Welcome to the Huberman Lab podcast where we discuss science and science-based tools for everyday life. I'm Andrew Huberman and I'm a professor of neurobiology and ophthalmology at Stanford School of Medicine. Today I have the pleasure of introducing Dr. Anna Lemke. Dr. Lemke is a psychiatrist and the chief of the Addiction Medicine dual diagnosis clinic at Stanford University School of Medicine. She's a psychiatrist who treats patients struggling with addiction. She has successfully treated patients dealing with drug addiction, alcohol addiction, and behavioral addictions, such as gambling and sex addiction, as well as other types of addiction. In fact, during our discussion I learned that there are a huge range of behaviors and substances to which people can become addicted to, and that there is a common biological underpinning of all those addictions. I also learned that there is a common path to the treatment and recovery from essentially all addictions. Dr. Lemke explained that to me and explained how to think about and conceptualize our own addictions, as well as the addictions of other people who are struggling to get treatment, move through treatment, and stay sober from their addictions. In addition to treating patients, Dr. Lemke is an author and was featured in the 2020 Netflix documentary, The Social Dilemma. I'm excited to tell you that she has a new book coming out called Dopamine Nation, Finding Balance in the Age of Indulgence. The book comes out August 24th and is an absolutely fascinating read into addiction and ways to treat various types of addiction. I've read the book, Cover to Cover, and all I'll tell you is that at the very first chapter and throughout, you are going to be absolutely blown away. The stories about her patients are extremely engaging. It brings forward the real struggle of addiction and the incredible, I think it's fair to say, heroic battles that people fight in order to get through addictions of various kinds. All of that is woven through with story, with science, and ways that make it very accessible to anyone, whether or not you have a science background or not. I can't recommend it highly enough. So again, the book is Dopamine Nation, Finding Balance in the Age of Indulgence. It comes out August 24th of this year, 2021. And you can pre-order that book by going to Amazon. We will provide a link to that in the show caption. Before we begin, I just want to mention that this podcast is separate from my teaching and research roles at Stanford. It is, however, part of my desire and effort to bring zero cost to consumer information about science and science-related tools to the general public. And now, for my discussion with Dr. Anna Lemke. All right. Great to have you here. Thank you for having me. I'm excited to be here. I have a lot of questions for you. I, and many listeners of this podcast, are obsessed with dopamine. And what is dopamine? How does it work? We all hear that dopamine is the molecule associated with pleasure. I think the term dopamine hits. Like I'm getting a dopamine hit from this, from Instagram, or from likes, or from praise, or from whatever is now commonly heard. What is dopamine? And what are maybe some things about dopamine that most people don't know? And probably that I don't know either. So dopamine is a neurotransmitter. And neurotransmitters are those molecules that bridge the gap between two neurons. So they essentially allow one neuron, the presynaptic neuron, to communicate with the postsynaptic neuron. Dopamine is intimately associated with the experience of reward, but also with movement, which I think is really interesting because movement and reward or linked, right? If you think about, you know, early humans, you had to move in order to go seek out the water or the meat or whatever it was. And even in the most primitive organisms, dopamine is released when food is sensed in the environment, for example, see elegans, a very primitive worm. So dopamine is this really powerful, important molecule in the brain that helps us experience pleasure. It's not the only neurotransmitter involved in pleasure, but it's a really, really important one. And if you want to think about something that most people don't know about dopamine, which I think is really interesting, is that we are always releasing dopamine at a kind of tonic baseline rate. And it's really the deviation from that baseline, rather than like hits of dopamine in a vacuum that make a difference. So when we experience pleasure, our dopamine release goes above baseline. And likewise, dopamine can go below that tonic baseline. And then we experience a kind of pain. Interesting. So is it fair to say that one's baseline levels of dopamine, how frequently we are releasing dopamine in the absence of some drug or food or experience just sitting being. Is that associated with how happy somebody is? They're kind of baseline of happiness or level of depression. There is evidence that shows that people who are depressed, may indeed have lower tonic levels of dopamine. So that's a really reasonable thought. And there is some evidence to suggest that that may be true. The other thing that we know, and this is really kind of what the book is about, is that if we expose ourselves chronically to substances or behaviors that repeatedly release large amounts of dopamine in our brains or word pathway, that we can change our tonic baseline and actually lower it over time as our brain tries to compensate for all of that dopamine, which is more important. And so that's what we know about dopamine, which is more really than we were designed to experience. Interesting. And is it the case that our baseline levels of dopamine are set by our genetics, by our heredity? Well, I think, you know, if you think about sort of, you know, the early stages of development and infancy, certainly that is true. You know, born with probably whatever is your baseline level, but obviously your experiences can have a huge impact on where your dopamine level ultimately settles out. So if somebody's disposition is one of constant excitement and anticipation or easily excited, these are, I think about the kind of people where you say it, you want to check out the new place for tacos and like, yeah, that'd be great. And other people are a little more cynical, harder to budge like my bulldog Costello. Very, very stable low levels of dopamine with big inflections in his case. Is that, do you think that's set in terms of our parents and obviously nature and nurture interact, but is that is dopamine at the core of our temperament? I don't really think we know the answer to that, but I will say that people are definitely born with different temperaments. And those temperaments do affect their ability to experience joy. And, you know, we've known that for a long time and we describe that in many different ways. One of the ways that we describe that in the modern era is to use psychiatric nomenclature like this person has a dysthymic temperament or, you know, this person has chronic major depressive disorder. In terms of looking specifically at who's vulnerable to addiction, that's an interesting sort of mixed bag because when you look at the research on risk factors for addiction. So what kind of temperament of a person makes them more vulnerable to addiction. You see some interesting findings. First, you see that people who are more impulsive are more vulnerable to addiction. So what is impulsivity? That means having difficulty putting space between the thought or desire to do something and actually doing it. And people who have difficulty putting a space there who have a thought to do something and just do it impulsively are people who are more vulnerable to addiction. Interesting. Could I, in terms of impulsivity, is this something that relates literally to the start or reflex? Like, I, for instance, has a lab director. I'm familiar with walking around my lab. And when I decide deciding I'm going to talk to my people. Of course, when they knock on my door, it's always like, wait, why am I being bothered right now, even though I love to talk to them. But I walk around my lab from time to time. And some people I know as I'll say, do you have a moment and they'll slowly turn around and say, yeah, or no, in some cases. And other people will jump the moment I say their name. They actually have a kind of a heightened startle reflex. And that related to impulsivity or is what you're referring to an attempt to withhold behavior that's very deliberate under very deliberate conditions. Yeah. So I don't think that that startle reflex is necessarily related to impulsivity that can be related to anxiety. So people who are high anxiety people will tend to have more of a startle reflex. Impulsivity is a little bit different. Impulsivity is not always bad, right? Impulsivity is that thing where there's not a lot of self editing or worrying about future consequences. You know, you have the idea to do something and you do it. And of course, we can imagine many scenarios where that's absolutely wonderful. You know, there can be sort of, let's say, intimate interactions between people where you wouldn't really want to be super inhibited about it, right? You would want to be dis-inhibited and impulsive. I can also imagine like sort of fight or flight scenarios, like battle scenarios, right? Where it would really be good to be impulsive and just go, right, you know, just go. Where hesitation can cost you. Yes, that's right. That's right. But you know, and I think this brings up a really, I mean, something that I've come to believe after 25 years of practicing psychiatry is that what we now conceptualize in our current ecosystem as mental illness are actually traits that in another ecosystem might be very advantageous. They're just not advantageous right now because of the world that we live in. And I think, you know, impulsivity is potentially one of those, right? Because we live in this world that's sort of like you have to constantly be thinking sort of rationally about the consequences of X, Y, or Z. And such a sensory rich environment, right, that we're being bombarded with all of these opportunities, these sensory opportunities. And we have to constantly check ourselves. And so, so, so impulsivity is something that right now can be a difficult trait, but isn't in and of itself a bad thing. I see. Yeah. Yeah. And it's I begin to realize it's a fine line between spontaneity and impulsivity. Yeah. What is pleasure? And how does it work at the biological level? And if it feels right at the psychological level? I think we end if you don't mind painting a picture of sort of the range of things that you have observed in your clinic or in life that people can become addicted to, but just to start off really simply what is this thing that we call pleasure? Well, I think it's it's actually really hard to define pleasure in any kind of succinct way because certainly there is the seeking out of a high or a euphoria or or I think, you know, the kind of experience that most anybody would associate with the word pleasure. But but also the seeking out of those same substances and behaviors is often a way to escape pain. So, for example, when I when I talk to people with addiction, sometimes they're initial for a into using a drug is to get pleasure, but very often it's a way to escape their suffering, whatever their suffering may be. Certainly as people become addicted, even those who initially were seeking out pleasure are ultimately just trying to avoid the pain of withdrawal or the pain of the consequences of their drug use. I think it's, you know, very hard to actually, you know, define it as this unitary thing and it's certainly not just getting a high. There are so many ways in which people sort of want to escape, which is not the same thing as sort of this hedonic, you know, wanting to feel pleasure. So, someone could decide that they want to go out and dance or get up and dance because of the pleasure of dancing. I can imagine that. But and maybe it's very difficult for them to stay seated when a particular song comes on, for instance. But seeking what we would call pleasure in order to eliminate pain, that that evokes a different picture in my mind, that evokes a picture of somebody that feels lost or depressed or underwhelmed. I definitely want to get into the precise and general description of addiction and what that is. But in a previous conversation we had, you said something that really rung in my mind, which is that many people who become addicted to things, let's call them addicts, have this feeling that normal life isn't interesting enough, that they are seeking a super normal experience and that the day to day routine balance, which is actually in the title of your book. Dopamine Nation finding balance in the age of indulgence, that the word balance itself can sometimes be a bit of an a an aversive term for people. And I'm struck by this idea and the reason I want to explore it is because so much of what I see online is about generating a lack of balance, about being tilted forward at all times, really leaning into life hard, experience. Living a full life, even the commencement speech given by Steve Jobs on this campus was really about finding passion, digging, you know, that's so much in the narrative now. So maybe you could just tell us a little bit about your experience with this association if it really exists between people's sense of the normal sea or maybe even how boring life can be and their tendency to become addicts of some sort. Yeah, well, I mean, I