The Great Simplification

Nate Hagens (00:00:02):

You are listening to the Great Simplification with Nate Hagens, that's me. On this show, we try to explore and simplify what's happening with energy, the economy, the environment in our society together with scientists, experts, and leaders, this show is about understanding the bird's eye view of how everything fits together, where we go from here, and what we can do about it as a society and as individuals.

(00:00:33):

It is an honor to introduce my next guest, Professor Robert Sapolsky, who at Stanford University is a professor of biology, neurology, and neurosurgery, as well as a research associate at the Institute of Primate Research at the National Museum of Kenya. Over the past 30 years, Professor Sapolsky has divided his time between the lab where he studies how stress hormones can damage the brain, as well as in East Africa where he studies the impact of chronic stress on the health of baboons.

(00:01:11):

Robert is the author of numerous books of which I have all of them, including his new book out in October called Determined: A Science of Life Without Free Will. This was a wide ranging, intense and challenging conversation. One of my favorite ever. Robert has had a big influence on my thinking these last 20 years, and it was a real treat to talk to him in person, even though when I scheduled the interview, I didn't know his next book was on free will. I'm still making my mind up on what I think on this topic, but this guy has been working on this for 40 years and this is an amazing conversation with insight into the constraints that biology poses for the great simplification. Please welcome Professor Robert Sapolsky.

(00:02:25):

Professor Sapolsky, welcome to the program.

Professor Robert Sapolsky (00:02:29):

Well, thanks for having me here.

Nate Hagens (00:02:32):

I know you well enough to call you Robert, but I've learned so much from you over the last couple decades that I feel Professor Sapolsky is more appropriate.

Professor Robert Sapolsky (00:02:42):

Well, all that does is make me feel elderly and having an enlarged prostate, so Robert's just fine.

Nate Hagens (00:02:52):

Okay, Robert, it is, so you have a new book coming out called Determined: A Science of Life Without Free Will and we're going to get to that, but it is very hard for me as someone who has all of your books, has watched almost all of your online biology lectures to pass over your decades of scholarship on the human brain and behavior that's relevant to the subject of this podcast, which is the great simplification. I know you watched my movie earlier. Let's start with this though, how and when did you first realize that you wanted to be a biologist and study animals and behavior?

Professor Robert Sapolsky (00:03:38):

I was about eight years old when I decided I wanted to be a primatologist, go study primates in the wild. I've run across a lot of field work people over the years, not surprisingly, and about two thirds of them grew up someplace exotic. Their parents were field researchers or missionaries or some governmental NGO thing in some exotic place. Then the remaining third would be people who grew up in some godawful urban like I'm trying not to use hellhole, but in some ways yes. Then at some point they stumbled into the Natural History Museum and imprinted on something and that was my version of it, the American Museum of Natural History. In retrospect, I probably could just as easily have imprinted on geckos or horseshoe crabs if I had taken a left or instead of a right in the hallway, but I wound up in the primate exhibit and that's it. I decided I wanted to go live with primates, non-human ones forever after.

Nate Hagens (00:05:00):

You wrote A Primate's Memoir and Why Zebras Don't Get Ulcers, but recently for a long time you've been at Stanford. When's the last time you've been to Africa and do you miss that type of work?

Professor Robert Sapolsky (00:05:13):

Let's see. The rhythm I maintained was nine months a year in a laboratory being a neurobiologist with a lab coat and during the summers, three months a year back out in a tent with baboons in the Serengeti. I managed to keep that going for 33 summers until 13, 12 years ago when things just fell apart there on a whole bunch of fronts and it was time to pack it in and decide 33 was pretty damn lucky. Yeah, I miss it.

Nate Hagens (00:05:48):

Yeah, I've been to Africa four times, including Kenya, Tanzania, Malawi, Botswana, Zambia, and I was enthralled every single time and I wish I could have in a different lifetime done something like you did. We are getting into the brain and behavior. Humanity and the biosphere are facing multiple interconnected challenges. In my own writing and speaking I point out and have for 20 years, that we don't so much have an environmental problem or an economic problem, but rather that most of our challenges emanate from a mismatch of the human brain, modern human brain from our ancestral environment. What do you think about that broadly?

Professor Robert Sapolsky (00:06:44):

I love your emphasis on that and your work. I mean, it's a obligatory cliche in my field to once every 10 minutes start a sentence by saying, "Well, realizing that for 99% of human history was spent in small hunter gatherer bands, it's a total cliche because it's true and it's incredibly important." Not only are microwaves like a relatively recent invention that don't particularly fit with our evolutionary past, but agriculture isn't either. Living in sedentary, settled communities isn't either. All of that is in a blink of an eye of the notion that culture evolves faster than brains do is at the core exactly of a huge amount of what ails humans.

Nate Hagens (00:07:41):

Historically, culturally, it's been common to think of our emotions, our psyche and human personalities as completely separate from the body and physiology. Back 30, 40 years ago, there was the standard social science model, but a lot of emerging work in the past decades, including yours, has suggested that that's not true and that these two things are in fact, deeply intertwined. Where did this separation come about in the first place?

Professor Robert Sapolsky (00:08:15):

Well, everybody has to pull out Descartes at this point who was going on about how animals are machines and humans have souls and that sort of set up the basic dichotomy that people have run with ever since between humans and other species, or between the brain and the body, or between the brain and the mind. What everybody's very fond of saying now is Descartes was totally wrong, which is animals have emotions and empathy and all of that also. My take is Descartes was totally wrong because yeah, animals are biological machines and so are we. We're just really much more complicated versions, but we're built out of the same stuff. Where the mismatch has become most interesting is when we're working with the exact same blueprint in the brain and the hormones, all of that, of any other species out there that we're just like them, we're just like them and then we go use it in a way that no orangutan could ever dream of. There you have the mismatch.

Nate Hagens (00:09:31):

It's so bizarre having a conversation with you. I just realized something as you were speaking that in reading your latest book, Determined, when I'm reading your voice is in my head reading the words like your voice and your diction. I didn't realize it until just now, but it's interesting because I've listened to so many of your lectures. I wonder if that's true for a lot of people. Building on your point in our culture, in our polarized social media-addicted soundbite culture, on the conservative side, a lot of humans don't actually believe in evolution. On the more liberal side, anything that is explained as having biological origins or biological explanations can now get you canceled. What do you think about that? Will it ever be possible for a plurality or a majority of society to have a broad understanding of the biological origins of human behaviors?

Professor Robert Sapolsky (00:10:35):

Well, just to be pessimistic, I think there's always going to be a divide and it's often going to be able to be framed in terms of a conservative versus a progressive orientation or a made excited by novelty versus made anxious by novelty sort of dichotomy. Amid that though, there's interesting stuff. A standard progressive stance is to have apoplexy when people start talking about biological roots, genetic roots, genetic inevitability of something like intelligence, and obviously, all sorts of right wing

ideologues have run with the pseudoscience of genetic determinism of IQ, things like that. That's exactly the dichotomy you've set up there.

(00:11:32):

On the other hand, when it comes to sexual orientation, the left has been pioneering and the notion that being gay is not a choice, let alone a choice that souls soils your extensive soul or whatever, it's a biological trade on a continuum, while in this case it's the right that says there's no biology there at all. It's a little bit a function of what the topic is, but all of that is within yes, indeed, this very narrow edge that one has to walk on these days between being canceled and going in a left position that places humane ideology way above scientific facts now and then. Then all the folks who want to burn science textbooks.

Nate Hagens (00:12:33):

Do you find it teaching at one of the premier universities in the world more difficult today than it was 10 or 15 years ago to discuss the biological origins of many human behaviors?

Professor Robert Sapolsky (00:12:49):

Yes, maybe a little bit. Every other year I teach this big class, it's been getting like five, 600 students per round in sort of the last decade or so about the biological roots of human behavior, human social behavior, and I always say for the next to last lecture, one of the biological roots of religiosity. I realized after a while that I didn't record it because it came back and bit me in the rear in some ways. Inevitably, my theme in it was religious belief or the lack of capacity for religious belief are biological phenomena just like anything else, and they're interesting to analyze and they've got all sorts of unexpected twists and it's complicated as hell and all that, but we're biological organisms and inevitably, there's always some religious students who are offended.

(00:13:52):

Very nicely, inevitably, there's always some religious students who instead have an epiphany and usually earlier in the quarter come to me and say, "Oh my God, I'm kind of having a crisis here," and I say, "Me too, that's what I had as well." At least they're not hostile. No one's condemning me to Hades. What I've noticed is the pattern

instead, is a few weeks later when they graduate, they leave me a little gift, which is always a little pocket Bible saying, "Please, please, please read this. I'm really concerned for you," so if that's my reversion to getting in trouble, that's okay by me.

Nate Hagens (00:14:36):

It's education at this level is kind of like selling insurance. You have to make 100 calls to get 10 meetings to have one sale and changing minds about the state of the world is difficult. On that note, I also taught for nine years a class called Reality 101. I'm just curious, you've been teaching, what, 40 years now almost? Do you have people from your classes 20, 30 years ago that reach out to you and say, "This was a foundational epiphany for me and it changed my life and my worldview?" I imagine you do.

