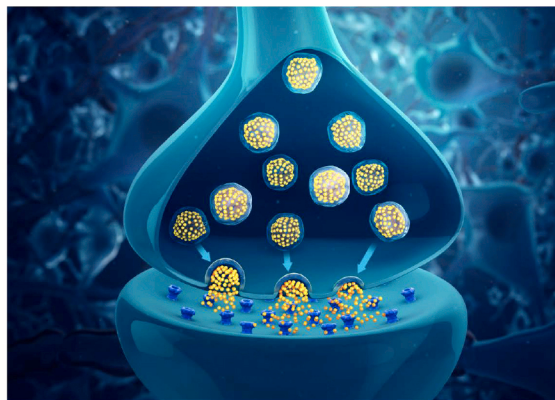
Tracking and measuring health and mindfulness is not straightforward. Yet, more and more apps, devices, supplements, and even remote healthcare services, are trying. In the process, science is often ignored for as pseudoscience. California psychiatrist, Dr. Cameron Sepah, proposed the concept of “dopamine fasting”. According to the Harvard Health Blog, this has little to do with either dopamine or fasting. We will return to this later.

Let us start with a few neuroscience basics

The brain has a lot to do. It manages bodily functions via a complex communication network, run on electrical signals. Neurons are like the electrical cable that the brain uses to send these signals these cables are not connected. A gap, known as the synaptic cleft, exists between these cells. For two neurons to communicate, the signal needs to cross this microscopic gap via a process called “neurotransmission”. The gap is critical and allows signals to be stopped or altered. For example, pain medication, chemically inhibits the pain signal.

Dopamine is a neurotransmitter

When a signal reaches the end of a neuron, it releases small sacs called vesicles that contain these neurotransmitters. These sacs spill their contents into the gap or synaptic cleft, where the neurotransmitters move across the gap to receptors on the receiving neuron. Receptors and neurotransmitters work like a lock-and-key system. The neurotransmitter (key) can only trigger changes on the receiving cell if there are appropriate receptors (locks).



Dopamine is also a powerful reward neurotransmitter

From an evolutionary perspective, dopamine has served us well. Thinking about primary rewards like finding palatable food, reproducing, or even social rewards like being recognised as a leader or being

compared favourably to another person, the pleasant feeling we get is the result of a dopamine release.

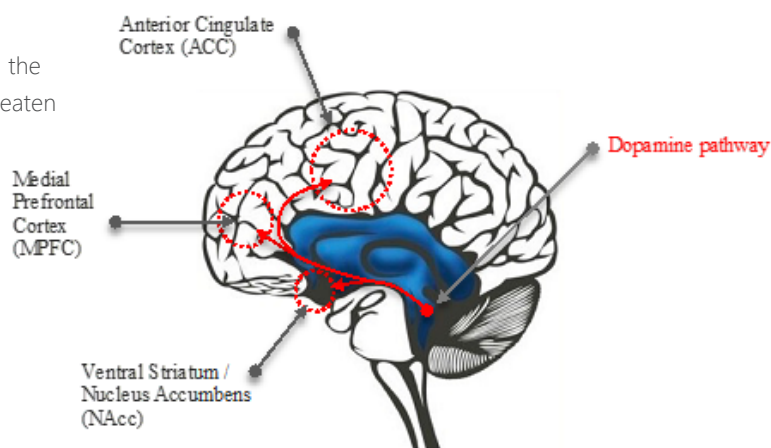
Remember when you were cut off in traffic and the rage that followed immediately? The quickest dilutant to this rapid rise in blood pressure and emotion is when the person puts their hand out to say “sorry”. There is a deeply wired social reward from others recognising us a “leader” and asking for permission or forgiveness. There is a similar story behind the adage of there always being room for dessert.

Finding and eating food with a high fat or sugar content triggers the release of dopamine, suppressing signals from the stretch receptors in the stomach. We *feel* like we have not eaten much yet, so bring the *death-by-chocolate* cake!

Dopamine is so central to our survival

that genetically engineered mice, unable to manufacture dopamine, starved as they failed to seek out food. However, when they were fed, they ate and seemed to enjoy the food. This simple experiment provides important insights. Dopamine is as much about the anticipation of reward as about the reward itself. In another experiment, where rats could access cocaine by pressing a button, it was clear from monitoring brain activity that dopamine was released *before* the button was pressed.