think that life for humans has always been hard, but I think that now it's harder in unprecedented ways. And I think that the way that life is really hard now is that it actually is really boring. And the reason that it's boring is because all of our survival needs are met, right? I mean, we don't even have to leave our homes to meet every single physical need, you know, as long as you're of a certain level of financial well-being, which was frankly, you know, we talk so much about, you know, the income gap. And certainly there is this enormous gap between Rich and poor, but that gap is smaller than it's ever been in like the history of humans, even the poorest of the poor have more excess income to spend on leisure goods than they ever have before in human history. If you look at leisure time, for example, so people without a high school education have 42% more leisure time than people with a college degree. So, so my point here is that life is hard now in this really weird way in that we don't really have anything that we have to do. So, we're all forced to make stuff up, you know, whether it's being a scientist or being a doctor or being an Olympic athlete or, you know, climbing Mount Everest. And people really vary in their need for friction. And some people need a lot more than others. And if they don't have it, they're really, really unhappy. And I do think that a lot of the people that I see with addiction and other forms of mental illness are people who need more friction, like they're unhappy, not necessarily because there's something wrong with their brain, but because their brain is not suited to this world. And do you think they have that sense? My brain isn't suited to this world or they simply feel a restlessness and they're constantly seeking stimulation. I think that's right. Yeah, I think it's not really knowing what's wrong with me. Why am I unhappy? How can I be happier? And of course, as you talk about what's so pervasive in our narrative now is like find your passion, you know, you know, find your, you know, whatever it is to save the world. And in a way that's good because it has people out in the world and seeking. But in a way, it can also be misleading in the sense that I think people aren't entirely aware that that the world is a hard place and that life is hard and that, you know, like we're all kind of making it up. You know what I mean? Yeah, well, there's a book by Cal Newport. I don't know if you know Cal Newport's work, but you guys are very symbiotic in your messages. He's a professor of computer science at Georgetown. Yes, at Georgetown and wrote a book some years ago, really ahead of its time, called So Good They Can't Ignore You, which is about not meditating or doing much work to try and figure out what one's passion is by thinking, but rather go out and acquire skills. Right. And get develop a sense of passion for something by your experience of hard work and getting better and feedback a little bit of the growth mindset thing, our colleague, Carol, but he's gone on to write books. Deep work and which is all about removing yourself from technology and doing deep work. And he's been a big proponent of the evils of context switching too often throughout the day. For sake of productivity, mostly his new book is called a world without email. I begin to realize as I cite off these books and your book dopamine nation finding balance in the age of indulgence that maybe the reason why you two don't know about one another is because neither of you are on social media. That's it. Right. And yeah, you two are the most productive people that I know, including productive authors. So that's a discussion into itself. But I find this fascinating. So let's talk about the pleasure pain balance and addiction. And I've heard you use this seesaw or balance scale analogy before. And I think it's a wonderful one that really for me clarified what addiction is at least at the mechanistic level. Yeah, so to me, one of the most significant findings in neuroscience in the last 75 years is that pleasure and pain are co-located, which means the same parts of the brain that process pleasure also process pain. And they work like a balance. So when we feel pleasure or balance tips one way when we feel pain, it tips in the opposite direction. And one of the overriding rules governing this balance is that it wants to stay level. So it doesn't want to remain tipped very long to pleasure or to pain. And with any deviation from neutrality, the brain will work very hard to restore a level balance or what scientists call homeostasis. And the way the brain does that is with any stimulus to one side, there will be a tip in equal and opposite amount to the other side. And the principle laws of physics. Yes, right. So like I like to watch YouTube videos when I watch YouTube videos of American Idol, you know, it tips to the side of pleasure. And then when I stop watching it, I have a come down, right, which is a tip to the equal and opposite amount on the other side. And that's that moment of wanting to watch one more YouTube video. Right. Yeah. And I just want to do a check there. So this moment of wanting to watch another that is associated with pain, I think, is, are we always aware of that happening because you just described in a very conscious way. Right. But when I indulge in something I enjoy, I'm usually thinking about just wanting more of that thing. I don't think about the pain. I just think about more. Right. So really excellent point because we're mostly not aware of it. And it's also reflexive. So we, it's not something that consciously happens or that we're aware of unless we really begin to pay attention. And when we begin to pay attention, we really can become very aware of it in the moment. Again, it's like a falling away, like that, you know, you're on social media, and you know, you get a good tweet of something. And then you can't stop yourself because there's this awareness, a latent awareness that as soon as I disengage from this behavior, I'm going to experience a kind of a pain, right, a falling away, a missing that feeling, a wanting more of it. And of course, one way to combat that is to do it more, right, and more and more and more. So I think, I think that is really what I want people to tune into and get an awareness around because once you tune into it, you can see it a lot. And then when you begin to see it, you have, and if you, you know, keep the model of the balance in mind, I think it gives people kind of a way to imagine what they're experiencing on a neurobiological level and understand it. And in that understanding, get some mastery over it, which is really what this is all about, because ultimately we do need to disengage, right, we can't live in that space all the time, right, we have other things we need to do. And there are also serious consequences that come with trying to repeat and continue that experience or that feeling. So if I understand this correctly, when we find something or when something finds us, that we enjoy that feels pleasurable. Social media, food, sex, gambling, whatever happens to be, we will explore the full range of these. There's a some dopamine release when we engage in that behavior. And then what you're telling me is that very quickly, yes, and beneath my conscious awareness, there's a tilting back of this scale where pleasure is reduced by way of increasing pain. Right. And I've heard you say before that the pain mechanism has some competitive advantages over the pleasure mechanism such that it doesn't just bring the scale back to level. It actually brings pain higher than pleasure. Could you tell us a little bit more about that? Yeah, yeah. So what happens again, so the the hallmark of any addictive substance or behavior is that it releases a lot of dopamine in our brand reward pathway, right, like broccoli just doesn't release a lot of dopamine just doesn't, right. I'm trying to imagine I was about to say maybe I stopped myself because no, broccoli is good. It can be really good, but broccoli is never amazing. Right. Broccoli is never amazing. Honestly, we can probably find somebody on the planet for whom broccoli is amazing. And of course, if I'm starving, broccoli is amazing. Yeah, rich role. Rich role is big on plants and he has a good relationship to plants. Rich, tell us how to make broccoli amazing. If anyone could do it, it'd be rich. Yeah. But what happens right after I do something that is really pleasurable and releases a lot of dopamine is again, my brain is going to immediately compensate by down regulating my own dopamine receptors, my own dopamine transmission to compensate for that. Okay. And that's that come down or the hangover that after effect that moment of wanting to do it more. Now, if I just wait for that feeling to pass, then my dopamine will re-regulate itself and I'll go back to whatever my chronic baseline is. But if I don't wait, and here's really the key, if I keep indulging again and again and again, ultimately I have, I have so much on the pain side, right, that I've essentially reset my brain to what we call like an anhydonic or lacking enjoy type of state, which is a dopamine deficit state. So that's really the way in which pain can become the main driver is because I've indulged so much in these high reward behaviors or substances that my brain has had to compensate by way down regulating my own dopamine such that even when I'm not doing that drug, I'm in a dopamine deficit state, which is akin to a clinical depression, I have anxiety or ability and Sami dysphoria. And a lot of mental preoccupation with using again or getting the drug and so that that's the piece there. There's the single use, which easily passes, but it's the chronic use that can then reset really our dopamine thresholds and then nothing is enjoyable, right, that then everything sort of pales in comparison to this one drug that I want to keep doing. And that one drug could be a person, right? I mean, I know people in my life that are still talking about this one relationship, this one person that was just so great despite all the challenges of that thing that it's almost like they're addicted to the narrative. They were it maybe you're still are addicted to the person so it could be to any number of things video game sex gambling a person a narrative. To me, and because of the way you described this mechanism, this pleasure pain balance, that all speaks to the kind of generalizability of our brain circuitry. And this is something that fascinates me and I know it fascinates you as well, which is that nature did not evolve 20 different mechanisms for 20 different types of addiction. Just like anxiety is a couple of core sets of hormones and neurotransmitters in pathways and one person is triggered by social interactions and other person is triggered by spiders, but the underlying response is identical. It sounds like with addiction as well, there there may be some nuance, but that they're sort of a core set of processes. So it doesn't really matter if it's gambling or video games or sex or a narrative about a previous lover or partner or whatever. It's the same addictive process underneath that. Is that correct? Yes, exactly. And that's where this whole idea of cross addiction comes in. So once you've been addicted to a substance severely addicted, that makes you more vulnerable to addiction to any substance. And when you say substance does the same is what you just said also true for behaviors. Yes, so when I use the word drug, I'm talking about substances and behaviors really and I'm talking about behaviors like gambling, sex, you know, gaming, porn, absolutely shopping, work, you've accused me. Just for the record and Dr. Lovegazey accused me, not accused me has diagnosed me outside the clinic in a playful way of being work addicted. You're probably right. I the first thoughts I have when I wake up or typically about work, certainly within 50 milliseconds or so, waking. And probably the last thoughts I have, I would hope are not about work, but yeah, I work constantly. I don't I do other things, but I have to actively turn that off. Yes, that's exactly right. And you're certainly not alone in that. At Stanford. No, no, no, no, no, I'm here in Silicon Valley. It's highly rewarded. Right. So that kind of that kind of embedded in the culture. Absolutely. Yeah. Yeah. And there's this other city. I think it's called New York where they also work a lot here. And it's heavily rewarded. I want said and I'm sure that I'm not the first person to say it, but I was thinking about addiction and I was thinking about the underlying circuits. And I posted something to the social media. It said that addiction is a progressive narrowing of the things that bring you pleasure. That was the way that I kind of crystallized the literature in my mind. And then we met and you, of course, came and gave these amazing lectures in the neuroanademy course for the medical students and the rest is history. But I tossed out a kind of mirroring statement for that as well, which was a bit overstepping, I admit, which I said addiction is a progressive narrowing of the things that bring you pleasure. And I said, dare I say enlightenment is a progressive expansion of the things that bring you pleasure. Not that anybody knows what enlightenment is. But it was my attempt to take a little bit of a jab at the fact that nobody knows. And so why not? Why would not throw in her biological explanation just to just kind of sample the waters. And people had varying levels of response. But I would have the