

Dave Asprey ([00:00:01](#)):

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([00:00:07](#)):

You are listening to the Human Upgrade with Dave Asprey today. I'm hoping you remember the episode because it's an episode about memory with one of the world's leading experts in memory. And this is really important because whether you're talking about things in your relationship or your career or just becoming a better, more functional human being, which is the whole point of this podcast, if you don't remember the things that are important to you, there's probably a reason. And it may be that you don't have a skill. Certainly Jim Quick has a dear friend who's been on who teaches skills, but maybe it's something deeper in the way your memory works. I've been studying this for years because I couldn't remember most of what was happening during the day when I had chronic petite syndrome. And today people ask me all the time, how do you remember all this biohacking stuff? And I have some theories about that. But rather than just my theories, given that I am a professional, but unlicensed biohacker, there is no biohacking license, which means you can't take it away from me saying what's true. So let's talk to a guy who really, really has studied memory at every possible level. And a guy who was not offended by my comment there, some doctors get pissed when I say that others like cheer because I wanted to speak the truth, but I was afraid. So Dr. Tarran Ragina, welcome to the show.

Dr. Charan Ranganath ([00:01:33](#)):

Thank you for having me.

Dave Asprey ([00:01:34](#)):

You're a professor at the Center for Neuroscience and the Department of Psychology at the University of California Davis.

Dr. Charan Ranganath ([00:01:42](#)):

That's right, yes.

Dave Asprey ([00:01:43](#)):

Does that mean you only study cows? This is in Central California. I mean, you guys are known for ag. What do you study memory at an ag school for brother?

Dr. Charan Ranganath ([00:01:52](#)):

Oh, well that's actually a good question sometimes, but we're also known for our vet school. We're also known for our vet school engineering, and actually we have the best viticulture and enology program in the world. So you want good wine, this is the place to be. And actually, it turns out we're probably also one of the top, say four places for memory research in the world.

Dave Asprey ([00:02:15](#)):

It's a fantastic school, and I'm a little bit bitter because when I applied there for my undergrad, I chose uc Davis as my top choice because it was close enough to where I lived in Manteca, California. If you guys are wondering, which is a little unknown town, except that it's where 99 and I five cross. Oh

Dr. Charan Ranganath ([00:02:32](#)):

No, it had those gray water slides.

Dave Asprey ([00:02:35](#)):

Yeah, I used to work at the water slides, believe it or not. Oh, is that right? Yeah. So van going back to high school. So I was really choosing it because I knew I could come home and do laundry and then they didn't let me into uc Davis. So I swore revenge and I just got my revenge by making fun of the Ag school. So there, by the way, it is a fantastic memory school, and that's one of the reasons I wanted to have you on. It's a good reputation, but more importantly, you run the Dynamic memory Lab, which is like how do we all get better at this? And you look at brain imaging, computational modeling and all this stuff that's hard science for something that also is like, I can or I can't remember, memory seems like a mushy field. How do you know if someone has a good memory?

Dr. Charan Ranganath ([00:03:21](#)):

Well, that's part of what I wanted to write the book about because I think people have this misconception that having a good memory means being able to remember everything. And it's a bit like sort of saying, okay, well the ideal way to decorate your house is to throw as much junk in your house as possible. And so if you're looking at Marie Kondo and you'd be, oh, why aren't you hoarding more? This is terrible. Why are you saying goodbye to all these possessions? And so I think when people say, I want to remember, I want to have a good memory, they're usually saying, I just want to memorize everything. And I don't think that's what our brains are designed to do. And I don't think that's good memory in the first place.

Dave Asprey ([00:04:02](#)):

So our brain should be more like Marie Kdo, like only remember the important stuff.

Dr. Charan Ranganath ([00:04:09](#)):

The important stuff. It should be organized, it should be be easy to find what you need when you need it, and you should be able to lose the stuff that's not important. I mean, think of all the temporary passwords you've had to do. Maybe you're better at not forgetting your passwords that I have in the first place, but think of all the temporary passwords, hotel room numbers that you've had, just so many things that we encounter that we don't need to remember. And so our brains aren't really well equipped to take in all that information computers are. And so I'm all for outsourcing boring memorization to my machines, and I stick with the intelligence stuff. That's what I like to tell myself anyway.

