

Addiction Explained, Rises & Falls in Dopamine | Dr. Andrew Huberman

Let's just think about addiction because in biology and in psychology frankly it really often pays to think about the extremes first and then work our way towards more typical circumstances. And with that said, addiction unfortunately is very common. Nowadays I just heard a statistic in fact that there is an 88.0% increase in alcohol use disorder among women in the last 30 years. I talked a little bit about this in the episode that I did about alcohol and health. Again, I want to be very clear. I'm not somebody that is completely against alcohol for adults provided they're not alcoholics. Turns out two drinks a week probably fine. Health wise, zero would be better if we're honest. Zero is better than any alcohol, but two drinks a week is probably fine. Past two drinks, you start running into problems, and yet many, many people out there, male and female alike, suffer from alcohol use disorder, also called alcoholism. The same is also true for things like methamphetamine or cocaine or other types of substance addictions. And the same is also true for a lot of behavioral or what are sometimes called process addictions, things like sex addiction or video game addiction or any type of behavior that frankly is leveraging the dopamine system. But that engages this progressive narrowing of the things that bring someone pleasure such that nothing else is really salient. Nothing else is really pulling them in in the way that their video games or sex or pornography or alcohol pick your substance or you know behavior that you see out there or, uh, hopefully not, but that you might suffer from an addiction to. So what's happening in addiction? Well, addiction involves dopamine among other things, often the opioid system, et cetera. But if we were to think about what's the stimulus in an addiction and what's the peak in dopamine, and then what happens after that peak, it all becomes very clear as to why addiction happens and why it's so pernicious. So for instance, let's take cocaine. Cocaine causes dramatic increases in dopamine, very, very fast. So if somebody craves cocaine, what are they craving? They're craving that dopamine peak, they're craving the increased level of alertness, they're craving a number of things associated with the feeling of being under the influence of the drug. But the stimulus for it simply becomes that line of cocaine or in the case of crack, that crack rock that they're gonna smoke and God forbid they're mainlining it, you know they're shooting into a vein. What happens is they snort, smoke or inject cocaine and dopamine levels almost

immediately go up up up up up up to a very high peak OK So the the time gap between the stimulus and the dopamine is very very short so short In fact that there's really no other contingencies in between that the meso cortical system has to learn In fact what is the system quote unquote learn it learns cocaine equals massive amounts of dopamine equals feeling euphoric and energetic et cetera And in doing that it reinforces the whole circuit So that that short we can even say hyper short contingency is really what the system wants so much So that longer contingencies of say putting in the hard work of you know generating a fitness program or a professional program for yourself or a uh education program which takes not just many days but many weeks and years Well none of that is going to lead to P and dopamine that are as high as the peak in dopamine associated with cocaine So that tells us something critical It is both the duration between desire and effect And when I say effect I mean the rewarding properties of dopamine that are experienced that's important So very short gaps teach the system to expect and want short gaps makes it very hard to pursue things that take longer So when we say it's the short or or in this case hyper short distance or time between the stimulus and the dopamine what we're really talking about if we were to plot this out on a on a board or on a piece of paper is the steepness of the rise of that peak It's very very steep The peak in dopamine is coming up very fast after the desire And in addition to that and this is very important the higher the peak in dopamine and the faster the rise to that peak the further below baseline the dopamine drops after the drug wears off Ok So in the case of cocaine it's a very fast and very large rise in dopamine followed by a steep drop and very deep trough in dopamine below baseline you say Ok so there's pleasure then there's lack of pleasure Ah but it's worse than that because it's not just lack of pleasure If you recall what we talked about a little bit earlier that drop below baseline triggers the desire and the pursuit for what For more And so this sets in motion a vicious loop where people start pursuing peaks in dopamine that can come very fast without much effort And that's one of the ways in which addictions start to take hold Uh there's a simple way to think about this and to remember if you want to avoid this whole thing I mean the first one is obvious don't do cocaine don't try it don't use it certainly don't get addicted to it Those are all sort of one and the same frankly I don't know many people that um despite opinions to the contrary that use cocaine recreationally that don't at some point run into either a financial psychological physical or some other problem The other thing that's absolutely critical to keep in mind and this was discussed in my colleague

Doctor Anna Lemke's book Dopamine Nation and on this podcast excellent book By the way I highly recommend it if you haven't read it already It's a fascinating uh exploration into dopamine as it relates to addiction not just drug addiction but other types of addiction Again the name of that book is dopamine nation We'll provide a link to it in the show note captions The other thing that happens after those big fast increases in dopamine caused by things like cocaine is afterwards when it quickly drops below baseline it takes a much longer time to get back to the original baseline than it did prior to using the drug And worse still is that the peaks in dopamine that are created from more consumption of cocaine leads to progressively lower peaks and deeper troughs below baseline So the whole system is shifting away from pleasure and more to pain and the desire for pursuit of the drug