reason I bring that up is that I would imagine that being able to derive pleasure from many things would be a wonderful attribute. Well, you know, people like this that can experience pleasure in little things and in big events, not just the big milestones of life, but also the subtle, you know, as that like the yogis would say the subtle ripples of life. If such an ability exists, what do you think that that reflects a healthily tuned dopamine system? One that can engage and enjoy, but then disengage is that what we should be seeking. And to underscore, I know nothing about enlightenment meditation or or any of it, I just I use these as opportunities to explore. Yeah, so it's a great question. I mean, and I understand the question as so where what should we be striving for right where where should we settle out. And you know, in my book, I really hold out people in recovery from severe addiction as sort of modern day profits for the rest of us because I do think that people who have been addicted and then go get into recovery do have a hard one wisdom. That we can all benefit from and and the wisdom. I guess, you know, to distill it down. I mean, it's it's many things. But in terms of, you know, dopamine, the wisdom is there are adaptive ways to get your dopamine and there are less than adaptive ways. And in general, you could describe the adaptive ways as not too potent. So not tipping that balance too hard or too fast to the side of pleasure. So does that mean never allowing myself to be absolutely incomplete bliss or does it mean not allowing myself to stay in that state too long? The latter, I think the latter. So and then that gets to temperament. So I'm going to get that to a second. So so in general, what we want is some kind of flexibility in that balance and the ability to easily reassert homeostasis. We don't want to break our balance, which is possible if we over indulge for enough period of time and end up with a balanced tip to the side of pain, the stopamine deficit state we've been talking about. We want it, we want a flexible, resilient balance, right, which can be sensitive to things going on in the environment, which can experience pleasure and approach, which can experience pain and recoil, right, this is all adaptive and healthy and necessary and good. We would never want a balance that doesn't tilt. Right. That would be a disaster. We wouldn't be human. And we wouldn't want that. We really, really boring. On the other hand, what people in recovery from addiction talk about is to some extent having to learn to live with things being a little boring a lot of the time, right. So trying to avoid some of this intensity and thrill seeking and escapism that really is at the core of addictive tendencies. It's a start to interrupt. But when you say boring, can we add stressful and boring? Yes. Because there are days where I'm not ex I have to I'm one of these have to remind myself to have fun because I sort of forgot what the term is because I like to think that I experienced a lot of pleasure and little things, but I'm pretty hard driving guy. I like goals and big milestones, all that stuff. Anyway, the point being that many days I'm not bored thinking, there's nothing to do. But I am an overwhelmed by the number of things that are really not pleasureful that I have to do. I won't mention what they are. I don't want my colleagues. That's why you don't respond to emails. No, just your email. Not yours, Anna, but there. In any event. So anxiety and boredom can hang out together. Am I correct? Oh, for sure. I mean, actually boredom is highly anxiety provoking. That's good to know because I think people hear boredom and they think like, there's nothing to do here. I feel like we have a ton to do. We just don't really want to do it. As opposed to something that we're excited to do. Right. Okay. So this gets to sort of some of the core things. Also, we were talking about earlier about finding your passion. So I'm going to try to link it all together. But basically is boredom. For example, boredom is a rare experience for modern humans because we're constantly distracting ourselves from the present moment. We have an infinite number of ways to do that. Right. But boredom is really, I think, an important and necessary experience. But it is scary because when you allow yourself to be bored. Let's say you had the list of all the things you hate to do. And you actually got them all done. Imagine that. And you got your forthcoming book done. And you did all your interviews. And it could happen lightning. And you watch your dog and you cleaned your house and you went shopping. Imagine that for a moment. You would be sitting in your house. And my guess is you would be terrified because wow, what am I supposed to do now? Right. There's nothing I really have to do. And that is really, really scary. That can feel like free fall. And yet that's really an important and good experience to have. And I think that is an experience out of which we can have a lot of creative initiative. But also really consider our priorities and values. Okay, here I am on planet earth. What the he home I'm going to do with my life. What do I really care about? How do I really want to spend my time when I'm not distracting myself, you know, in order to spend it. And the you know, then this gets back to our conversation a little bit earlier about finding your passion. So I think that one of the big problems now that's very misguided about this idea of finding your passion. It's almost as if people are looking to fit the key into the lock of the thing that was meant for them to do. And then everything will feel like a natural. Right. And then everything will be wonderful. I can attest to the fact that is not how it works. Any endeavor. Right. And then you'll have all this great success or you know, but and here, here's where I really think the answer lies. And I really, really believe this. Stop looking for your passion. And instead look around right where you are. Stop distracting yourself. Look around right where you are and see what needs to be done. So not what do I want to do. But what is the work that needs to be done. And more importantly, it doesn't have to be some grandiose work. Like does the garbage need to be taken out right. Is there some garbage on your neighbor's lawn that someone through that you could actually bend over and pick up and put into the garbage can. Look around you. There is so much work that needs to be done that nobody wants to do that is really, really important. And if we all did that, I really think the world would be a much better place. And this is what people who have severe addiction who get into recovery realize they're like, it's not about me and my will. And what I'm going to will in my life or in the world. It's about looking around what needs to be done. What is the work that I am called to do in this moment, which also is incredibly freeing because I don't have to search for the perfect thing. There's a lot of burden now on young people that they have to find that perfect thing. And until they found that perfect thing, they're going to be miserable. You don't have to do that. Look at the life you were given. Look at the people around you. Look at the jobs that present themselves to you. And do that job simply and honorably one day at a time with a kind of humility. I think this is really what what's so striking to me about the wisdom of people in recovery. There's this incredible humility that comes out of that experience. You feel so broken, so ashamed, but you pick yourself up one day at a time and you build a life that's around what can I do right in this moment that might benefit another person and thereby benefit me. It's a really important point. And if you're willing, I'd like to actually stay on this issue of passion because I think the dopamine systems, if I understand them correctly, the dopamine systems merge with this work that you refer to this immediacy of things calling to us like taking out the trash, which sounds frankly really boring. I hate taking out the trash, but I do it because I like a clean home and a home that smells good, or at least doesn't smell bad. So we do these things and not that we want to offer some larger carrot as a consequence of doing those things. So, what you're saying is in the act of looking at one's immediate environment, acting on that immediate environment, we cultivate a relationship to these circuits in our brain about action and reward that at least to my mind, span the range of small things being rewarding and then lead us to bigger things being rewarding. It's not like all we're going to do is take out trash and tend to house. We eventually will venture out and we eventually will find careers and work on those. But if I understand correctly, you're talking about getting into a sort of functional or adaptive action step. And it's the action step that these days, we tend to overlook because most of our mindset is in things that are truly outside of the our immediate reality. Do I have that correct? Yeah, that was beautifully said. And I would just add to that, I see a lot of young people who, for example, spend most of their waking hours playing video games. And they come to me and they say, I am anxious and depressed. I'm majoring in computer science. I hated. I thought I would like it. You know, if I could only find that thing that I was really meant to do, my life would be better. And my first intervention for the many, many people like that that I see in clinical care is you have it backwards. I don't say it quite like that. You were waiting for that thing to pull you out of the video game world. And you're never going to find it as long as you're playing video games because video games are so powerfully dopaminergic that you have this distorted sense of really pleasure and pain and you will not be able to find that thing that you enjoy. And so of course, the intervention is abstained from video games, reset your reward pathways, start with a level balance and what invariably happens and I've just seen it over 20 years so many times I become really a believer in this. All of a sudden it's like, oh wow, my computer science class is interesting this quarter. It's like, okay, you know, you have a receptivity then to experiencing pleasure and reward. In a way you just don't have when you're bombarding your reward pathways with these high dopamine drugs. Very interesting. And just to underscore this notion that tending to the immediate things can lead to super performance. I may have mentioned it earlier this episode, but if I didn't, I'll mention now which is I have the great privilege of having some close friends that were in the SEAL teams and doing some work with those communities and it's a remarkable community for reasons that I think most people don't understand. People think they see the images carrying logs down the beach and all the blowing stuff on all the stuff that's fun for guys like that. But all of the guys I know who are in the SEAL teams have this sense of duty about immediate things and not just holding the door and doing the helping with the dishes and moving these around. They are constantly scanning their environment for what can be done. They essentially conquer every environment they're in. They are also some of the most competitive human beings. They do it in the world and they do it unless they're in the act of war fighting, which is their real job. They do it in every environment in a very benevolent way. And it's a remarkable thing because it I think it's what is part of what they're selected for. And you know that there's a range there. But I think when we hear about tending to the immediate things where this phrase, you know, how you do one thing is how you do anything. That's a tricky one for me because there's certain things I just don't do well. But should we always be trying I think that the tending to setting the horizon in closely and tending to things in one's immediate environment, I think it is very powerful and translates because again, I think the nervous system. It performs algorithms has action steps. The brain doesn't evolve to do one thing. It evolves to be able to use the same approach to doing lots of different things. I just want to add so even beyond that because that totally resonates for me and is very consistent with people in recovery from addiction who learn to take it one day at a time, which is one of the, you know, standard lingo from alcoholics anonymous and other 12 step groups. But I think also as you say, you know, our brain is really wired for the 24 hour period. We're not very good at sort of the, you know, 10 year 20. I mean, we're we have this huge frontal lobes and yes, we're great planners and we can. But if we live too much in that space, we can really get very anxious and depressed and lost and either catastrophes or get grandiose, but if you can chunk it down to a day, what what people in recovery talk about is how if I can just do today, right, then I will get a chain of days that seem insignificant in their individual units. But after six months or a year or two years of those good days, I've got two very good years, right, and I look back and it's like, oh, wow, I guess I did all that. But I think that's really, you know, one of the keys is really taking it one day at a time, which, which your seals and also this connecting with the environment, right. So being awake and alert to your environment and connecting with your environment, not trying to escape it. Of course, escapism is what we all want and desire, that experience of non being and we get it from the internet or from drugs or whatever it is, but it is, it's the booby prize. Because ultimately, it takes you further and further away from your immediate environment, which is where we really have to connect to get that sense of groundedness and authenticity and like of being in our own lives. The unit of the day is something that comes up again and again of in my discussions with colleagues who are extremely successful and who also have balanced lives. This actually came up in the discussion with Carl Dicer, who is also successful scientists and clinician and, you know, manages a family, et cetera. So the unit of the day, I think, is fundamental and those stack up, as you mentioned. So along those lines, I've heard you say that in order to reset the dopamine system, essentially in order to break an addictive pattern to become unaddicted. 