Dave Asprey ([00:04:55](#)):

Do you actively teach?

Dr. Charan Ranganath ([00:04:57](#)):

Yeah. Yeah. I teach an undergraduate class in memory. I teach a class in brain imaging and yeah, basically that's what I do.

Dave Asprey ([00:05:08](#)):

Do you allow your students to use Google and chat GPT during exams?

Dr. Charan Ranganath ([00:05:11](#)):

I have yet. I still haven't seen the full chat GPT thing going in terms of our exam.

Dave Asprey ([00:05:19](#)):

But you just allow it explicitly because you said you want to outsource boring work. I'm just

Dr. Charan Ranganath ([00:05:24](#)):

Wondering. Well, it's a really good question actually. I mean, yeah, so Chachi, it is actually a very good question about what should we outsource and what shouldn't we outsource? And I think Chachi PT I think is very good for outsourcing in terms of a lot of people use it right now for grammar proofreading, for people who speak English as a second language, I think it could be super helpful. As far as generative work, it's junk, right? I mean it's like I've never gotten anything good out of chat GPT that's actually intelligent, but that's a conversation about memory, I think.

Dave Asprey ([00:06:01](#)):

Yeah, I love it when people send me spam emails written by Chad GPT that you can tell are written by Chad GPT, and it's like, dude, you couldn't even take the time to write the spam that you sent me. You want my attention? You sent me a spam and you didn't even write it. It's disrespectful to you. At least proofread your chat GPT spams. So that would be my request. And if you're a student in a memory class and use chat GPT, you better do such a good job with it that no one can tell. And at that point you probably did something that maybe was net positive. Now you wrote your book called Why We Remember. Did you use chat GPT to write your book?

Dr. Charan Ranganath ([00:06:41](#)):

No. Nope. Actually I didn't mean for one thing, I have yet to figure out how to write the right prompts to get chat GPT to give me something that's not garbage. But I think as a memory researcher, I find this to be a fascinating moment because I think a lot of what happens is our brains are constantly trying to tweak to adapt to whatever task we have to do. And I think rather than chat GPT getting better and becoming less crappy, I think people are just going to adapt their language to be as communicate as easily as possible with generative ai. And so I think it's an interesting moment to see whether people are going to change the way they communicate to be more chat g, PT like as opposed to getting chat GPT to be more intelligent and humanlike. We'll see where this goes.

Dave Asprey ([00:07:32](#)):

I'm very curious and I'm hoping to get Mo Gdat on who was the head of Google's r and d who wrote a really good book called Scary Smart about that. I saw him at a recent conference and there there's a lot going on there that will probably affect human memory, but let's get into human memory and how it works now before we merge our consciousness without implants, hopefully with all the different AI projects that are out there, take me through the basics of human memory. What's it for?

Dr. Charan Ranganath ([00:08:07](#)):

Well, in the book I argue that what memory is for is it's not about the past, it's about the present and the future. And what I mean by that is if you actually look at why you need this ability to remember it's not about the past because as an animal you survived in the past. So if anything's happening, that's critical for survival. It's in the present in the future, and that is why if you look at the neurobiology of memory, what you see over and over again is the factors that promote plasticity. The factors that promote a memory being able to last over time are factors that basically are involved in things that are

biologically important. So the chemicals like noradrenaline, dopamine, serotonin, these are all chemicals I imagine many of your listeners know a lot about already. Those are released during biologically important moments, whether it's fear, anxiety, stress, reward, and those are all chemicals that promote plasticity. And without these chemicals, it's a lot harder to get a memory that's going to stick around and last. So what it's telling us is that our brains are not trying to carry everything with us. It's trying to carry what is most likely to be useful in the future.

Dave Asprey ([00:09:23](#)):

Your book is called Why We Remember. Can you tell me in two sentences why we remember?