Professor Robert Sapolsky (00:15:16):

I'd love to hear that every day, but more often than I've had any reasonable expectation of that sort of, but yeah, and it's very pleasurable. It's nice to see my ex students who are like chairs of psychiatry or this or that at med school. It's even more nice to see someone who's using a biological model now in the social work they've been doing for the last 25 years. I've got two ex students who are senators now, and one of them I take complete credit for and the other I run from in a panic. That counts as a net zero there. I won't use names, but education is kind of a cool thing. My father was a professor of architectural history in New York City, and at his death we went through the number crunching to figure out 14% of New York City's licensed architects had been in a class of his at some point, and that felt really damn good to see.

Nate Hagens (00:16:24):

That's cultural evolution.

Professor Robert Sapolsky (00:16:26):

Yeah. In a very exciting way. Students have learned all sorts of stuff about stress hormones from me, I've learned all sorts of interesting vocalizations from baboons. Yeah, culture rolls along and it involves acquiring new behavioral characteristics.

Nate Hagens (00:16:51):

Let's get into this. This is a difficult interview for me to have because if we weren't time or energy constraint, it would probably go on for five or six hours because there's so much to cover in your work that's relevant to the coming decades of humanity. Let's do just a real quick flash round on three hormones that seem prominent in your research on the brain and behavior, dopamine, serotonin, or sorry, well, we could include serotonin, dopamine, testosterone, and oxytocin. Could you briefly maybe tell a little story about what are the common misconceptions of these neurotransmitters/hormones and what roles do they actually play in shaping our behavior?

Professor Robert Sapolsky (00:17:38):

Great, and you're absolutely right to say the slash because it used to be testosterone only belonged to the endocrinologists, but then it's doing something neurotransmitter issue of the brain and dopamine used to only belong to the neurochemist. Yeah, it's on a continuum, of course. Testosterone, everybody knows exactly what testosterone is about, which is the hormone that makes you aggressive. It explains why males, the world over and species after species are such pains in the asses because testosterone causes aggression. Testosterone does not cause aggression. What testosterone does mostly is it amplifies, it increases the volume on the aggression that's already there, the aggression that's been socially learned, and that's a very different story. A perfect example of it, you take five male monkeys, they've formed a dominance hierarchy, number one, trashes two through five, two trashes three through five, all of that. You take number three in the hierarchy and shoot them up with testosterone, shoot them up with so much of it like he's grown antlers or something, and does he get in more fights?

(00:18:51):

Absolutely. Whoa, testosterone causes aggression, but what you might speculate at that point is as a result of that testosterone, number three is suddenly confronting numbers two and one and maybe toppling the … Nah. You never see that he still is just as brown-nosing with them as he used to be. All that happens is he's become a total nightmare to numbers four and five. All the testosterone has done is amplify the social learning that was there already. One and two, you have to pretend you like haircuts, four and five, you can do anything you want to, so let's do it 10 times as much as

normal. Testosterone doesn't cause aggression, testosterone amplifies what's already been socially learned. Testosterone even more so is about defending challenges to your status, but then humans have come up all sorts of circumstances where defending your status does not involve aggression.

(00:19:55):

Just look at a bunch of rich half drunk people at a charity auction and they're competing for status over who could give away the most money conspicuously. That one doesn't make a whole lot of sense when testosterone is all about aggression. In studies where people get status by being more generous, you give people testosterone and they become more generous. It's not about making you aggressive. It's a making about amplifying whatever you've learned is good for holding onto status in your little sliver of the universe.

Nate Hagens (00:20:34):

That's fascinating. I didn't know that. How we get status in our culture is we're probably going to have to change away from conspicuous consumption, et cetera, so testosterone will play a role.

Professor Robert Sapolsky (00:20:47):

Exactly, and I mean, what that tells us at the end of the day with human aggression, testosterone isn't the problem. The problem is that we hand out so damn much social status for aggression. That's the thing that needs to be solved. As you know, that's immediately intertwined with who's got how many toys and how conspicuously can you display it, et cetera, et cetera. We may not be economically rational, but we are economically competitive and testosterone just feeds into that in ways no other ape can make sense of.

Nate Hagens (00:21:28):

What about dopamine?

Professor Robert Sapolsky (00:21:30):

Dopamine, totally great, exciting neurotransmitter. Another one where everybody knows what dopamine is about, which is dopamine is about reward. It's about pleasure.

Cocaine works on the dopamine system, various euphoriants. You give somebody cocaine and they're releasing 1,000 fold more dopamine than some key parts of the brain ever do. Whoa, it's amazing. Dopamine's about reward, it's about pleasure and superficially it seems that way. You take a person or a monkey or a rat and you give them a reward from completely out of nowhere and they have a rush of dopamine. Yeah, that's great. Then you look more closely and what you do is you take a paradigm and it works this way in a human or a monkey or a rat, you train the individual that, "Okay, we put you in a room and as soon as the little light comes on, it means every time you press this lever 10 times, you're going to get a little reward." Signal work reward, signal work reward.

(00:22:39):

The organism learns that the college freshmen in psych 101 or the lab, whatever, and they learn this. You put them in the situation, the light comes on, they do the work and they get the reward. When did dopamine rise? If dopamine is just about reward, it rises after you get the reward. That's not what you see. It rises when the little light comes on. What's that about? That's you sitting there saying, "Yeah, I'm all over this. I know about this lever pressing stuff. This is going to be great. I'm like completely master of the universe at this lever pressing." Dopamine isn't about reward as much as it's about the anticipation of reward. We sure know endless ways in life in which the anticipation turned out to be better than the actual thing. Most importantly, if you block dopamine from being released at that time, you don't get the lever pressing. It's about the anticipation and it's about the motivation and the goal-directed behavior that's generated by that anticipation.

Nate Hagens (00:23:49):

Our entire economic system is turning billions of barrels of ancient sunlight into microliters of dopamine in anticipating what is better than the actual result of consuming all these non-renewable natural resources. It really is at part of the core of our current super organism energy-hungry dynamic of human society.

Professor Robert Sapolsky (00:24:14):

Absolutely, and a weird human specific feature of the dopamine system explains if you want to be grandiose, 99% of what's going wrong with this, which is like you're a

baboon, what are your sources of pleasure in life? You get to hassle somebody lower ranking than. You get to have sex. You're hungry and you eat something good. That's about it. If you're human, all of those things feel good but also, solving Fermat's last theorem feels good, and reading about acts of random kindness, and seeing an arousing scene in a movie involving characters who aren't even real, and listening to a symphony and smelling a flower in early in spring and all of that. We've got a system that has to incorporate responding to rewarding things that range from remembering a line of poetry to quadruple orgasms. And the only way you can get a dopamine system that could handle that large of a range is it's got to reset quickly.

(00:25:29):

It's got to habituate quickly. It's got to be able to go from, "Okay, we're now going from the good to bad poetry range. We're now going to the good or bad outcome of a billion dollar lottery and my one ticket range." It's got a reset frequently, and there's some totally cool research showing some weirdo wiring things about the human dopamine system that's very unique that probably explains the rapid resetting. That's great, but it sets you up for exactly the problem you've spent all your time thinking about, which is if the dopamine system quickly resets, by definition, whatever was an amazing reward that came out from nowhere yesterday is going to be what you feel like you're entitled to today, and is going to feel insufficient tomorrow. That's your whole world of what has gone wrong. We inevitably habituate to unexpected good stuff. Before you know it, not only is it like the norm, it's not enough anymore. We get hungry again.

Nate Hagens (00:26:42):

Can that be trained? I don't know you very well, so I don't know your own social media and internet habits, but being a professor of neuroscience and being a dopamine expert, have you created a firewall in your own behaviors so that your dopamine, your super highway can reset to normal things like flowers in the spring or playing with your dog or going for a walk in the forest, or what do you do about that?

Professor Robert Sapolsky (00:27:16):

Well, I try a little bit of a Luddite, so I think I'm protected from an awful lot of that pummeling, and I think I'm sufficiently large and upper generations away from where

the culture is at that not only don't I know how to access that stuff, but it probably isn't going to do dopamine things to me that it does for 18 year olds. In retrospect, in some ways, that's what spending three months a year alone in a tent in the Serengeti would do. The nearest electric outlet was like 90 miles away. Mail would be dropped off once every two weeks. We got water from a river, there was no electricity, all of that. You do that and baboons are interesting, but I think what kept me spending now 50% of my life going there back and forth is at the end of the day, you are so damn tired from the physical work and from the bright sun and from the cool things that you saw, and whatever rice and beans you're eating for dinner, you cannot believe how good it tastes. It's hot as hell midday, but there is a breeze and you're like euphoric.

(00:28:40):

That's the resetting. Of course, what I would find is back in this world, that would have wonderfully protective residual effects for about six and a half days.

Nate Hagens (00:28:53):

Yeah, interesting. I'm trying to do this silent Saturdays thing now just because as the podcast gets more popular, I have so many emails and social media and stuff, and it's becoming a little much, so I'm trying to ratchet down my baseline a little bit and just do mundane things on Saturday with limited success so far, because I don't have free will, but we're going to get to that. Oxytocin. What about oxytocin?