30 days of zero interaction with that substance, that person, et cetera. Right. Correct. Yeah. And 30 days is in my clinical experience, the average amount of time it takes for the brain to reset, reward pathways for dopamine transmission to regenerate itself. There's also a little bit of science that suggests that that's true. Some imaging studies showing that our brains are still in a dopamine deficit state two weeks after we've been using our drug and then a study by Shuckett and Brown, which took a group of depressed men who also were addicted to alcohol put them in a hospital where they had received no treatment for depression, but they had no no access to alcohol in that time. And after four weeks, 80% of them no longer met criteria for major depression. So again, this idea that by depriving ourselves of this high dopamine, high reward, substance or behavior, we allow our brains to regenerate its own dopamine, for the balance to really quill it really. And then we're in a place where we can sort of enjoy other things. So that progressive narrowing of what is one pleasure eventually expands. So I'd like to dissect out that 30 days a little more finely. And I also want to address how does one stop doing something for 30 days if the thing is a thought. So I'll put that on the shelf for a moment. So days one through 10, I would imagine will be very uncomfortable. Yes. They're going to suck, basically, to be quite honest because what if the way you describe this pleasure pain balance, to my mind says that if you remove what little pleasure one is getting or a lot of pleasure from engaging in some behavior, that's gone. The pain system is really ramped up and nothing is making me feel good. I'll just use myself as an example. I'm not in recovery, but that 10 days is going to be miserable. Right. Anxiety, trouble sleeping, physical agitation, into the point where they be impulsive, angry, should one expect all of that? Should the family members of people expect all of that? Yeah. So what I say to patients, and it's a really important piece of this intervention is that you will feel worse before you feel better. How long? Is it probably the first question? Yes. And I say usually in my clinical experience, you'll feel worse for two weeks. But if you can make it through those first two weeks, the sun will start to come out in week three. And by week four, most people are feeling a whole lot better than they were before they stopped using their stuff in substance. So, yeah, you have to, it's a hard thing, like you have to sign up for it. And I will say obviously there are people with addictions that are so severe that as long as they have access to their drug or behavior, they're not able to stop themselves. And that's why we have higher levels of care or residential treatment. So this is not going to be for everybody this intervention. But it's amazing how many people with really severe addictions to things like heroin, cocaine, you know, very severe pornography addictions. I posit this and I do it as an experiment. I said, you know what? Let's try this experiment. I'm always amazed. Number one, how many of them are willing and number two, how many of them are actually able to do it? They are able to do it. And so that little nudge is sort of just what they need. And the carrot is, you know, there's a better life out there for you. And you'll be able to taste it in a month. You really will be able to begin to see that you can feel better and that there's another way. So the way you describe it seems like it's hard, but it's doable for most people, not everybody. Right. And we'll return to that category of people who can't do that on their own. Well, then days 21 through 30, people are feeling better. The sun is starting to come out, as you mentioned, they, which translates in the narrative we've created here and support biology that dopamine is starting to be released in response to the taste of a really good cup of coffee. Yes, exactly. Whereas before it was only to insert, you know, addictive behavior. Right. So what, whichever, of course, he can be addictive to, but we'll leave that aside. I feel like coffee has a kind of consumption limiting mechanism built in where at some point you just can't ingest anymore. But maybe that's wrong. Sorry to give lift to the caffeine addicts out there as I clutch my my month. So days 21 through 30. I've seen a lot of people go through addiction and addiction treatment. I've spent a lot of time in those places actually looking at it, researching I've got friends in that community. I'm close with that community. One thing I've seen over and over again, sadly, often in the same individuals is they get sober from whatever they're doing great. These are people with families. These are people that you discard your normal image of an addict and insert the most normal typical whatever healthy person you can imagine because a lot of these people you wouldn't know where addicts. And then all of a sudden you get this call so and so's back in jail so and so's wife is going to leave him because he drank two bottles of wine and took a Xanax at 7 a.m. Crash is trucking to a pole. It's got two beautiful kids like how did this happen again to the point where by the fourth and fifth time people are just done. I mean, maybe people you might be able to attack the frustration my voice. I'm dealing with this with somebody that's like I don't even know that I want to help this time. It's been so many times to the point where I'm starting to wonder is this person just an addict. This is just kind of what they do and who they are and I and you never want to give up on people but and I'm hanging in there for them. But I will say that many people have given up on them. And so what I'd like to talk about in this context is what sorts of things help other people that we know that are addicted. What really helps not not what could help but what really helps and are there certain people for whom it's hopeless. I mean, I don't like to hold the conversation that way but I wouldn't be close to the real life data if I didn't ask. Is it hopeless? Are there people who just will not be able to quit their substance use or their addictive behavior despite I have to assume really wanting to. Yeah. Yeah. So there are people who will die of their disease of addiction. And I think conceptualizing it as a disease is a helpful frame. There are other frames that we could use but I do think given the brain physiologic changes that occur with sustained heavy drug use and what we know happens to the brain, it is really reasonable to think of it as a brain disease. And for me, the real window of let's say being able to access my compassion around people who are repeat relapses, even when their life is so much better when they're. Yeah, it's like it's like a no brainer right is is to conceptualize this balance and the dopamine deficit state and a balance tilted to the side of pain. And to imagine that for some people after a month or six months or maybe even six years, their balance is still tipped to the side of pain that on some level that balance has lost its resilience and its ability to restore homeostasis. It's almost like the hinge on that balance is messed up. Exactly. And so I mean for someone who's never experienced addiction like yourself maybe one one way to conceptualize it is. I didn't say that. I was not referring to myself but I in this example I was given if I were I would I would come clean I would reveal that. But I think that especially after hearing some of your lectures and descriptions of the range of things that are addictive I think I've been fortunate I don't have a propensity for drugs or alcohol. I'm lucky in that right that frankly if they remove all the alcohol from the planet I'll just be relieved because no one will offer it to me. Right. Right. So don't send me any alcohol. It won't go to me. Right. But but I don't have that. I like to think I have the compassion but I don't have that empathy for you know taking a really good situation and I don't have that empathy for. You know taking a really good situation and what from the outside looks like throwing it in the trash. Yeah so so so that let me and this is really I think important because I also had to come to an understanding of this and I feel that I have in my 20 years of seeing these patients. And of course addiction is a spectrum. That's right and so you've got the severe end of things. Imagine that you had an itch somewhere on your body okay and it was I mean we've all had that like you know whatever the source. It was super super itchy you can go for you know if you really focus you could go for a pretty good amount of time not scratching it. But the moment you stopped focusing on not scratching it you would scratch it and maybe you do it while you were sleep right that is and that is what happens to people with severe addiction. That balance is essentially broken. Homestasis does not get restored despite sustained abstinence they're living with that constant spectre of that pull it never goes away. So in severe cases that's always there and it's lingering and it's the moment when they're not focusing on not using it's like a reflex they fall back into it. It's not purposeful it's not because they want to get high it's not because they value using drugs more than they do their family. None of that it's that really they they they cannot not do it when given the opportunity and that moment when they're not thinking about it. Does that make sense that's a great description and actually in that description I can feel a bit of empathy because the way you describe scratching an itch in your sleep. Yeah you know I've done that with mosquito bites and scratching like I you wake up scratching that right mosquito bite. I also have to admit that I've experienced not feeling like I want to pick up my phone because it's so rewarding but just finding myself doing it. Yes of course I'm not going to use this and I use this thing and then just finding myself like what am I doing here. Sort of the how did I get back again and I know enough about brain function to understand that we have circuits that generate deliberate behavior and we have circuits that generate reflexive behavior and one of the goals of the nervous system is to make the deliberate stuff reflexive so you don't have to make the decision because decision making is a very costly thing to do. That decision making of any kind right right so that does really help and the I want to just trying to weave together this this dopamine puzzle however because if by week less so first phase of this 30 or 40 day detox is like a dopamine fast right okay. First 10 days are miserable middle 10 days the clouds are out there may be some shards of sunlight coming through and then all of a sudden sun starts to come out it gets brighter and brighter why is it then that people will relapse not just after getting fired from a job or their spouse leaving the but when things are going really well is it this unconscious mechanism because I've seen this before is they have a great win I have a friend who's a really impressive creative. I don't want to real any more than that but and relapsed upon getting another really terrific opportunity to create for the entire world and I was like how can that happen but now I'm beginning to wonder was it the dopamine associated with that win that open the spigot on this dopamine system because it happened in a phase of a really great stretch of life. Yeah right yeah so you raise that great point about triggers right and triggers are things that make us want to go back to using our drug and the key thing about triggers whatever they are is they also release a little bit of dopamine right so just thinking about whatever the trigger is that we associate with drug use or just thinking about drug use can already release this anticipatory dopamine this middle mini spike but here's the part that we're going to do. It's a spike but here's the part that I think is really fascinating that mini spike is followed by a mini deficit state so it goes up and then it doesn't go back down the baseline it goes below baseline tonic levels and that's craving right so that anticipation is immediately followed by wanting the drug and it's that dopamine deficit state that drives the motivation to go and get the drug so many people talk about dopamine is not really about pleasure but about wanting and it's not going to be a good example. It's not about wanting and about motivation and so it is that deficit state that then drives the local motion to get it and earlier your description of dopamine being involved in the