These experiments show that our motivation is strongly linked to rewards experienced (in the past), explaining the role of dopamine in addiction (coming back for more). Once stimulus-reward relationships have been formed, they may become automatic and habitual. Conscious thought becomes overwhelmed by the anticipation of reward because the dopaminergic reward pathway runs directly through the prefrontal cortex.



In her book on managing dopamine

Dr. Anna Lembke refers to the “dark side of capitalism”. Manage it, or it will manage you. Think of binge - watching TV, fast foods delivered to the door, online gaming, sex, gambling, and liking / trolling, as well as having access to amphetamines and opioid narcotics in medication for treatment of ADHD and pain respectively.

Much like the mice in addiction experiments, we can literally press the “dopamine button” all day long. When using a baseline level of dopamine in our system, we can use this neurotransmitter to measure the potential of any behaviour or drug to become addictive.

For example :

- Eating chocolate elevates dopamine levels by 55 %.
- Sex elevates the levels by 100 %.
- Amphetamines increase levels by a whopping 1000 % (or 10 times).

Dr. Anna Lembke continues to provide an insightful analogy in the way that dopamine works and how we can manage it, instead of the other way around. As our understanding of the brain’s risk and reward systems improves, it has become apparent that pleasure and pain are interlinked. With pain. Imagine for a second a see-saw where the fulcrum sits perfectly between two sides (pleasure and pain).

The plane is so well balanced that it doesn’t touch the ground and remains perfectly perpendicular to the fulcrum (making a shortened “T” shape). Each time we experience pleasure, dopamine is released and the scale tips out of balance. The more and the faster the balance tips, and the faster it tips the more pleasure we feel (a particularly happy individual is jumping up and down on the see-saw, tipping it out of balance).

The thing is that your brain

does not want this to continue. You’ve found and enjoyed the food (or whatever reward you were after), mission accomplished. Now, powerful self-regulation mechanisms kick in to get the balance back to the scale.

Dr. Lembke imagines this as little gremlins, frantically trying to climb onto the “pain” side of the see-saw to get the system back into equilibrium. ; The more pleasure you’ve experienced, the more gremlins need to climb onto the pain side.

From a biological perspective, your dopamine receptors become saturated and as a result, less sensitive. The reward circuit is now less functional and so the brain is resetting the balance. Using the analogy of the see-saw, the fulcrum starts to shift slowly towards the “pleasure side”. What does this mean? More dopamine is now needed to tip the scale of pleasure (more online gaming, more chocolate, more amphetamines, etc.). In response, more gremlins will become available to climb onto the “pain” side as the brain struggles for balance. This continues until our behaviour becomes more and more unhealthy and likely also antisocial.

Sadly, after the balance has been compromised several times, the clambering gremlins, to reset the balance, present more and painful physical symptoms of withdrawal. Neuroscientist George Koob refers to this as "dysphoria-driven relapse". In this case, addicts consume substances for virtually no pleasure at all, it becomes all about trying to escape the gremlins (alleviate the physical and psychological suffering of withdrawal).

Adding an understanding of the role of reward anticipation to the reward system provides even deeper insights. The rats expecting cocaine received a healthy dose of dopamine in their systems before receiving the reward. However, when pressing the button did not provide the reward, an immediate drop in dopamine levels was very clear. By contrast, those that received the reward of cocaine, recorded an even bigger spike in dopamine. Unsurprisingly, the rats who were set up for the reward but were deprived of it, displayed erratic and sometimes aggressive behaviour as their systems moved into a dopamine deficit (the gremlins are weighing down the pain side of the see-saw).

Moving to secondary rewards, like money, dopamine once again plays a critical role. Scanning the neural activations in an experiment, where subjects were playing a game that resulted in making or losing money, revealed some startling findings. When these brain scans were compared to those taken from drug addicts high on cocaine, the results were almost identical, particularly in those participants that were winning money. Renowned neuroscience researcher, Dr. Brian Knutson, reminds us that the effect money has on people is unlike that of anything else. Nothing makes the brain light up in the same way, not neither naked bodies, nor corpses. The issue is that our neural hardware is designed and optimised to process primary rewards, like food and sex, via effective reward and reinforcement mechanisms such as the dopaminergic pathway in the brain. However, when used to decode and process secondary rewards like money, processing errors often occur. For this reason, dopamine will play a role in financial planning.