Professor Robert Sapolsky (00:29:25):

Okay, oxytocin. It's the grooviest hormone on earth. Oxytocin is about love and trust and social intelligence and all of that. Oxytocin is this amazing hormone. Best evidence is, it's about 100 million years old. What it first evolved for was the most basic thing that mammals were getting around to doing, which was making mothers get attached to their kids and kids attached to their mothers, which is really essential if you're going to do that mammal dependent on mom stuff. That's been around for about 100 million years. Best evidence is about

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30, 20 million years ago, it then got refigured and started being used as well for pair bonding, monogamy, and it's just a tiny percentage of social mammals that are monogamous, but they make heavy use of oxytocin. Whether we are one of those

species is a really interesting topic in and of itself because we're not but we're kind of a little bit and we're very confused. And then, I don't know, maybe in the last five million years, oxytocin then got reconfigured again for things like trust, and social cooperation, and generosity, and game theory settings, and all of that.

(00:30:49):

Here's the nuttiest thing we've done with oxytocin. This 100-million-year-old hormone, and in the last 20,000 years, we've reconfigured it again so that we secrete it and our dogs secrete it when we're looking into each other's eyes. Whoa, we're now using oxytocin for feeling attached to our ex-wolves. 20,000 years, a blink of an eye, and now we use it for that, and you give a dog oxytocin and it looks at its human longer. Okay, so everything about oxytocin there is great, and if we could just dump oxytocin in the water supply, this would be a wonderful planet. Oxytocin promotes prosociality.

(00:31:31):

It doesn't. Oxytocin promotes prosociality with people who you consider to be an us. People like me and your pet dog who you spend more on for food each year than your Sudanese gets in a decade counts as an us. What does oxytocin do when you're encountering thems? It makes you crappier to them. It makes you more preemptively aggressive. It makes you less trustworthy. Oxytocin doesn't make you nice. It makes you nice to people who already count as a you and it makes you awful to thems. It just takes this us/them fracture line we have in our heads and it just pushes it apart further, and amazing studies showing you give people oxytocin and they become more cooperative to their team members and they become awful to the people on the other team. It is not this groovy hormone. It is this hormone that makes parochial provinciality more dramatic, and that's not often a good thing.

Nate Hagens (00:32:39):

It is just so obvious to me how critical biology and where these neurotransmitters originated and why and what they're doing to our behaviors and our culture are so relevant to what we face. What do you know about how oxytocin or anything else can change the dynamic or who is us and who is them? How does that change?

Professor Robert Sapolsky (00:33:10):

Well, what it's really ideal for is what a lot of these hormones affect social behavior are good for. You get someone who's super aggressive and testosterone makes them more aggressive. You get someone who's incredibly altruistic and pro-social and oxytocin probably makes them more so. Who you want to get are the folks in the middle when they're looking at an ambiguous stimulus. Is this face angry, threatening, or what? And most people would say, "Looks neutral to me." Give someone testosterone and they now perceive it as being threatening. Take a neutral face and give somebody oxytocin, and they're now more likely to look at as friendly or trustworthy.

(00:33:55):

Where these hormones do their most modulatory things is the gray zone where what you're perceiving really is much more in the eye of the beholder than the external realities of your perceptions. It's really good at influencing interpretations in the gray zone, and that's... Once again, it doesn't really require a hormone to have hated Nazis even more than you hated them before, but depending on which politician is spouting which stuff, a hormone that turns a neutral, ambiguous signal into a strongly felt one, for good or bad, that's where you really see the interesting consequences.

Nate Hagens (00:34:41):

It's so fascinating. So I want to get to your new book, but one of my staff members is a fan of your work and she wanted me to ask something related to one of your books, Why Zebras Don't Get Ulcers. You talked about stress, and for an individual making a decision now, the effects of stress in the last few months of their life will, if I understand it correctly, shrink the prefrontal cortex and enlarge the amygdala affecting whatever decision that that individual will make. So following the logic of the great simplification that we're approaching the peak of the carbon pulse and we're going to have less energy to power society, if individuals who are barely having their basic needs met, stressed out in terms of survival, are those individuals less likely then to be pro-social and more prone towards violence, and in fact, in a society with less access to resources and lower standard of living, does that itself change the brains of its citizens immersed in that, causing negative feedbacks and less trust, et cetera?

Professor Robert Sapolsky (00:35:55):

Yep, absolutely, and in all the bad ways especially you might imagine. It's not just in the previous few months, it's already you look at… This is one of these findings where you should be up and screaming at how the world works this way. You use some totally fancy brain imaging techniques that you could use on a fetus, and by a third trimester fetus, their mother's socioeconomic status is already affecting their brain development by way of the mother's stress hormones. So it's not just in the last few months, it's starting from when you were still mostly being fed by Mom's blood and her stress hormones. So in that regard, it's an entire lifetime worth of good or bad luck that is sculpting your brain into a more reactive this or a sluggish that, and all of that absolutely plays out.

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In terms of your specific question of a world of more and more deprivation, hunger, fear, stress, uncertainty, all of that, temperature, ambient temperature in cities, the ambient temperature on a particular day is a statistically significant predictor of levels of violence. As this planet gets hotter, cities are going to be more violent. You look at people, not where they live now but where they grew up, and you look at people who grew up in cities versus rural areas and there's structural differences in their brain on the average. Whoa, is this pertinent to our everyday lives? Absolutely, and I think we're three and a half years into seeing one of the most tragic versions of it, which is for about a week or so into COVID, everyone said, "Wow, we're all in this together." That lasted about a week, and all it has done is polarized people and bring out the worst in an awful lot of people, while bringing out the best in some people, but exaggerating us/them contrasts and making empathy totally tunnel visioned.

(00:38:09):

That's been awful seeing that for the last three and a half years, and just to be really pessimistic, oh my god, there's this new virus that suddenly is the most important thing in the world. We blew it with our response to that. That's a pretty unappealing trial run for what the equivalent's going to be when our cities are flooding and there's not enough crops being grown anymore. Yeah, this was not a good dress rehearsal.

Nate Hagens (00:38:37):

Yeah, I hear you on that. So if it were possible and fundable and there was political will, if we truly cared about the society of the future and what Palo Alto and San

Francisco might look like in 2050 or any city in the world, wouldn't it make sense to invest in third trimester security and oxytocin with groups of happy people surrounding pregnant women so that they don't have stress? I don't know how feasible it is, but would it pay dividends over decades if such a thing were pursued?

Professor Robert Sapolsky (00:39:23):

Actually multiple lifetimes which brings in this... Okay, so how did your brain construct? Genes had something to do with it, but environment beginning in fetal life has something to do with. What does that actually mean on a nuts and bolts level? Environmental stimuli starting from where you were a fetus to what you had for breakfast this morning will change which genes in your brain are active and which are turned off, and in some cases will turn some of them on permanently and some of them off permanently. And then there's these amazing mechanisms, something that's called non- Mendelian inheritance of traits that because of something in the world you developed in, you have a body with a certain physiological profile such that when you are pregnant, you will pass on some of those traits to your fetus, not through genes, but because of the hormonal environment that's been generated, things like that, where it will affect your parenting style in a way that will produce a kid who as an adult will be just like you. Some of these things are multi-generational.

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Now, amid that, you've got this narrow line to sort of tread there, which an awful lot of social progressives have to do, which is, wow, adversity, societal adversity, social adversity, all of that is so, so bad for you that could actually have multi-generational consequences. Wow, that's really bad. That's really bad. But where the temptation then is to say, and these are such strong effects, there's nothing we could do about it.

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The other side of it is there's very little of that biology that winds up being written in stone. Interventions at every point in life can undo some of those things. It's this whole trendy, sexy field called neuroplasticity. You make the environments of 90 year olds more sensorially stimulating, and at postmortem, they were making new neuronal connections in a part. So wow, bad stuff leaves long, long scar tissue, but it's reversible. How do you reconcile these two that seemingly are contradictory? Yeah, bad stuff leaves consequences for a long time afterward, and the longer you wait to try to

reverse it, to try to counter it, the more of an uphill battle it's going to be. You want to fix somebody who has been mired in the neurodevelopmental consequences of poverty, do something about it when they're four years old, not when they're applying to college.

Nate Hagens (00:42:15):

Thank you for all that. Let's move on to your new book, Determined: A Science of Life Without Free Will, which, as I looked this morning, is available for pre-order on Amazon and elsewhere. Can you give an overview of the main thesis and maybe in there please start by defining what you mean by free will?

Professor Robert Sapolsky (00:42:36):

Okay. I published this book about five years ago called Behave: The Biology of Humans at Their Best and Worst, and it was like the original draft was a thousand pages and my publisher had a panic attack and it was eventually merely an impossible 700 page. It was how do you understand where social behavior comes from. Yeah, it was caused by neurons one second ago, but it was also caused by whatever environmental stimuli in the previous minute made those neurons do that, and it was also caused by your hormone levels this morning that made this or that part of the brain more or less sensitive to these stimuli, and it has to do with trauma or stimulation in the last year, and it's got to do with adolescence and fetal life and your genes interacting with all of that, and what's most charming to me, it also has something to do with what kind of culture your ancestors invented 400 years ago because that's going to have affected how your mother was mothering you within minutes of birth, cultural differences with that and thereafter.

(00:43:47):

So everything from like was there a good or bad smell in the room just now affects people's opinions about social politics to were your ancestors dealing with a high infectious disease load and thus they were spooked by foreigners coming in, and that influences cultural differences in xenophobia today. All of that stuff matters. So I'd stand up in front of a bunch of people and go on about this for 60 minutes, and at the end, the ones who were still standing, inevitably someone would say, "Whoa, this seems to kind of challenge the notion of free will." My immediate response was, "Uh,

yeah, you think? I haven't believed in free will since I was 13 or so." But it was a little bit of a revelation of, okay, I got to do a son of that previous book and make explicit when you put all these pieces together, there is no room for free will whatsoever.