desire for more giving the sense of reward but also movement right I have to assume that those things are braided together in our nervous system for the specific intention of when you feel something good then you feel the pain yeah you don't notice it and then the next thing you know you're pursuing more of the thing that I love the way you use the word braided together that's beautiful and let me also just say that you know that you're not going to be able to do that. And let me also just say something I find also fascinating in my work with patients and I see this all the time there are people for whom bad life experiences loss you know in any form stress in many different forms that's a trigger but there are absolutely people for whom the trigger is things going well and the things going well can be like the reward of the things going well but very often what it is is the removal of the hyper vigilant state that's going to be a good example of the normal. So if you're in a state that's required to keep their use in check so it's this sense of I want to celebrate you know or I want to this reward happened I want to put more reward on there and it's really really fast because when people come to that realization that about themselves that they're most vulnerable when things are going well. And they can put some things in place or barriers in place or go to more meetings or whatever it is that they do know to protect themselves along those lines I have a friend 40 years sober was a severe drug and alcohol addict from very young age really impressive person does a lot of important work in the kind of at risk youth community out in Hawaii and he said something to me he said as form or addicts often do they got these great things but I think it fits very well with what you're just doing. He said no matter how far you drive you're always the same distance and I said well that's kind of depressing and he said no that's actually what gives me peace because what would happen is for so many years of relapsing and relapsing getting recovering and relapsing he felt like it was hopeless and then somehow conceptualizing that the vigilance can never go away instead of making him feel like he's not going to be able to do that. Instead of making him feel burdened. It made him feel relieved. So I often think about that the statement no matter how far you drive you're always the same distance from the itch because in my mind I conceptualize that as gosh that's a that's a tough way to drive down the road but actually on a road where you know where the ditches and where you know where the lane lines are it's actually a pretty nice drive. It's when you don't know where the shoulder is that you constantly have to be looking around so there's this where we're speaking now in analogies and imagery and science but I one of the things I find so incredible about this community of 12 step in their variety of them or the the communities that they create for themselves. And some of these things which I do believe link back to really core biological mechanisms. Yes. Yes. I do want to ask about those communities. I have a question which might be a little bit controversial. Great. Which is is it possible that people who were addicted to drugs or alcohol or some gambling or some other behavior get addicted to the addiction community because one thing that I think I observe over and over is that there's some circuit in the brain of human beings that has to tell you about the dream they had the night before for whatever reason. There's another circuit that leads people to wake you up if they themselves can't sleep. I don't know what it is. I'm being physis here. But there does seem to also be a circuit in the brain of addicts to discuss and want to talk about their recovery a lot. And I mention this not to poke at them but rather the opposite because I think that one thing that is challenging at least for me and having friends that have a propensity for drug or alcohol addiction not all of them but certainly some of them is when they're talking about the recovery I feel like it's all they talk about this meeting that meeting that way. How are we so what I'm really asking here is is that some can we become addicted to sobriety. Right. So this is a great question and it links into some of the other things we've been talking about having to do with where do we settle settle out you know what is the way to live between pleasure and pain. And I implied earlier that ultimately we want to resilient balance that sensitive to pleasure and pain but that can easily restore homeostasis after we indulge even when we indulge greatly. But the truth of the matter is that people with severe addiction I believe temperamentally want those extremes and they're wired for that kind of intensity that is more than just these slight adjustments around the full crumb right. It's like they want the big highs and the big lows they'll say great meeting. Yeah, right. They're like that was such an amazing or they find a group. Yeah, we see I this is almost an inside joke in those communities again I'm not reporting I'm not talking about a friend in quotes. This isn't me reporting with they'll they'll talk about how attractive people are to give in a meeting or how how bonded they feel to people at a given meeting that the meetings it themselves become their own form of dopamine. Yes, yes, yes, and again I'm not being disparaging I just I I want to understand that right. So yes, so a lot of times patients will say to me oh you know I don't want to go to AA it's a cult and my response to that is because it's a cult is exactly why it works. Okay, because yes, it is much better for you to be addicted to AA and to recovery than almost any other addiction I could think of and we know from Rob Malenka's work who's here at Stanford that oxytocin you know is the hormone that's involved in human pair bonding and relationships and love and it directly links to dopamine neurons and causes the release of dopamine. So yes, when we connect with other humans especially in a kind of transcendent spiritual way that's a huge dopamine hit and it does replace the dopamine that people get from drugs and for people who have this addiction temperament they need it on a more intense level they're not going to be generally satisfied with kind of you know and sort of acquaintance ship right they they they want that intensity of the intimacy that you get with people when you're cathartically. You know, we're cathartically exposing you know warts and all so yes people can get addicted to recovery and good for them go for it you know and of course this can be disruptive for friendships and relationships where the one person is not in recovery like you're going to so many meetings you're always talking recovery but you know what much better than them being intoxicated right I mean so although you may tire of your friends talking about their their you know meeting those time I'm sure you would rather have them do that then then you know be in their addictions. Yeah absolutely and this is now the second time you've done this discussion but now I have empathy because the way you describe their enthusiasm about meetings yes is probably the way that people feel about me yeah right and my neuroscience I mean I've been getting up in front of the class since I was eight years old and talking about things I read over the weekend now I just happen to have this thing called a podcast right I've been doing it since I was a little and it annoys a lot of people right I've learned to suppress it a little bit some people like it but I I'm poking fun at myself just to say that I now can understand that the way I feel about their reports about yet another amazing meeting or and or for there's a different form of this but there's some people for which they just love intense experiences yes they're always like trying to pull me off to Bali because they're talking about how sensual it is all time sure Bali is wonderful but there's this kind of ratcheting and I'm not going to talk about it. I'm kind of ratcheting up it's like seeking burning man all the way I've never been a burning man no desire to go to burning man but inside of academia I mean if I were to just turn the mirror at myself inside of academia or here in Silicon Valley work and the pursuit of more success even if money is kind of divorced from that sometimes it is sometimes it isn't academic work is you know for sake of pursuit of knowledge. It sounds to me like the same mechanism in fact it feels to me very much like the the same mechanism. So Andrew here's what I love about you first of all you're willing to bring your own flaws and foibles to this conversation. Well they're everywhere. Well you know what it's wonderful and then you really open and curious and wanting to understand because I can't tell you how many people I have met who really see addiction as some kind of otherness but the truth is we're all wide. Or all wired for addiction and if you're not addicted yet it's just it's right around the corner do you know what I mean especially with the incredible panoply of new drugs and behaviors that are out there. So I love that you're willing to take a moment and really try to understand this because it is it is we can all relate and you're relating it to your essentially your work addiction is right and and apt you just happen to be addicted to something that is really socially rewarded. You know you figured that out in an early age. Oh when I do x, y and z all these people go look at that smart kid or whatever it is you know you made me feel safe. Okay I felt like yeah I just felt like this and I pause there because it's like it's like peace. I'm like I can relax for a moment. When you're talking about neuro someone or just when I'm when I when I feel like I'm on the right path. Yeah and I'm on to something or if I see something that I'm excited about. I'm like I feel filled with it must be dopamine. I feel flooded with pleasure literally from head to toe. Yeah. And then my next thought is more. So true you're you're really you're true at it. Okay thank you. You are but you just got really I think you really got lucky with the fact that that what you know what you're drawn to is is adaptive essentially you know and then your challenge is going to be that your life doesn't get too out of balance in the sense that you're 24 seven working you don't stop and do some other children is your think about it in my life in my life admittedly is somewhat asymmetric I mean it has other components of physical health etc but is right. So I got a dog although I talk about him an awful lot so but the dog is good because that draws you out of yourself in a little bit away from the work but again you know I think the key here is for people feel like they don't they've never experienced addiction or they don't know anybody with addiction or if they do they don't get it just think of that one thing that is the most important thing in your life that you do that gives you pleasure and meaning in purpose and then imagine if you couldn't do it. Oh yeah let's not talk about that right. Well I appreciate that the feedback and you can send me a bill of the end. What is the most ridiculous sounding addiction that you've ever witnessed that was actually a real addiction along these lines because I I think we all know the standard heroin pill you've been very I should mention because it's important your previous book and we will provide a link to that as well focused on the opioid crisis and what we thought was a medication turned out to be just as that if not worse than a lot of so-called street drugs so we understand those those you know gambling sex addiction porn addiction now video games we'll talk about social media a little bit more in depth but what's the most like wow I didn't realize people could get addicted to that water really really so I had a very lovely patient who was a severe alcohol addiction and she got into recovery from her alcohol addiction for many years but she kind of had a sort of a polydipsia or an urge to be drinking something a lot and so she drank a lot of water and slowly over time she realized that if she drank enough water she could become hyponatremic and delirious and be out of herself with it right which is what she just wanted to be out of her own head and so she would periodically intentionally overdose on water in order you know to to I know it was so sad so sad what happened to her she eventually took her own life yeah it's really that's rough she was a lovely woman she was so bright she had so many interests and passions and and of course it was very sad when you know when she died but but I that was a wow to me it was like wow if you have this disease of addiction you can even get addicted to water wow and I think it just underscores the the general eyes ability of these circuits right there isn't a brain circuit for addiction to water that she happened to have there's a brain circuit for pleasure and pain and addiction and water plugged into that right right wow that's it that's intense in your book dopamine nation you also describe some amazing paths to recovery people that you know from reading it I would I won't say which ones and who because there's some great surprises in the book to both tragic and and triumphant as they say you've often described your patients as your heroes yeah tell us a little bit more about that you know when you think about how hard it is to give up a drug or a behavior that you're addicted to how much courage that takes and