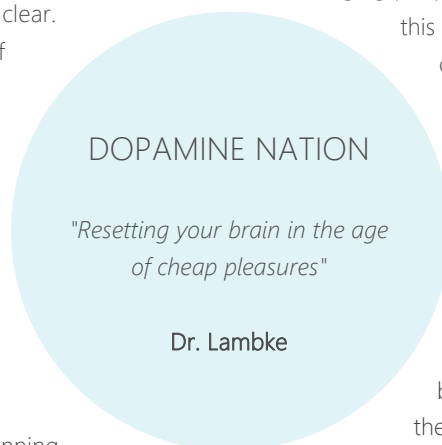
What do we do with this information?

Returning to the earlier discussion on dopamine fasting, it is clear that trying to suppress a natural and necessary process (and neurotransmitter) is ludicrous.

Dr. Sepah reiterates that his idea was never meant to be taken literally, but rather as an indication for the use of cognitive behavioural therapy when behaviour is becoming destructive.

Dr. Lembke once again, provides a useful framework to help identify how to restore balance when engaged in compulsive behaviour that is to our detriment. In other words, when a dopamine fast is necessary and likely to be effective. To illustrate the framework, we will use the (money) behaviour of compulsive shopping. As an aside, as the financial services industry follows the lead of the medical fraternity in transforming the value proposition from managing disease to managing people (shifting from managing money to managing people in the case of financial advice)

this is a practice where financial advisers can definitely help people to stop detrimental money behaviour.



Dr. Lembke's framework is called D O P A M I N E, here is how it works in changing behaviour:

D: Deep reflection is required, keeping a paper and pen handy. Gathering data on the behaviour itself, for example how often does the person shop compulsively?

When (before what and after)?

O: What are the objectives of the change in behaviour? This explores what the behaviour is *doing* for the person. What benefits are they deriving from it? People do things for various reasons, : fun, escape, fitting in, boredom, managing fear or anxiety, or even anger.

P: The person writes down all the negative consequences of the behaviour. Is the compulsive shopping resulting in financial problems that cascade into marriage problems, an angry spouse, disappointment and perhaps also regret? Human beings are notoriously bad at predicting the long term consequences of their actions and it is helpful to write some of them down.

A: Unfortunately, there is no easy way around this one. To reset the see-saw, abstinence is required. However, from a behavioural science perspective, the trick is not to focus on what may seem to be a very long period. Smaller abstinence goals are key. Stopping the behaviour first for a week, then two weeks, then one month. The more time that passes, the more is lost, because human beings are loss-averse by nature. We can ultimately leverage this to our advantage. While around 20% of Dr. Lembke's patients don't feel any benefit from the dopamine fast, there is important data in this. Perhaps the compulsive shopping behaviour, for example, is not the root cause of the imbalance?

M: Mindfulness refers to being prepared for the work. Prepare for the gremlins and impending discomfort from abstinence. Furthermore, any other substance taken or behaviour indulged in to try and avoid the gremlins is in itself potentially destructive as it interferes with another pleasure / pain balance. Painful emotions cannot be escaped, and should be confronted.

I: The next step revolves around insights after the first period of abstinence. How does the person feel after not compulsively shopping for a week? Perhaps less anxiety, perhaps relieved that they do not have to hide things from their partner or loved ones. It is important to document and celebrate the work and associated feelings. The link is created between the new behaviour and the associated emotions.

N: The second-last step is all about next steps. Clearly, we cannot keep the credit card in the freezer forever. Life should return to normal, and it is important to return to a state of non-risky use of, in this case, a credit card. What does the new world look like and in what circumstances can the credit card now be used? In some cases (alcohol addiction) this is not possible.

E: Finally, armed with this new pleasure / pain balance, the person returns to normal life to maintain the (new) balance. The process of trial and error is used to figure out what works and what does not. Modern-day life leaves us susceptible to relapse. We cannot abstain from using money and relapse is possible. However, the journaling process helps with reinforcing the new desired state.

In an age of excess, it is encouraging to see that we are looking for help in tracking and measuring wellness. However, financial wellness is intrinsically linked to our emotional and biological well-being. Elevated cortisol levels, from the anxiety that stems from compulsive behaviour, can have a detrimental effect on our health.

Financial advisers could add tremendous value in getting clients more attuned with their money behaviours, which are often underpinned by neurobiological / chemical foundations. Ultimately, the dopamine fast can, financially speaking, assist us in moving away from compulsive spending towards a new and better version of ourselves.



Paul Nixon

Head of Behavioural Finance at Momentum Investments