(00:44:53):

We are nothing more or less than the biology which brought us to this moment over which we had no control and its interactions with environment that brought us to this moment over which we had no control. So the first half of the book is trying to, in a less screechy way, convince somebody of that, and basically go after all of the contemporary, compatibilist arguments where you don't have to deal with like a medial peasant, you can deal with someone contemporary who says, "Yeah, atoms exist and molecules exist and neurons are for real," but here is somehow how you still pull free will out of the rabbit's hat there of taking on the contemporary arguments for free will.

(00:45:40):

The second half of the book is the one that's been much more challenging to me since I was 13 which is, okay, okay, you convinced me there's no free will, I give up. Okay. Oh my god, what if people actually started believing this? How are we supposed to function? What's the world supposed to look like if we all accepted that there's no free will at all? What the second half of the book is about is trying to wrestle with that and the themes over and over and there are, number one, the roof isn't going to cave in. We're not going to have murderers running throughout the streets because over and over we've been able to deal with subtracting responsibility out of our understanding of where behavior comes from, and not only doesn't the world run amuck at that point, it's become a more humane place. Wow. Witches really don't cause hailstorms. So that is one point.

(00:46:42):

Another is this sort of knee-jerk response of, oh my god, if it's deterministic world and there's no free will, does that mean nothing can change? No, it means this is exactly how we change. Here's the biology of how you turn Nazis into ex-Nazis 40 years later who were remorseful, all of that. I guess the third final theme in there is if you look at this, and this is depressing as hell, oh my god, maybe my corner office in my corporation and my sense of self-esteem that I've gotten from that wasn't earned

because there's no free will or whatever. What a bummer. Maybe this leaves a big existential void. If that's your response to there being no free will, you're one of the lucky ones. From most humans on Earth, their experience isn't being given credit for stuff that they really aren't worthy of being credited for. For most humans, it's being blamed for stuff that was out of your control. A world in which people stop believing in free will is going to be a hell of a lot more humane.

Nate Hagens (00:47:51):

I have a lot of questions, Robert. I sent a note around to my inner circle about a week ago in anticipation and preparation for this interview, and the response on this topic was very polarizing. There were some people who thought... There were three responses and three groups. One group was like, "It doesn't matter. We've been having this discussion of free will for centuries. A book isn't going to change that." There was another camp that said, "This is horribly dangerous because it could lead to nihilism at a time when we need a pro-social response from more people." And then another camp, which was actually the majority, including my girlfriend, they felt liberated by it because it got them off the hook of things that had been bothering them and they're content in their own lives. So it made them, this is what I'm good at, this is what I'm doing.

(00:48:50):

So it was really fascinating, three categories of response, and these are largely intellectual, well-read people that I shared it with. But before I ask you further questions, could you just define what you mean by free will? Is it a binary thing, yes or no, or is it a spectrum or a continuum?

Professor Robert Sapolsky (00:49:14):

Yeah, and this part of the debate itself, and apropos that and your canvassing people, it's interesting that you didn't get, in fact, the most common response, including people who think about this a lot, including people who make a profession thinking about this a lot, saying, "Yeah, yeah, yeah, this is how the brain works, this is how genes work, but somehow, I still believe in free will and it's still there," which is very different from your people who said, "Oh my god, nihilism." The people who say, "Well, even if there isn't free will, we probably shouldn't tell people that because things are going to go crazy

after that." Most people somehow are, the term is compatibilists. They're able to believe in things like 21st century technology and science and stuff, but somehow there's still a way of getting free will out of there, and that's 90 to 95% of contemporary philosophers. So you've got to-

Nate Hagens (00:50:14):

It's almost like a religion then, like I'm not going to die, climate change isn't going to be a disaster because the truth is so painful that you don't... It's like cognitive dissonance of sorts.

Professor Robert Sapolsky (00:50:25):

Yeah, and of course the most interesting ones are these super smart philosophers who go on and on in books that I can't understand about how yes, yes, yes, I'm willing to admit I believe this is the physical universe, but here's where we get free will from, and when you really, really look at what they're saying and when you look at their YouTube lectures and you look at where their faces get sort of wince-y and pained looking and stuff, most of the time what they're saying is, "Please, let's pretend there's free will because, damn, this is going to be scary if there isn't," which puts you one of those circles of your friends.

(00:51:08):

Okay, so what do I mean by free will? People who get gummed up with free will stuff in the legal realm, it's always stuff like did you know you had options to behave differently, were you aware of what the consequences would be of the option, you did choose. That's all the stuff about intent, and that's completely boring to me.

(00:51:34):

Then there's a whole school of people, neurobiologists, who think about free will and what they say is something that's sort of like the cousin of the legal approach which is when you first become aware that you intend to do something, is it possible to show that your brain already decided to do that. Is the awareness, is your sense of intent just the total red herring? And in fact, your brain decided before you think you're decided, whoa, there's no free will. This was from some landmark experiments in the 1980s and people have been fighting about the interpretation of that ever since, and it's not clear because... And it totally bores me also because both the legal realm and

the, ooh, when do you become aware of intent, and is that different from when you become aware of being aware of intent, and here we're going to fight that for the next 10 years between the neuroscientists and the philosophers.

(00:52:39):

None of those people and none of the legal people ask where did that intent come from in the first place. That's where things fall apart because the intent came from what those neurons were doing a second ago and what the hormones were doing this morning and what your fetal life and genes and culture and all of that. When you look closely at that, there isn't a crack in that edifice of biology-interacting environment from what your ancestors were up to to what happened a millisecond ago, there isn't a crack in there in which you can shoehorn in this non-biological notion that there's free will.

Nate Hagens (00:53:20):

So one of my coaches talked to me about meditation and other things and shares this famous quote from Viktor Frankl, "Between stimulus and response, there is a space. In that space is our power to choose our response. In our response lies our growth and our freedom." I've always loved this quote, but in light of your recent book, what are your thoughts on that quote?

Professor Robert Sapolsky (00:53:53):

It's beautiful. It's clearly what was needed to sustain people who survived concentration camps, and Viktor Frankl was one of them, but he understood the reality of it. People who became depressed and gave up in concentration camps died. People who were able to, quote, "choose to hold onto what mattered to them," and their sense of self-worth and whatever and had these amazing abilities to resist during this hell hole, they only survived if they had all those admirable traits, plus a hell of a lot of luck because if you didn't have that luck, if your number came up today, it didn't matter how optimistic your basic temperament was. So he was taking basically the lesson that got him through that, and it's incredibly powerful.

(00:54:52):

Nonetheless, that's not how the biology of it works. You look at somebody in a concentration camp who sunk into depression and they were dead two months later,

even before starvation was enough to explain it, and you look at someone like Viktor Frankl who was able to find meaning in life, plus a hell of a lot of luck got him at the other end, and it's not by chance that those two people differed.

Nate Hagens (00:55:20):

But maybe it's the belief in free will in this case was more important than actual free will.

Professor Robert Sapolsky (00:55:27):

Absolutely. On the other hand, if you believe you were responsible for the fact that you haven't become rich just because you happen to have been born poor, that's not a very good recipe for coming out the other end feeling good about yourself. Okay, here's a great example of this. One of the stupidest ways in which we could think about, ooh, biology affects our perceptions of us like the shape of your skull. The shape of your skull, how symmetrical it is, whether the zygomatic arches underneath your eyes that make your cheekbones are of a particular shape, yeah, it's got nothing to do with free will. We know bone morphogenic proteins and all of that, and it just so happens that in one realm, if you luck out and you have one of these nice symmetrical faces that counts as more attractive, people like you more, they treat you better, they unconsciously are more cooperative with you, they're more likely to vote for you.

(00:56:35):

So you get somebody who is sitting in the corner office and part of it is that they've got magnificent cheekbones, and whoa, there's no free will, maybe you shouldn't feel quite so proud of all your accomplishments because your cheekbones are just the first of the zillion things that you didn't control. But then in another setting, if you're sitting in a defendant's seat in a courtroom and you happen to have those cheekbones that are not of the beautiful type, you're more likely to get convicted. The attractiveness of a defendant influences, for the same exact circumstances with mock juries and experiments, the likelihood of getting convicted. People who are more attractive, African-American men who have less Afro stereotypical features to their face are less likely to get convicted. That's not stop feeling so good about yourself, about your corner office. That's you were more likely to get sent to jail because of this dumbass business about the symmetry of your skull. What kind of world is this?

Nate Hagens (00:57:44):

What does 18-to-20-year-old listening to this podcast who does not have a symmetrical face to make of what you just said?

Professor Robert Sapolsky (00:57:54):

It sucks. It sucks because this is a very deeply ingrained... Primates and other animals like more attractive organisms. Fruit flies like more symmetrical ones, and symmetrical here is just the tip of the iceberg of all the versions of good biological luck. It sucks. Amid that, the notion that there is an average, that there is a norm out there, this is what a normal person is supposed to look like, this is a normal height, this is a normal degree of extroversion, this is a normal degree of beauty, this is a normal, normal is an emergent artifact. There is no normal. There is no human who is normal, and normal is an artifact that every one of those traits, just to get all chaos theory stuff, is a strange attractor. Nobody is normal. What we call normal is people whose collections of traits are statistically closest to what we've decided counts as desirable and healthy. There's no normal out there that you're failing to live up to.