fortitude and discipline and stick to it so you're not just saying right or a delusion at the very beginning is also number five and one is a kind of you know the right. So yeah I think it's that created the new world. That's new to both what about doing it the new world. And you know how do you think Ireland too in bars that were not even available to scan that out for us. that you double down on the shame that they feel because of that urge, even when their lives are so much better. I mean, these people are really, really remarkable. And you take their remarkable accomplishment and then you imagine the world that we live in now, where we are constantly invited and tempted and really bombarded with opportunities to become addicted. It's like telling a niche everywhere. Oh, yeah. I mean, you can't escape it. You know, you cannot escape it that you'll get an email in your inbox inviting you to do X, Y, or Z. And if you're addicted to that thing, you know, you tried to like delete all your apps and not go here. All the sudden your work inbox, you're, you know, you're getting those images, let's say, really, really, really hard. And yet these people find a way to do it. I think it's absolutely amazing. And they're really wise people. They have so much wisdom to offer. They've taught me a lot. You know, as I talk about my book, I have my own addictions and I really just like took a page right out of their buzz. Okay, what do I do now? All right, what did this patient do without camera to try that? It is, it is an amazing community. Yeah. The people that there are very sage. I wanted to just touch on something that you mentioned, which is the shame. Yeah. You know, you can't go to a meeting or talk to addicts without detecting or hearing about like lies, shame, etc. I heard you say in an interview with somebody else recently that truth telling and secrets are sort of at the core of recovery. And yeah, tell us more about that. Yeah. So one of the things that I found really fascinating about working with people in recovery was how telling the truth, even about the nearest detail of their lives was central to their recovery. And I became really curious about that. Like, why would truth telling be so important? And of course, there is the obvious thing that when people are in their addiction, they're lying about using, you know, so part of getting into recovery is to stop lying to the people they care about about their use. But it's really more than that because what, what people in recovery have taught me is that it's not, it's not even just not lying about using drugs. I have to not lie about anything. I can't lie about why I was late to work this morning, which we all do. I hit traffic. No, I didn't hit traffic. I wanted to spend two more minutes reading the paper and drinking my coffee, right? Or just lying about, you know, I don't know where I had dinner. Like, so people with addiction will get into, you know, the lying habit where they're lying about random stuff because they're sort of in the habit of lying. And how recovery is really about telling the truth, you know, in all ways. And so one of the things that I, with I had a lot of fun with in writing the book is sort of exploring the neuroscience around why truth telling is important to leading a balanced life. And we know like every religion since the beginning of time is all about telling the truth, well, why, right? And there's really interesting neuroscience behind it that suggests that when we tell the truth, we actually potentially strengthen our prefrontal cortical circuits and their connections to our limbic brain and our reward brain. And of course, these are the circuits that get disconnected when we're in our addiction, right? Our balance in our reward pathway or limbic brain or emotion brain is doing one thing. And our cortical circuits are completely disengaged from that, ignoring what's happening, which is easy to do because it's reflexive. We don't need to think about that balance for the balance to be happening. But we have to reengage those circuits and dissipate future consequences, think through the drink, you know, not just how am I going to feel now if I use, but how am I going to feel tomorrow or six months from now? And that telling the truth is in fact a way to do that, to make these connections stronger in there. I talk about some studies in my book that that kind of indirectly show that. So I find that really fascinating. Plus that they're just like being open and honest with people really does create very intimate connections. And those intimate connections create dopamine. So we were talking a little bit about how you know, know a bunch of people who need like intensity in their lives. For me, I need a lot of intensity in my human connections. Like I'm really not interested in and bored by and made anxious by casual interactions. But you know, like having this kind of discussion with you, that's very intense and also intimate and self-disclosing is very rewarding for me. So that's an important source of dopamine. Thank God it became a psychiatrist. Yeah, absolutely. I can't disclose all my stuff, but I am quite transparent with my patients, which is a slightly unorthodox. But you know, when I think it's right, I'm also transparent with them. So that's, you know, that's a source of dopamine too when we're honest and we disclose and that you think people are going to run away from you if you tell them about all like your weird neuroses, but really they don't. But they're like, oh, thank God. I'm not the only one, right? Well, what I love about, I love many things about your book. I read it in one suite. Oh, thank you. And I was like, wow, is I was a pleasantly surprised, but I was like, wow, she's really opening up in this book from the very beginning. And I don't want to give it away, but it's yeah, you're very open where it's appropriate. And also, I think that this question about truth telling, I always think about like tell the truth be, you know, 100% about the truth. But there's also this element about do you report previous lies, right? Like what about prior behavior? And I'm fascinating about this, because to me, telling the truth is has many facets, but the three sides of this thing in my mind are one is reporting everything accurately. The other is what do you withhold? What do you not withhold? Right? Because some people say, tell the truth or at least don't lie. That's sort of a lies of a mission lies of a mission lies of a mission. And then there, there's the what I have to assume for most people is a small to enormous batch of things that they lied about in the past that still thread into the future. So how important is it for the the addict or that every person really to because it sounds like cultivating the circuitry between prefrontal cortex and the dopamine system would be great for anybody. Since we're all addicts, right? Everyone should do it. But in all seriousness, it sounds like a good thing for everybody to do. How how much work needs to be done on all the priors, all the stuff we've hidden? And I mean, not me, but all the all the stuff that everybody else has hidden. Yeah. So the you know, the steps of the 12 steps of alcoholics anonymous, a good number of those steps are about that very thing that passed the ways that we've harmed people in the past. And one of the fourth step is about making amends, you know, by admitting the ways in which that we've contributed to harming others. And it is a really big piece of recovery. So, you know, how important is so for people with addiction, it's really, really important to go back and make amends. And you know, you the the the key idea there is you just go back and you apologize, you know, and you don't you don't have to get any particular kind of response or you don't need to be forgiven. It's the act itself of apologizing about the ways in which we've harmed or lied to people in the past that is cathartic and renewing and allows us to kind of shed this skin and be be new in our lives and begin again sort of absolved, you know, of past sins, so to speak. So it is really important. You know, are there situations when it's maybe not a good idea because of that person or the nature sure, you know, there are always going to be it doesn't have to be like it's not we're talking about not like not like Kant's idea about it never lie but you know, robbers in your house and you know, you're still away. You can't lie even about that's like no, there are probably situations where you know, per se of other people safety, right? Right, right, right. I mean, there you can think of a million scenarios, but but but in general, you know, when we're taking stock because I don't know about you, but I have a lot of regrets and guilt about a lot of things in my life and and and they kind of haunt me, you know, it's as if I'll have nightmares, right? And I think that's true for most people. I mean, like I can't even well meet somebody who's like, I don't have any regrets in my life. I'm like, wow, like I I cannot relate to that at all. So, you know, this idea of like catharsis and well, I mean, in the 12 steps it's telling telling God or your hair power, telling another human being the ways in which you've wronged others considering your own character defects and how those have contributed to me, that's a really important piece and something that we don't do enough in our current culture, especially in psychiatry, frankly, where there's a lot of eternally empathizing with patients, but not a whole lot of likes going, well, you know, actually, you kind of messed that up or like that was really bad on you, you know, and I mean, my work, I don't necessarily use that language, but you know, patients may be like, I really feel badly about, you know, this thing, I'll be like, yeah, I get it. I understand that you feel guilt is it, right? There's a circuit for that too, right? And it's it's important, right? And it's also important to recovery and to not becoming addicted, you know, experiencing a certain amount of appropriate shame for things that we have done and, you know, feeling of the pain that comes with shame, which is an incredibly painful emotion, right? And I think that may be the one that we all try to avoid more than any other is like that shame of not being liked or not being accepted or not being celebrated. Or the thing that we did is is really despicable. Right. It's really, yeah, like oh my God, I did that horrible thing, right? Right. And then so I mean, I've done horrible things that I haven't gone back and said I did this horrible thing, but I'm maybe I've tried to pay it forward like I've told my kids, you know, when I was younger, I did this horrible thing and it still haunts me. So if you're ever tempted to do something like what I did, you might think about my situation. So you know, some kind of way, but I think wrestling with that is important. I think it's a really important element to all this. And there's not, I love that there's neuroscience being done on truth telling and the value of truth telling. I think if I were to predict it, a new and truly exciting area that people are going to be really curious about in this huge sphere we call neuroscience, I hope they'll continue to do more. I'll just speak to I'm so glad to hear that's happening here at Stanford. No, that's that the the literature that I look at isn't Stanford work, but but there's work. There might be it might be people. Right. Regardless of where it's happening, more of that and all the rest, please. I want to ask you about using drugs to treat drug addiction. These days there's a growing interest or at least discussion about I began people going down going out of country because I think it's still illegal here or is illegal here going out of country to either inject it or smoke it or whatever it is or people going and doing I wasca journeys or MDMA which is still an illegal drug in this country, but there are clinical trials. There are people on this campus doing experimental studies. I don't know if clinical trials, but at Johns Hopkins, there are clinical trials, etc. So this this is a vast area, right. Different chemistries for different drugs and different purposes, but the rationale as I understand it is take people who are in a pattern of addiction, launch them into a experience that's also chemical and extreme often of the extreme serotonin and or extreme dopamine type. So MDMA, ecstasy, for instance, tons of serotonin dumped tons of dopamine dumped, how neurotoxic, if neurotoxic, debatable, etc., not the topic for now, but a lot. And then somehow that extreme experience wrapped inside of a supported network in there, whether or not there's just someone there or whether or not they're actively working through something with the patient is supposed to eject the person into a life where drug use isn't as much of interest. This violates at a rash, purely rational level. This violates everything we've talked about in terms of dopamine biology. It would if this arrangement is the way I described it, cause more addiction. Is anything but a dopamine fast? It's a dopamine feast. So we hear about successful transitions through this, at least anecdotally and maybe maybe some clinicals say what is going on? What is going on? There's a manny sense to me. Yeah. Yeah. So I think it's good that you're skeptical. I think we all should be skeptical. Having said that, there are clinical studies showing, you know, these are small studies and there's short duration, small number of subjects, but you know, taking people, for