Nate Hagens (00:59:15):

Is there something interesting on the other side of this that someone listening to this or even myself, when I hear you don't have free will, I'm like, "Hell yeah, I do. I'm going to show you," and it actually becomes a flipping moment where it may not actually be free will, but it may become dedication or motivation that was nascent within them towards some life of purpose or something different that was triggered by someone telling them they didn't have free will, what do you think about that?

Professor Robert Sapolsky (00:59:53):

Yeah. Here's a scenario I've experienced, I can almost see it coming, and I'm not trying to sound snarky here, but it's kind of like this-

(01:00:03):

Trying to sound snarky here, but it's kind of like this. I'm sitting there, I have office hours, two students are there taking my class and they're saying, I don't know about this free will stuff, but what about I feel like I'm having free will and I'm saying there's no free will and here's the biological explanation for what you just brought up.

(01:00:20):

And at an incredibly high rate over my 40 years of doing this, at some point of the students is going to lean forward, pick up a pen and say, "I just decided to pick up that pen. Are you telling me I had no free will on this?" And over these years asking the question, which of those two students are going to do that? And I will bet you I have about 85, 90% predictability.

(01:00:51):

If I know one of them is male, one of them is female, I'm betting it's more likely to be the male. One of them is male who's heterosexual and the female is attractive, I'm betting it's more likely to be the male. One of them is first generation from an immigrant group that came here as refugees. They're less likely to challenge me. One of them hates their father and I keep reminding them of that.

(01:01:17):

They're more likely to challenge me. One of them had higher testosterone levels this morning. They're the one who's more likely to challenge. One of them has more self-esteem problems and the one time they stood up to a bully in middle school, they got a sense of self-esteem from that. They're more likely, tell me how their frontal cortex is wired. Tell me what their fetal life was like.

(01:01:38):

Tell me what culture. Tell me if they're fourth generation going to my elite school or if they got in as a fourth generation, they're much more likely to want to take on some dead white male sitting there. First generation, they're more likely to feel grateful or intimidated about challenging. Throw all those variables together. And I got like 90% predictability with that and that's because where did that intent to pick up that pen just come from? Where did that intent in the other person did not pick up the pen where it came from? It came from one second before and a decade before and a thousand years before and all of that.

Nate Hagens (01:02:24):

Wow. I was about to tell you something that happened to me this morning, but then you're going to psychoanalyze me. But on the days of our podcast, I go for a long bike ride because it oxygenates me and I came back and I was craving like protein, an

omelet with cheese and I was opening the fridge and it wasn't like I'm going to show Robert. It was unbidden to me and I said, you know what? I'm not going to have an omelet. I'm going to have an oatmeal. So I didn't want oatmeal, but just to prove to myself it's a tiny little trivial example, but is that free will? That in the moment I changed what I wanted to do but kind of because I wanted to prove you wrong a little bit or what's going on there?

Professor Robert Sapolsky (01:03:10):

No, of course not. There was no free will there at all. Okay as a canonical example, if you grow up thinking your parents are the greatest and as an adult you wind up exactly like them, you didn't choose to be that way. If you grow up and circumstances has caused you to hate and despise your parents and as an adult you make sure you do exactly the opposite of them in every single possible domain. You are just as determined, there's no more free will in that case than the other. Or if you've decided you love some of these attributes of them and hate others. So you're a hybrid of them. Okay, so you this morning after the bike ride looking in there, so first thing, where did your self-reflection come from? You didn't choose to be someone capable of emotionally intelligent self-reflection and examination of your motives and behaviors. Next, where did your sense of, to the extent that I represent any sort of neuro biological authority, where did your sense of occasionally challenging their bullshit come from?

Nate Hagens (01:04:25):

You're higher up on the baboon hierarchy than me.

Professor Robert Sapolsky (01:04:28):

Well, in talking about how neurons work, I definitely am, in navigating the social world, my guess is I'm definitely not. But where did you become the sort of person who would want to say some version of, I'm going to show them? Where did you become somebody who would have critical thinking and enough respect for critical thinking to think critically and say this maybe constitutes a refutation of this stance? That didn't come from nowhere. If you had grown up marinating an alcohol from your mom when you were a fetus, you wouldn't have been capable of that critical self-reflection, if you had grown up in a culture where they said what you were told is true and do not

challenge authority or if you were grown up in a culture where your ethos is anything the man says is and you should challenge it.

(01:05:27):

You didn't choose which of those cultures and every one of those steps along the way, nor did you choose the neurochemical makeup of the part of your brain that does starch craving, versus protein craving. And depending on how those two places were wired, through no credit to you, it would have something to do with how readily you could think about this intellectual thought experiment of taking on the stance that there's no free will and showing that it's not really the case here by foregoing starch instead of protein. Maybe in some other case the reinforcement you would get from one of those was so powerful that you would do the, I'm going to show him, in some other setting. You're going to wait for the next elevator instead of cramming in there. You see, I chose to do that because you happen to have a brain that's wired for really, really liking starch after a bike ride. So that's not where you would've done that experiment. Every one of those steps, none of that was free.

Nate Hagens (01:06:32):

So actually that brings up another kind of profound insight while you were speaking, and I don't want to make all these examples about me, but when we're talking about free will, I only know my own brain. So I worked on Wall Street, I was a teacher and then all of the sudden I've got this podcast and it's becoming more popular, I'm getting emails from around the world, I'm getting traction with people in government, with universities, and it feels like my life is no longer my own. And listening to you speaking, it makes me even more have a fiduciary responsibility to these times and to help midwife society through to a softer landing than the default. And you talking about that we don't have free will, actually makes me feel more of that drive and that acting as a golden retriever, Overton window sort of vector in these conversations. What's going on there as I'm feeling that?

Professor Robert Sapolsky (01:07:48):

Well once again, you're proving there's no free will because lots of other people at your juncture would decide it's hopeless and instead you take this information and you've turned it into some sort of moral imperative to try to make the world whole.

That doesn't happen by chance. That's not random. Who's capable of doing that? Lots of people who find out about this collapse into self-interest or a nihilistic nothingness or, where did that response come from? That's an incredibly healthy response, especially for all the people in the world around you. That's a great way and that didn't come from out of nowhere. Nothing comes from nothing.

Nate Hagens (01:08:34):

But like your dad had 14% of the architects had learned from him. Cultural evolution can happen that way irrespective of whether there is free will or not.

Professor Robert Sapolsky (01:08:49):

Of course. But whether culture evolves isn't dependent on whether or not there's free will, I don't think there is free will. Cultural phenomenon could be explained with the same biology interacting with environment, blah blah, blah that I've been spouting. Cultural evolution could be explained by the myth of free will as well. It's in some ways a separate topic until you start getting into what were the nuts and bolts about how the culture just evolved.

Nate Hagens (01:09:18):

So what about free won't. So about 10 years ago, I like you, love dogs and I realized that pigs were smarter than dogs or as smart and one of my favorite things to eat was bacon, lettuce and tomato sandwiches. And my girlfriend didn't eat meat and I'm like, I'm giving up pork, but it was very difficult. So I created this image in my head of trucks on the highway that had pigs in them, but instead they were dogs. And I had this visceral negative response to any menu with pork on it and I haven't had pork in 10 years. So that's not free will, but I call it free won't. I decided something that was ethically important to me and I created a way for my neocortex to trump my limbic system in the moment. How do you explain that?

Professor Robert Sapolsky (01:10:14):

It's a little bit of a semantic issue as to what counts as free will versus free won't. Your experience can be an example of free won't, I'm not going to eat pig anymore, or it could be an example of free will. I'm going to stick to a moral stance of mine. So it's a little bit semantic and insofar as it's semantic, it's the same answer where'd that free

won't come from in you. First off, where'd your knowledge of what gets done to pigs, where did your love of dogs come from? Where did your capacity to generalize empathy from dogs to pigs, where did your knowledge of pig intelligence come from? Where did your frontal cortex get the means for you to look at the bacon, lettuce, tomato sandwich on the menu and somehow to suppress the associated cravings and instead pull up an image of terrified dogs in a transport truck?

(01:11:20):

Your mother did something right by you that you have a frontal cortex that was capable of regulating impulsive cravings to that extent, because that got constructed at you at some point. Your brain is of a type where whatever rewards bacon gives to your... The correct neurons in there, it's not so powerful that it overwhelms your capacity for emotional regulation. And it's quite possible that you have lurking in there a craving for something else that you wouldn't be able to override. You have for sure not because you lack self-confidence, self-discipline there, but because oh, your wiring Ben and Jerry's ice cream sets off neurons that will not be said no to, but bacon didn't, once you set your conscious frontal cortex to it sufficiently.

Nate Hagens (01:12:20):

So if there is free will, would it reside in the frontal cortex?

Professor Robert Sapolsky (01:12:29):

Well, again, not to sound snarky, but that's a hard one for me to answer because that's in a sense asking me if the tooth fairy existed, which neurons would-

Nate Hagens (01:12:43):

Let me rephrase the question. Let me rephrase the question. So in the Amazon bio for Determined, they write that, "Sapolsky mounts a full-frontal assault on the pleasant fantasy that there is some separate self telling our biology what to do." But couldn't biology itself in our ancestral environment, created via evolution and adaptation, such a separate self from novel historical circumstances that is the part of a body that exerts control in certain situations, in my situation to decide not to eat pork?