example, who are addicted to alcohol and then having them have this, let's say psychedelic experience in a very controlled setting. So either typically it's a high dose psilocybin or three dose as I saw it for the map study of MDMA. Those are sort of the sea divi that kind of the kind of bread and butter of this kind of work. But the thing to really keep in mind is that this is completely interwoven with regular psychotherapy and that these are highly selected individuals. And clinical trials. Right. Right. And so, you know, I think the metaphor that helps me think about this is there are many ways to the top of the mountain. And these are sort of like taking the gondola instead of walking up. It's sort of, instead of doing like a year of psychoanalysis where you're sitting on the couch every week, reflecting on your life, it's a condensed version of psychoanalysis or psychotherapy plus, you know, MDMA, which gets you there faster. It creates the intimacy presumably because it's okay. Well, I think the main thing that happens when it's beneficial is it just allows the person to get outside of their own head and look at their lives on a much broader sweep and to consider themselves not mired in the, you know, quotidian sort of details of their life, but rather as a human on the large planet earth in the vast universe. So I think it takes, it's like when it works, it's a transformational experience because it gives the person another lens through which to view their lives, their lives, which which I think for some people is positive and powerful because they can come back from that and be like, oh my gosh, I care about my family and I don't, I want X, Y, or Z for them and I realize that my continuing to drink is not going to, you know, achieve that. So it's, it's almost like a spiritual or values based. So I think it can be very powerful, but having said that, I truly am quite skeptical because, you know, addiction is a chronic relapse in a remitting problem. It's hard for me to imagine that there's something that works very quickly, short-term that's going to work for a disease that's really long-lasting. Yeah, the two addicts, I know that that did MDMA, MDMA assisted psychotherapy as part of as part of this thing both got worse. Yeah. But the people I know who had severe trauma, who did this, who took this approach seem to be doing better. Okay. And so I, I think that the discussion as we hear it now is just sort of psychedelics, which is a huge category of that includes many different drugs and compounds with different effects. And we hear about trauma and addiction lump together. And I think that I'm a splitter, not a lumper, as we say in science. And I think it's going to be important for people to know that this is definitely not a one-size-fits-all kind of thing, but it sounds like it may have some utility under certain conditions. Yeah, I think so. I think we, I'm trying to be very open-minded about its potential utility for certain individuals, but I can tell you in my clinical work what is a very concerning unintended consequence of this narrative is I have a lot of people who are looking for some kind of spiritual awakening who on their own, not in the context of any kind of therapeutic psychological work, you know, microdose or want to try, you know, psilocybin or MDMA with a friend or wherever so they can have this, you know, spiritual experience that they can figure out their lives. That's a disaster and almost never works out well. And I've then had people who, literally, supposedly you can't get addicted to psychedelics because, you know, something with the biochemistry, which I don't fully understand because it doesn't make any sense to me, but I have patients, clinically, who definitely are addicted to, you know, MDMA, to microdosing. So that's very concerning to me because like, you know, Collins had to change her mind that, that, you know, I respect that work, but on the other hand, it's penetrated the culture. Michael Collins book. Yeah, yeah. And I don't know him. And so I don't have a problem taking it, taking a stance. So I'll just say my stance on that is the narrative of popular authors can expand and wick out so fast that pretty soon people are essentially taking their mental health into their own hands. And I actually have, I have great optimism for this business of clinical use of psychedelics, including MDMA, Matthew Johnson at Johns Hopkins is doing fabulous work on this. And, and there are others too, of course. But those are controlled settings. Right. And the pharmacology is being tuned up. And one thing that I think is coming, there are several papers published recently in great journals like Nature and Science, etc. Where there are scientists who are removing the hallucinogenic components of these drugs. And finding that they still have the antidepressant effects. And so the experience of a psychedelic and the long-term effects of the psychedelic might actually be dissociable. And so, again, I, and I'm always careful to say I'm neither for something or against it. I just think that treading carefully is what's important. I agree with you. And I can just tell you that the downstream effect for the average person, I for many of whom present in our clinic, is that they've misconstrued the data on the use of psychedelics for mental health conditions. To this idea that they're safe for that anybody can take them in any circumstance and have this kind of awakening. That's not what the data show, right. The data are these highly controlled settings. I'm just carefully selected patients. So that's my worry. Sure. And I'm going to be sitting down with Matthew Johnson at some point and we'll discuss this. And I think that that care and that cocoon of real clinical care does seem to be an important component. Well, I'm glad we could touch on it. And I'm sure I'll get a bunch of comments telling me that. But I think it is important to explore things from all sides. And that's what we do as scientists. And if Michael Paulin wants to chat, we can do that too. That's fine. I very much enjoyed the book actually. But I think that people run with ideas. That's right. They don't walk with them. They sprint. Right. Yeah. There are a couple other things I just want to touch on. But they all relate to social media. Okay. You were featured in the social dilemma. As a powerful movie, I think many people have avoided seeing that movie because it reflects back on us just how addicted we all are and how manipulated we all are. Yes. But it doesn't seem to have changed behavior much. I have to say that the movie changed my understanding and my perception, but not my behavior too much. If we look at addiction as a maladaptive thing, something that's making our lives worse or our less functional that work and in relationships, I could imagine a version of social media where it's making me more connected. I mean, this is a podcast after all. I post videos that this will show up on YouTube and elements of it on Instagram as well. So much like sugar or other things, I have to imagine that we need to regulate not necessarily eliminate this behavior. So I want to talk about what that looks like. And I want to talk about what you've referred to as this narcissistic preoccupation that social media is creating that we are all far more keenly aware of how we look and how we sound and how we are being perceived than we were 10 years ago. So first of all, social media, how addicting is it really and what is healthy social media behavior? So the first message I would want to get across about social media is that it really is a drug and it's engineered to be a drug. And it's based on potency, quantity, variety, the bottomless bowls, the likes, the way that it's enumerated all of that, which doesn't mean that we can't use it, but we need to be very thoughtful about the way we use it, just like we need to be thoughtful about the way we use any drug. And so that means with intention and in advance planning our use, right? And trying to use it as a really awesome tool to potentially connect with other people and not to be used by it or get lost in it. And of course, people are going to come with different propensities for addiction to any drug and that's true for social media too. Some people will have no problem using it in moderation or using it in a way that's adaptive and other people will immediately get sucked in. And the key thing about getting addicted is when it's happening, we nobody who's getting addicted thinks they're getting addicted, right? Let's face it. It's only after the fact that we go whoops, you know, what was that about? We'll remember texting and driving. There are all these books about texting and driving how terrible it was. Yeah. Even the governments have largely given up. You see these billboards like don't text and drive or any text can read or not worth dying for. Right. But everybody's texting and driving. Right. And if you look at young people, they're teenagers. I mean, they're basically cybernetically enhanced that the phone is there. You know, it's like they're talking to you and texting 12 friends at the same time. And there's no stopping it. I mean, the genie is out of the bottle where, you know, it's not we're not going back. Right. You know, so we do need to figure out, you know, how to make this, this tool, something that's, you know, going to be good for us and not ultimately harmful. And I don't have all the answers by any stretch of the imagination. But I do think, you know, some of the wisdom that we have learned from using other drugs also applies to social media, which is to say that we have to again put barriers in place that allow us to remain in control of our use, which means not not too much, you know, not too often, not too potent. Do you think in going back to this idea of the, the unit of the day, being a good, a tractable unit, a manageable unit of time for most people? So you're saying in advance, allocating two hours in which you're going to allow yourself to have free reign use of the phone and all its apps and all its things or even more restricted than that, meaning, okay, I'm only going to allow myself 30 minutes a day to post in comment. And then that's a close out completely. Yeah. So I think it's, it's, it depends on the person and sort of a combination. We talked earlier about, you know, having an itch and scratching yourself at night. We've gotten to a point with smartphones. People are pulling them out and they're utterly unconscious of doing so, pulling them out, you know, a couple of texts, a couple of soy. They don't know they're doing it. I have a friend who works and does delivers babies. Yeah. And many pregnant mothers won't actually deliver without their phone in hand. And this used to be the hand that was connected to their spouse. This may be a comment on on spouses more than on phones, but, but it sounds like there's it's a kind of a security blanket. Right. A transitional object. Yeah. Actually, that reminds me. You've referred to the phone. I think it's the phone, but maybe it's our online persona or our selves as we've become sort of infantile in our need for it's like a baby in a bottle. Right. And so I do wonder if we have a regressed and I do think we've regressed a bit in terms of our online behavior, our inability to act like I was thought an adult with somebody that can control their behavior. That's the difference between a baby and an adult. You don't have to be a developmental neurologist for very long to understand that young organism can't control its behavior in older one can. So to me, a mature organism mature in years organism that can't control its behavior is a baby. It's an immature version of itself. And there's neural, there's no science to support that statement. I look at my own behavior with the phone sometimes and I think I'm a grown man. Like what is the problem here? Right. You know, I don't eat baby food, but I'm acting like a baby with the phone. All right. In the sense that I'm reflexively picking it up. I'm not being intentioned and deliberate with it. Do I need a full 30 days? Yeah. So 30 days away from my phone. You know, that's my recommend to the full 30 days to reset. I think, you know, if you're severely addicted, I recommend the 30 days, but if you're just a little bit addicted like most of us, you probably don't need 30 days. In fact, a single day, not only would be challenging, but probably maybe sufficient. My phone is off for substantial segments. Okay. That's great. And it drives other people crazy. People expect me to respond. But I don't care. I really want. And I actually take a little bit of pleasure in the fact that, well, because I think the point I'm trying to make is the right one, which is that it's not just right for me, but like why? I don't see a clause on text messages or emails that say, must be responded to within an X amount of time or else. So I take the liberty of just replying when I, when I'm able to. Yeah. That's right. Yeah. Right. But which touches on one of the big challenges about social media is that as more and more of us are spending more and more time on social media, we're divesting our libidness energies, et cetera, from real life interactions. So that means even when we want to choose to not be online connecting, we go outside and there's there's no there there, right? There's nobody else there. So I think our collective challenge and it should be our mission is to make sure that we are preserving and maintaining offline ways to connect with each other. Because if we don't do that, then we'll be