Professor Robert Sapolsky (01:13:28):

Well, yes and no. This puts us into sort of your area of thinking about emergence, it's this totally cool phenomenon. One of the most interesting things about neuroscience is you take a neuron from a fruit fly and you take a neuron from us and they're the same thing, they're the same cell, they use the same neurotransmitters, the same wiring. We did not become human because we invented new parts of the brain or new types of neurotransmitters. What happened instead is one of those more is different scenarios of, we've got a hundred million neurons for every neuron that a fly has, and you put that many of them together and unexpected, complicated, adaptive, totally beautiful stuff emerges. And the interesting stuff in our brains are emergent phenomenon, like you give a chimp as many neurons as us and it would come up with theology, it would come up with a totally different theology and it would come up with aesthetics.

(01:14:32):

It would come up with, okay, so why isn't free will just an emergent phenomenon? The belief in free will, the invention of the notion, the emotional connectedness to it and dependence upon the notion is certainly emergent, but free will is not, because neurons don't work that way. Okay, what do I mean by that? The coolest thing about emergence is you take an ant and it's making no sense at all, and you put 10 ants and they're just doing random incoherent stuff, and you put 10,000 of them and they build a whole society. And it's not because when you get 10,000 of them, suddenly the ants understand geometry or something. They know exactly the same, simple, stupid few local neighbor interaction rules that they did when there was just three of them. But when you put enough of them together, out pops this. And all of the models for how free will can be an emergent property requires you to break that rule and instead allow that.

(01:15:48):

Once you get enough ants together, all of the ants can speak French and once you get neurons together, all of them could work in ways that the physical universe doesn't allow. The coolest thing about emergence is you look at our brains inventing stuff and we're made out of the same cells as drosophila brains are and they're still doing the same stupid things. The amazingness is what is totally provincial three or four local neighbor rules and suddenly you throw enough of them together and they're still just as simple. That's the thing that makes me almost want to weep at how cool emergence is and it explains so many things out there, but any model in which you have to

speculate that the emergent metal level property now suddenly gets the ability to reach down to the micro level of the constituent parts and make them work differently in much cooler ways, it can't work that way. And every version of free will coming out of emergence requires that.

Nate Hagens (01:17:03):

My work, and you watched my movie recently, looks at the emergent constraints of the macro human economy, the 8 billion ants, 8 billion humans that no one is in control and that society, at least for now, is this functioning as an energy hungry. But your recent work suggests the same is happening at the micro level in an individual brain of sorts. So am I correct in saying that biology constrains both our micro and our macro systems, but it doesn't determine it? What do you think about that?

Professor Robert Sapolsky (01:17:44):

Well, of course I'm going to disagree. Because I don't think it just constraints, when you look at all of the biological influences from a second ago to a million years ago and you look at all the ways the biology interacts with environment, not only isn't it constraining or facilitating, that's all there is. That is what's there. That is who we are. That is how we arrived at being who we are at this moment. There's nothing but that. But you bring up, and you're bringing up the micro level stuff. One of the inevitable things that people get pulled to at this point, which is, oh, a deterministic universe and deterministic interactions of deterministic biology and interactive ways with deterministic environment, blah, blah, blah, et cetera. What about quantum and indeterminacy?

Nate Hagens (01:18:40):

What's that?

Professor Robert Sapolsky (01:18:42):

That you get down to a sufficiently micro subatomic level and events right now were not caused by the events that just came before that, there is complete unpredictable randomness about how subatomic particles work and people still are boggled by it and don't fully understand it. And there's still a counter-revolutionary old guard of physicists who say there's got to be actually a deterministic thing lurking in there

someplace. But on a very, very subatomic level, things appear not to be deterministic and are totally random. And thus, what do you know, there's a whole school of philosophers who say free will comes out of quantum indeterminism and that doesn't make any sense either.

Nate Hagens (01:19:33):

So let me go down a little bit of an academic rabbit hole here. My PhD advisor who's since passed away, Charles Goodnight, was an evolutionary biologist who focused on multi-level selection. The fact that it wasn't just selfishness, but it was the individual competitiveness with group behavior, with maybe some bacteria or things in your gut that our selection happened at multiple different levels and he called that contextual analysis.

(01:20:08):

So with respect to free will, doesn't it depend on multiple scales and dimensions? Like what's happened to an organism's life? We say organisms have will, which might also describe as desire or preference. So an organism feels hunger, okay, so it seeks food, finds it eats, is satisfied. Then other drivers kick in after it's satisfied, it has defense or shelter or to go to the bathroom or to mate. So these are all genetic programs with chemical rewards, but what about this case? The organism feels hunger, but because of the complexity of its emotions, its life, the society, it considers whether or not to act on that feeling. And especially if it's a human organism, such a complex animal with hundreds of millions of neurons, it might weigh or defer or change the paths because of these other contexts in its life. So how does context fit in with free will, especially with human animals?

Professor Robert Sapolsky (01:21:17):

It's beautiful, it's incredibly important and I have such respect for multilevel selection people just because they were out crying in the wilderness for such a long time. People like David Sloan Wilson and-

Nate Hagens (01:21:32):

He's been on my podcast. Yeah.

Professor Robert Sapolsky (01:21:34):

Okay, he's great. And he was like a pariah for until, not in an act of kin selection, but David Sloan Wilson and E.O. Wilson decided that they actually agreed on more things than they disagreed about and it was totally beautiful and the resolution was context. In some settings, this is the most appropriate level of analysis at the level of groups. In some settings it's genomic, non-expressed DNA, and you're looking at selfish DNA and sometimes it's the whole genome, and sometimes...

(01:22:11):

And yeah, it's context dependent and context is the most interesting thing about us because, my last book was all about this, the biology of our best behaviors and our worst behaviors. What's most interesting about it is you could have the exact same behavior, the same neurons telling the same muscles, to .do the same exact thing and depending on the context, you could just be ethnically cleansing a village or you could be Mother Teresa in one setting pulling a trigger is like self-sacrificial and amazing and in another, it's like one of the most heartless things to do, like the motoric aspects of the behavior we carry out. Yeah, that's kind of interesting to learn the biology of that, that's nowhere near as interesting as what it means in that context, and that's exactly what all of this is about.

Nate Hagens (01:23:11):

So your dog just shook his head and I heard the chain and the chain reminded me that you have a golden retriever in your office, and that made me happy and it made me more positive and maybe that changed the framing of my next question. So that's also context or is that-

Professor Robert Sapolsky (01:23:31):

Absolutely.

Nate Hagens (01:23:32):

Totally unrelated to free will? Okay, so that's context?

Professor Robert Sapolsky (01:23:36):

That's one of the sets of webs which, when all wound together and in that case context was about five minutes long, knowing I had a golden, but also 30 years long since you were growing up with goldens and 40,000 years long since you were of a culture that likes dogs instead of eating them, all of that. But yeah, that's exactly where that came from.

Nate Hagens (01:24:05):

So how do you define Robert, the difference between free will and agency? Do you feel any sort of agency in your life and how do you still feel a drive to contribute to good in the world if you don't see us as having free will?

Professor Robert Sapolsky (01:24:23):

Well, this is where there's no such thing as free will. There's no such thing as agency, a criminal justice system that uses the notion of responsibility and blame and punishment makes no sense whatsoever. At the same time, a meritocracy that runs on notions of praise and reward makes just as little sense. None of it makes any sense. And someone like telling you, you did something rotten, ultimately, if you really, really believe it makes as little sense as saying that earthquake did something rotten, and someone telling you just did something great and what a good job, makes this little sense as telling a flower that's a great odor that you release, a fragrance or whatever. That's the reality. How in hell do you function that way? How do I function that way? I function that way about one 10th of 1% of the time, where I truly, truly am able to think I don't deserve anything.

(01:25:30):

I'm not entitled to anything, I have earned nothing, where I truly can think hating somebody makes as little sense as hating an earthquake. Yeah, I could pull that off for about three and a half seconds at a time before I fall into my lifetime of cultural training.

(01:25:48):

Or framed a different way, one 10th of 1% of the time. I can actually function in a way that I think is the only morally acceptable way for us to function. In other words, it's not easy and we all got a long way to go with it, but at least start trying to think that way in the domains that really matter. When you're deciding who gets a life sentence

without parole or when you're deciding who gets a corporate salary that's a hundred times higher than the people working in the warehouse. And if you don't want to have to try to figure out why that explains why you like bacon constitutively more than you like Ben and Jerry's, that's fine. Leave the science alone for that. Just go with your instincts that there's agency there. But when it comes to the big stuff, if we can only pull it off some of the time, that's where we have the moral obligation to do that.

Nate Hagens (01:26:49):

So what are the societal, I mean, you've spent years presumably writing this book and you said that you've been, since you were 13, you believed this way. So you've obviously thought about the implications of this. Could we use the scientific foundations that you outline in Determined to influence the behavior or the policies, the institutions of our world in a positive way?

Professor Robert Sapolsky (01:27:16):

Well, I guess at this point, am I going to sound like an NPR tote bag toting liberal, or am I going to sound like someone who's much more left in my extreme or am I going to sound someone who's so far out like I'm not even in the same playing field in terms of lunatic fringe? The only it puts you at the lunatic fringe. Somebody tells you nice cheekbones, and that makes as little sense to feel good afterward as somebody telling you have a good moral philosophy and you have just used that to make a million lives better, and thank you for being that person. That makes as little, none of it makes any sense. If you really, really follow this stuff out and the cheekbone end, it doesn't really matter. But getting people to think more correctly about punishment and reward and who deserves anything, and whether hate ever makes sense at all, that's where it has some major societal consequences. I mean, just as one example of that, we understand how epilepsy works to some degree. There was a time when people didn't, and if somebody had an epileptic seizure, what they did to you in their 15th century village was burn you at the stake because you were demonically possessed. Whoa, understanding how this stuff works has societal implications. That's thousands of people who were burned at the stake. Understanding that schizophrenia isn't caused by crappy psycho dynamically, hostile mothering, and instead a neuro genetic disorder. Whoa, that makes a big difference in how the world works. And in every one of these cases, it makes for a more humane world. It's really good that we don't burn

people with epilepsy at the stakes or tell mothers of teenagers who've just been diagnosed with schizophrenia, some Freudian bile that you caused it because unconsciously you hate your child. It's a better world at each one of these steps.

Nate Hagens (01:29:36):

So what is the difference between a deterministic world, which you are describing and a fatalistic or nihilistic mindset or worldview?

Professor Robert Sapolsky (01:29:47):

Great. The fatalistic one is the worst place you could arrive from all of this stuff, which is to look at all of these biological threads around our finger-

(01:30:03):

Biological threads around our fingers and all of these environmental and all of these biology environment interaction threads and collectively, they're much more than threads. They're a gigantic cocoon, blah, blah, blah. To conclude, nothing can change, so why bother? What you proved is something can change. You don't eat bacon anymore. It's not really because you chose to no longer eat bacon. It's because you were changed previously in life in ways that made it possible for you to learn about pig intelligence and to evoke images of puppies and trucks. We don't change, we don't choose to change but we sure are changed and we have to make use of our knowledge about how that change comes about because if we don't think the change happens, we're totally screwed. Nihilism is not like a very happy picture for how we should go about looking at what else there is out there.

Nate Hagens (01:31:05):

So this is really a huge call to changing our cultural environment but really to education and many other things because humans can change, but only if our two seconds ago, one month ago, five years ago, 40 years ago, and we can't change the 40 years ago or the 400 years ago, but we can change our cultural stimuli, at least in theory. So education and moving in the direction of some of these pro-social outcomes, we'll be able to change other people and empower them to do the environmental equivalent of giving up pork or whatever it is.

Professor Robert Sapolsky (01:31:45):

Absolutely. So you get somebody who, because of environmental events, learns that something crummy is going on in Ukraine and they say, wow, I'm going to educate myself about the history of Slavic tribalism or whatever, and they come out the other end and tell people any of this Putin saying this is about NATO, this is nonsense. In the 19th century, the Russians were saying the Ukrainians couldn't use their own language. This is centuries old. What have you just done there? You have been exposed to environmental stimuli, telling you that something's going on in Ukraine and you decide, I'm going to learn more about it. How do you turn into the sort of person who at that juncture would say, I'm even interested in the news, I want to learn more about it, I'm going to use my critical thinking to see maybe one of the stories being spouted here isn't actually all that accurate?

(01:32:50):

Who taught you to challenge stuff like that? Who taught you to read, who to blah, blah, all the ways in which you could have been a different person in no ways that you can control, and once that brought about a change in you, whoa, this has nothing to do with NATO. This has to do with different Slavic tribes hating each other for half a millennium. Then you are capable of telling that to somebody else and perhaps they're in a position to be changed by that as a result. On the most basic concrete, are you kidding me? Yeah, actually, the world needs to work this way. If you've been listening to this podcast and you've decided this is incredibly galvanizing to you, or if you've decided this is totally wrong, or if you've decided this is boring or if you've decided you really want to get a cookie, your brain is structurally different than it was two seconds ago because it has to be.

(01:33:52):

That's how it works. If what you've concluded is this is boring, I'm going to get a cookie, your brain has probably changed in a way that's not going to have a whole lot of long-term consequences, but somewhere in there, there are three and a half synapses that are now working differently than they were working 10 minutes ago. They may no longer be working differently 10 minutes from now. It's a very transient effect, or if this makes you decide you're going to go out and become like a Baptist preacher or something, that change persisted but everything, something just changed in your brain in a way that is ultimately only explainable by the physical universe, and

thus, you go get a cookie, or thus, you go devote the rest of your life to a different cause than you would've 10 minutes ago because that's all there is.

(01:34:46):

There's nothing more than that. And anything more you would invoke to explain that, you are invoking magic that defies how the physical universe works and how emergent systems work and whether or not quantum indeterminacy has anything to do with what you order on the menu. It simply doesn't work that way.

Nate Hagens (01:35:08):

Why did you write this book? It wasn't free will. You had to have an idea in your mind. Other than getting the science right, you've been a lifelong scholar of the human and primate brain, but what was your hope in writing this book?

Professor Robert Sapolsky (01:35:27):

Well, everything ranging from, to make this a more humane world, to showing those asshole bullies when I was 14 year old in junior high and they were bullying me, look what I've done, to making money, to having people think I'm a kind person, to having people think I have nice cheekbones because they're confusing writing a good book with all sorts of other things that have nothing to do with it and are not based in reality, all this stuff, because my parents wanted me to be a doctor and they went to their graves wanting me to be a doctor and I turned into this instead. Yeah, look at this, look at... You see? Because they wanted me to be a critical thinker, yeah, look at this. You see?

Nate Hagens (01:36:21):

So it had to come out. It was like you had to give birth to this book as a natural continuum of your life's work.

Professor Robert Sapolsky (01:36:31):

Yeah, but in the exact same way but in a much less interesting level that I forgot to bring the charger with me when I went from outside back to here.

Nate Hagens (01:36:42):

I mean, I love all of your books. I've read about a third of this one because it's 500 pages in banks and I've been really busy, but I can see this book striking a nerve, especially with what's going on in our social discourse today. Are you worried at all about the academic public response to this book? Could there be a similar drama like there was created by Richard Dawkins's Selfish Gene in the '70s, which was a naive interpretation of selfishness back then? But could there be a naive interpretation of the science that could rationalize apathy and nihilism? Are you excited about that? Do you have some trepidation? What can you share?

Professor Robert Sapolsky (01:37:36):

And by the way, characterizing that as naive with Dawkins is exactly one would get from a card carrying multi-level selections. Yeah, pretty damn naive and dogmatic. But-

Nate Hagens (01:37:52):

But it did become popular and it was grabbed by people to rationalize, look, humans are naturally this way, which was an incorrect interpretation, but are you worried that we might get the same reaction with your book, I don't have any free will, that's what made me do it, it wasn't my fault?

Professor Robert Sapolsky (01:38:13):

Absolutely. And some of that's exciting and some of that's terrifying because I'm just like this twerpy professor sitting someplace and if somebody decides maligning their religious beliefs or at the other end of the spectrum, if I'm maligning their social identity and their validation of it and they're going to hate me, that's going to suck. I have a bit of a conundrum in that intellectually, I'm very, very combative and love it and interpersonally, I am totally meek and skittish. So there's going to be an interesting-

Nate Hagens (01:38:58):

Interesting.

Professor Robert Sapolsky (01:38:59):

... balancing of those tendencies depending on how much somebody hates my ideas versus if they wind up hating me.

Nate Hagens (01:39:07):

I get it. So intellectually, Robert, how could you be wrong about this? Is there an experiment or something that you could discover that would change your mind that humans have free will?

Professor Robert Sapolsky (01:39:22):

Absolutely. And conveniently, it's an impossible experiment but what the hell? You've just done something with incredible consequence. You've pulled a trigger as highly context dependent like this matters. It makes a difference. And it's possible to track down the one little node of neurons that told your muscle to do that. So let's look at that node of neurons. If you could show me they would've done the exact same thing regardless of what any of the neighboring neurons did in the previous seconds, that's interesting and impressive.

(01:40:08):

But then show me that they would've done the exact same thing regardless of what you had for breakfast, whether you were tired, scared, stressed, aroused, whatever, and then show me it would've done the same thing no matter what your hormone levels were and show me they would've done the exact same thing whether you grew up in an individualist or a collectivist culture, and show me that if you changed every gene inside those neurons into the set of genes that the person sitting next to you had, do all of those things, and if those neurons still made you do the exact same thing, you've just proven free will. Go. Good luck.

Nate Hagens (01:40:49):

Yeah, yeah. I see. As I said, I have hours of questions for you, but I want to be respectful of your time. I have one more question related to your book and your work, and then we'll get to the closing questions that I ask all my guests. So what might be some key components or even key questions in a new systems informed design of society based on an understanding of neuroscience, physiology and no free will?

Professor Robert Sapolsky (01:41:30):

Writ small, a huge challenge for the field is we know a lot about how a neuron works. We're a little circuit of neurons, and we know about the kind of stuff that brains produce, like ideology or love or things like that. It's really tough, the scaling up problem, the intermediate range is the big challenge because traditionally, you could look at the electrical activity of three neurons at a time. Now, these days, you can canvas activity in 10,000 neurons and look at their gene expression profiles and you get these massive bioinformatic data sets and nobody is smart enough to be able to think in 11 dimensions at once.