very lonely, right? If we were not online. But if you have a tribe of folks that you can be with none of whom are on their phones while you're together for that discrete amount of time, then it's wonderful and liberating and nobody's distracted. And I think that's really the key. And I think young people are figuring that out, you know, they're trying to create these spaces or try to let's say instead of doing a dopamine fast by yourself, do it with your friends, right? Then there's the FOMO is less if you're missing out because oh, you're all doing the dopamine fast together. So these are some of the tricks that we can come up with. I like that. Yeah, okay. Good. I don't allow I have a home gym and I love working out. I just enjoy it and I always have and I don't allow my phone in my gym anymore. Right. And I live in an area where I don't get any reception like two meters outside my door. Right. So all my dog walks now are just right. And they were boring as hell. I also have a bulldog. He doesn't like to walk. It's really slow. And it was so boring for a while. Yes. Because I was so used to taking calls right walking. It's super efficient. Yeah. When I do that. Yeah. The walks now are some of my favorite part of the day. Yeah. I read it. And if the phone were said, if I were to get a call on one of those and they brought reception to the area, I would be very dismayed. Right. So I can attest to this. And I don't think I'm a phonetic. But I do put work into regulating my. Yeah. So this is the key. You have to with intention prior to being in that situation, think of literal physical and metacognitive barriers that you can put between yourself and your phone or whatever your your drug is to create these intentional spaces where you're not constantly interrupting yourself, essentially, and distracting yourself. Because I really do think, you know, I think we talked just just before we started with the interview. You know, we're losing the ability to have a sustained thought, right? I mean, we get so far and then then you get to that point in the thought where it's a little bit hard to know what's coming next and it's very easy to check your phone or check your email or look something up on, you know, the internet. And then you never get that opportunity to finish that thought, which is really the source of creative energy and an original thought, right? You're not just reacting to right and something that could contribute to the world. That's right. I'm a big I'm a big believer that you're either consuming or you are creating, right? And there are there is I should mention it's important. I do believe in neutral time. I think sleep is great. I'm a big proponent of sleep and talk a lot about it on the podcast. He cares a lot about sleep and not just for sake of performance. I actually just really like sleep. I think that being a constant consumer of visual information and information of all kinds can be a problem. But there's some really great sources of information on the internet. And I certainly benefit from the fact that those channels exist. Narcissistic preoccupation. Am I a narcissist? First of all, there's there's helping. Or is the fact that I asked, does that take me out of what a narcissist never asked that question? Oh, yes. Highly sophisticated narcissists would note to do that. A lot of race of his today. So there's healthy narcissism, which means that we all invest our personal energies into things that we care about. And if our competence in that arena is threatened, we would all experience a narcissistic injury. And that's normal and healthy. But we are living in a narcissistic culture. I mean, that's not news. This preoccupation with individual achievement and individual self-worth and individual self-confidence. And I think all of that is just fueled by social media where we're not just seeing ourselves, but we're seeing people's reactions to ourselves and every single thing we say or do, we get likes and this and that. It's really insidious and it contributes, I think, ultimately to a lot of personal shame because we're not really meant to be individuals bouncing around in the universe. We're social animals. And we're probably generally happiest, even for natural contrairions among us when we're part of a tribe. Right? And if we do too much to kind of separate ourselves from that tribe, I think that the brain's natural and instinctive corrective mechanism against that is self-loathing and shame. So, you know, it's so ironic because the culture tells us if we just achieve more, we'll like ourselves more. But the truth is actually the opposite that I think when people get these pinnacles of personal achievement, you know, you have things like the imposter syndrome or whatever. You know, we're at Stanford after a lot of high achievers, you know, some phenomenal, amazing people like yourself and other colleagues of mine that just, I'm always in awe, like it's just amazing. Like the mean is shifted so high and also people who have amazing stork paths to get here coming from very little and accomplishing so much. But it's also the pressure. Yeah. Right? You know, the way that this career was described to me the day I got my job was one colleague of mine, the late Ben Barris said, welcome to schizophrenia. You're never going to be able to complete anything without getting interrupted. That was partially true, although I've created buffers. And the other one, very successful sign, does it remember the natural cabin, etc. I said to me, you know, just remember it's pinball. You never win. The best you can do is just keep playing. Yes. And I thought, wow, okay, okay. And then you just go. Right. But I think that as we achieve more, not just academics, of course, but as anyone achieves more, there's the relishing and the accomplishment. There's often the desire for more, but there's also the pressure of, well, now I have to do this for the next 30 years, even though I love it. It's the pressure of, well, if the mountain is this high, then how do I get here and here and here? And then you start shoveling more dirt on so you can keep climbing. And it's a lot of work. Yes. And I think that the the perception of success is that there's a roar of the crowd and you cruise. You don't cruise. And that they just give you more to do. Right. Or you give yourself more to do. Well, what I think is at least in my my life experience, and I've heard this from other people as well, you know, it's that prize that we're going for that if we get it is so unsatisfying. And it's the prize that we never imagined that we kind of go, well, how did that happen? But gee, you know, that feels good. And so I'm very, you know, it's cute. What's the thing? It's like a mirage in the one case. And it's like a like a yeah, it's on the one. It's almost like dopamine can create these mirages. Yes. That there's some place there. That's right. And if I just it's that part of gold, right? By constant dopamine. Right. That's right. That's right. Yeah. And I think this, you know, this really I think is related to our our discussion earlier about this taking it one day at a time or paying attention to that, you know, 24 hour period in your environment. I am absolutely fascinated by the ways in which we accumulate success when we do that totally independent of the desire for success. It's really process oriented. It's like where am I today? How can I make today a good and meaningful day a little bit better or as good as some other days I've had constantly tweaking and experimenting with this experiment that we call, you know, our human existence. And when we do that in a way that's authentic and paying attention and value driven, whatever our, you know, values are informed by. It is very, very interesting how those days again accumulate and you find, well, I guess I contributed something of value there, but I wasn't trying to do that. You know, I think that's really, I mean, what I'm so amazed by is like, you know, 20 years ago when I went to Stanford Medical School, 25 years ago, you know, I just I was happy to just be a good doctor. I was like, I guess I'm just going to try to figure out how to be a good doctor. I'm here to learn that. And now I see these medical students and they're wonderful. They're brilliant and they're well, they're all intentioned all that. But they're like, how can I, you know, write the great American novel? Do my startup go to Africa? Apply for that grant? You know, it's like really, I was just trying to learn how to be a doctor. And it's, as you say, it's a lot of pressure on them. And it's also kind of a weird leapfrogging of the real way to accomplish something. Right. Which isn't about like, oh, how can I accomplish something? It's like, what can I do today? That would be of service, right? And then finding that of trying to be of service. You know, and not really going for recognition can sometimes lead to what people call success, although that wasn't what you were aiming for. And it's all the more beautiful when it's not what you're aiming for. Oh, so much better, so much better. Yeah, I'm a big believer that when one can align their compulsion with some greater good service to humanity or the planet or animals, whatever it is, that that's where the really good stuff emerges. Because there's a lot of reciprocity there. The world starts to, you're supporting the world and then it starts to support you in a way that feels very fluid. And that comes back. Right. And I mean, that speaks to like your generosity to me. These are the my book. And I have to say, I love the book. I know there's like, we're not in a business deal, folks. It's just purely that I heard an lecture in my course. I wanted to learn more about dopamine. She taught me aster. If she would come on the podcast, turned out, she wrote this amazing book. She sent me a minute's copy of the book. I read it in one sweep. It's incredible. And I love it. So just like the eight year old version of me, now the 45 version of myself, I can't stop blabbing about the things I love. Well, it's awesome. But I have to say, I have been surprised by your generosity. It's not something I've encountered frequently at Stanford, which is a wonderful place. But there, there, there is a general sense that if I give away to somebody else, I've lost, I've lost something, which is not the right way to think about it, not how you are. And also not how the world works. Because when we give away to other people, we get back so much more. But it takes a long time and it might not come through that path. I never think about the about reciprocity. Yeah. But I was weaned by good advisors. No, that's very nice. Yeah. I think I just this or got drilled into me that the more, the more you give, the better your immediate life is. Yes. Yeah. But I also don't have a long-term vision. You know, I just I'm just excited about the book. I'm excited that people are learning about the brain and dopamine. I have to admit having grown up in neuroscience, essentially, I did not understand that pleasure and pain were orchestrated the way that they are. I'm very mindful of it now. Oh, good. And it's changed a number of my behaviors. I know a number of people are going to have questions and want to get in contact with you. You are not on social media. That's correct. Yes. You are true to your true to your ideology. That is great. And the reason for that is just I wouldn't be able to control myself. I mean, that really would be my drug. People are my drug. Inemies see as my drug and I wouldn't be able to manage it. And so just it was just easier for me to not do it at all rather than try to moderate it. Well, the book as you mentioned before and as I can attest to is it has a certain intimacy. People get to know you through the book. So, definitely check out the book. If you have questions about the book, etc., you welcome to send them my way. I will buffer you from all those questions. I'll filter them. And a doctor, Lemke, I should be a formal. Forgive me, I've been referring to you. No, no, that's fine. That's fine. It's true because we're colleagues. But thank you so much for sharing this information. And I know I learned a ton and I know everyone else is going to learn a lot more about addiction and the good side of dopamine. That's right. Thank you for having me. It's been really, really great to talk with you. Great. Thank you. Thank you for joining me for my discussion with Dr. Anna Lemke. I hope you enjoyed it as much as I did. Please be sure to check out her new book, Dopamine Nation, Finding Balance in the Age of Indulgence. You can pre-order it on Amazon or any places where books are sold. It's an absolutely fascinating and engaging read all about addiction and dopamine. If you're learning from Endor, enjoying this podcast, please follow us on YouTube by subscribing to the Huberman Lab channel. In addition, you can subscribe to the podcast on Apple and Spotify. And on Apple, you have the opportunity to leave us up to a five-star review. If you have comments or suggestions for topics for future podcasts, please put those in the comments section below this episode on YouTube. In addition, we have a Patreon. That's patreon.com slash Andrew Huberman. And there you can support us at any level that you like. Please also check out our sponsors that we mentioned at the beginning of the episode. That's a terrific way to support our podcast and our ability to continue to bring you zero-cost to consumer information about science and science-related tools. And last but not least, thank you for your interest in science.