(01:42:20):

So the connecting the two levels, okay, so that's, let's see, I hope lots of grad students are able to do that in the centuries to come. The much bigger to do is how do we get past this sense that judgment makes sense and punishment makes sense and praise makes sense, and that somebody really isn't responsible for the most wondrous things you can imagine or the most damaging, and how do you get past that fact that in the right circumstances, it feels really good to punish someone for righteous reasons?

(01:43:05):

How are you going to do this? But three, 400 years ago, people managed to do that in thinking about the biologically deterministic phenomenon of epilepsy and subtract Satan out of it. And we've done it over and over again in all sorts of other realms. This kid is having trouble reading because of a biologically deterministic thing called dyslexia, not because they're lazy. We've done it, we've done it over and over, we got to do it over and over again.

Nate Hagens (01:43:38):

I sometimes feel that we're in this Twilight Zone movie, and often in my lectures, I say that we've arrived at a species level conversation, that we're the first generation of homo sapiens to be able to, not necessarily that we are, but we have the ability to figure out where we came from, how we got here, what we're doing to each other, to the planet, what our biology is, what we actually need, what our natural resource balance sheet is, or that of the earth. And it feels like your story is a piece of this. It's like looking in the mirror at homo sapiens and looking all around us, and are we going

to have enough time to integrate this stuff? Do you get that feeling or how do you respond to what I just said?

Professor Robert Sapolsky (01:44:27):

Absolutely. As a way of summarizing everything you preach about, the clock's ticking and we got a lot of stuff to overcome and a lot of it taps into this, framed from my view of the world, what is the universe of circumstance that has made us into a species that's insatiable? Why was something wonderful yesterday not enough tomorrow? Why are there a few exceptions to that? Why are there some people who didn't turn out that way? How can we opportunize knowledge about that to get to save the world in time? Whereas your level of solving the same problem is, hey, oil reserves are not going to last forever. This is an anomaly. There's all these different levels of attacking the same problem, the clock is ticking, we're running out of all sorts of important stuff, and it's very much in our nature to be awful, to have-nots when times get bad. And go for it. There's no shortage of approaches that are desperately needed to try to fix some of this stuff.

Nate Hagens (01:45:49):

What would you like the viewers and listeners of this podcast to take away from this brief overview, a little bit of your earlier work, but primarily, your new book, Determined: a science of Life Without Free Will? How would you like people to take this subject on after hearing this?

Professor Robert Sapolsky (01:46:14):

This isn't scary because, oh my God, science, I hated 9th grade biology. This isn't scary because the concepts are inaccessible. This isn't scary because it means there's no purpose in life, anything but that. This isn't scary because it means we're all going to run amuck. The world's going to become more humane, and this isn't scary because if you are one of the lucky ones, it's going to make you feel like you don't deserve all the great things you've gotten. You don't deserve the great things you've gotten. But for most people on earth, what they're going to find out is they don't deserve to have not gotten most of the great things they were deprived. So this is a wonderful thing. So this is not, oh my God, this is like the roof isn't going to cave in. It's going to be better afterward inter-individually and on a societal level.

(01:47:13):

If we understand where we're coming from and where we're coming from is it doesn't make sense to feel like you are entitled to be treated better than another human. And it doesn't make sense to think that there's something like evil in looking at the damaging things that this collection of atoms we call humans are doing versus damaging things that other collections of atoms are doing. This can only be good things. And again, I could manage to think this way 1% of the time. So nobody's saying this is going to be easy, but we got to try.

Nate Hagens (01:47:51):

So broader than that, not on the topic of free will, but you've thought about the human condition and have a career choice on human behavioral biology, do you have any personal advice? Did the viewers of this show at this time of global inequality and anxiety and crazy politics and climate change and other things, what some people would call the poly crisis, do you have any recommendations to people?

Professor Robert Sapolsky (01:48:19):

All I can say is it takes a hell of a lot of work not to sink into a depression and a sense of helplessness, and my basic nature is such that I do that with a second's notice. You are not alone. Things can change. Big, potentially, revolutionary things could emerge from a lot of little component parts coming together. Empathy goes a hell of a long way, especially when it's empathy for someone where the empathy doesn't come naturally. And if you want to be a primate and decrease your stress hormone levels, it's great if people treat you nicely and groom you but it turns out it's even better if you groom them instead, and maybe all these pieces together keeps the clouds away for a few more seconds at a time and take advantage of those few seconds and be proactive.

Nate Hagens (01:49:34):

So you've been teaching for 40 years or so, what recommendations do you give to your 18 to 20-year-old young humans that take your class at the end after learning about this and after also living in a time of environmental damage and social stress, et cetera, or do you not give them advice at all?

Professor Robert Sapolsky (01:49:55):

Oh, I pontificate out the wazoo. I'm insufferable. And most of them appropriately glaze over at that point, what would I tell them? What do I tell them? It looks really tough to make a change, but by definition, because of my privilege in life, I've wound up spending my career interacting with students who are uber-privileged. So if anyone's going to do it, it's you guys because not only did you get to go to one of the best universities on Earth, you almost certainly don't have horrible gut parasites because you are one of the lucky ones.

(01:50:41):

Maybe the next thing is this thing that fascinates me trying to make sense of in terms of making the world whole and one of the completely irrational things we're capable of doing as humans and have to do, the more hopeless the problem seems, the more you have to decide that you're one of the ones who can solve the problem, which is a version of this impossible religious stance of the less lovable the person, the more you have to find the means to love them. You are one of the lucky ones. Go and do it. And keep in mind, it's not going to come cheap and you're going to have to make a lot of personal choices as to what you're willing to give up along the way. No one said this is going to be easy.

Nate Hagens (01:51:31):

That's the underlying feeling that I'm getting from this great conversation, irrespective of whether I fully buy that there's no free will or not, listening to you, I feel that I am one of the lucky ones and I have to do more than I have been doing to pass the baton or at least, accelerate this. So that's the emotion that I'm feeling listening to you on this topic. But of course, I can only understand my own mind. I don't understand anyone else's.

Professor Robert Sapolsky (01:52:04):

And to incorporate something, I have to tell myself 99% of the time, which is when you lapse and you fail to be that wonderful, you are no less a biological machine. We're dealing with some tough things here, and-

Nate Hagens (01:52:23):

So we have to be kind to ourselves.

Professor Robert Sapolsky (01:52:24):

... [inaudible 01:52:24] in this match. And it's a little bit self-serving to do that almost fatuous, you have to love yourself before you can love others but it helps.

Nate Hagens (01:52:37):

Yeah, I'm told that often. What do you care most about in the world, Robert?

Professor Robert Sapolsky (01:52:50):

The scientist in me says being able to sit quietly and see how pieces of things fit together. The 60 something says, being able to sit quietly and see how pieces of things fit together and there's less pain afterward.

Nate Hagens (01:53:15):

Yeah, I hear you. I ask this of all my guests, if you could wave a magic wand and there was no personal recourse to your decision, what is one thing you would do to improve human and planetary futures knowing that you're a scientist and you don't believe in magic wands, but just hypothetically?

Professor Robert Sapolsky (01:53:37):

Well, I'll take two since this is imaginary, one is that we habituate to good stuff more slowly. We may not invent that many the next big things, but that's probably a good thing in the long run. And I guess the other is to be able to understand all of the circumstances in which we lose empathy and to understand why it is that is so much easier to make a neutral somebody into a them than to make them into an us, let alone, to make them into an us because we can do it and there's circumstances that make it easier to do. Why does adversity bring out the worst in so many of us?

Nate Hagens (01:54:36):

This has been a fantastic conversation. Another thought that came to my mind is 20 years ago, when I started reading your books and watching your lectures, was it predetermined that I would do a podcast with you in 2023? I so value your intellect and your heart. If you were to come back in the future on this show, the free will book,

Determined, coming out soon aside, what is one topic that you are passionate about relevant to human futures that you'd be curious or willing to take a deep dive with me on?

Professor Robert Sapolsky (01:55:16):

Well, one that is derivative of all of this, and maybe it's because I can't think of anything these days, I can't think of which socks I'm putting on without thinking about this damn book I've been obsessing over since I was 13, but maybe on the level of, how do we remember that no matter what amid all of these explanations and stuff, we're biological machines who believe they can feel sad and because of how the world works, thus, we actually are sad when that's happening and we actually are feeling less pain when our machine, this has led us to that, we are biological machines who could know our machinists but it doesn't take the emotional implications of it away in the slightest, it doesn't make pleasure any less pleasurable, unhappiness, and it doesn't make pain any less painful.

Nate Hagens (01:56:32):

I'm going to think about that. Thank you so much, Professor Sapolsky, for your time today and for your work, and we will post a link to your book online. And let's, you and I, stay in touch.

Professor Robert Sapolsky (01:56:47):

Good. Let's do that. This was totally fun, and meeting a distant cousin who, not only likes multilevel selection, but emergence, so that's great.

Nate Hagens (01:56:58):

Well, we're also distant cousins from when Proconsul came down from the trees 17 million years ago.

Professor Robert Sapolsky (01:57:05):

That too.

Nate Hagens (01:57:06):

All right, sir. If you enjoyed or learned from this episode of The Great Simplification, please subscribe to us on your favorite podcast platform and visit thegreatsimplification.com for more information on future releases.