Dr. Charan Ranganath ([00:09:29](#)):

Well, I guess I would go back say memory we remember so that we can understand the present and anticipate the future.

Dave Asprey ([00:09:39](#)):

Is there an evolutionary reason for that?

Dr. Charan Ranganath ([00:09:41](#)):

I think so. I think we live in an uncertain world and I think that what we want to be able to do is be able to maximize the amount of predictability, maximize the amount of information that we can get. So one of the things that you see with memory is that it tends to emphasize things that are, as I was saying, like biologically significant. I almost got eaten by a bear or I found somebody who was really attractive or Hey, here's a good site for water. These are things that get emphasized in memory and they're associated with motivational states and emotions and so forth. And so I don't think it's a coincidence that memory prioritizes these things that are emotionally or biologically significant because that's the stuff that you need. It

Dave Asprey ([00:10:31](#)):

Feels like some people are abnormally good at remembering stuff. I had a chance a few years ago to have dinner with Ed O'Neill Al Bundy, and it was really interesting. He sat down with a friend and started talking about football scores from college games in the eighties. I'm like, I thought Al Bundy did that, but it was actually, you could tell he remembered this amazing amount of detail and I didn't even recognize the names of the teams. I'm not a sports guy, I'm a PubMed guy, but I was also thinking how much memory does it take up if you have an enormous collection of kind of trivial details like that, it's trivial to me, but maybe not trivial to you. Does that mean you're forgetting something else?

Dr. Charan Ranganath ([00:11:22](#)):

No, I don't think so. There's not really much evidence suggests that we hit true capacity limitations in memory. I think what happens is that when you build up a lot of expertise, what can happen is it just becomes effortless to be able to attach new information because you already have so much information in the background that you really don't have a lot of new information to encode. So you can see this in studies of chess players, for instance. Chess players are just incredibly good at memorizing not only what's a board at a given time, but entire sequences of moves throughout a match, let's say. And likewise, in the book I talk about LeBron James and his photographic memory, so to speak, for basketball games. I think anytime people have expertise, it gives them enormous power and memory.

Dave Asprey ([00:12:10](#)):

My son started studying the Rubik's Cube a few years ago and got to where he could solve it in under 10 seconds pretty reliably, and we were going to go to a Rubik's Cube championship thing, and then the pandemic happened, and after it ended, I said, do you still want to go? And he said, dad, it just takes too much time to remember all those moves because he had memorized hundreds and hundreds of algorithms in order to solve it really quickly and he knows which algorithm to apply at which time it was an amazing feat of memory. I think just driven through curiosity. I wasn't externally motivating to do it. It was all internally generated motivation and I was just so impressed when people develop an expertise and they remember a whole bunch of stuff and then you wait a couple years and all of a sudden it's like it's gone. Or you have to keep it up by working hard to keep remembering something because it's complex. Things like chess, you stop playing chess for five years, you're not very good at chess. Why is that?

Dr. Charan Ranganath ([00:13:08](#)):

Well, so one of the things that we know is that our brains are constantly warping and adapting and remain plastic throughout our lifetime. So I think there's a little bit of a myth that says like, oh, plasticity, if you don't use it, you lose it. Your brain's always plastic. But the problem is that if you're not doing a particular skill that you've learned, then yeah, that skill can become somewhat undone by the changes that are happening in the brain over time. Sometimes though, also it's a matter of simply getting yourself back into the mindset that you used to be in when you used to do those activities too. That's something we call context. And so both of those are true. There is probably some element of losing a little bit of that skill over time as your brain is using resources to try to adapt to new things that you're doing. And some of it is getting back into that mindset that you used to be in while you are in the game originally

Dave Asprey ([00:14:03](#)):

When you forget something, do people make fun of you?

Dr. Charan Ranganath ([00:14:07](#)):

My wife does. I don't know if you have that in your life, but yeah, people make fun of me, but at the same time, they kind of expected of me. I've sort of cultivated a little bit of the absentminded professor persona around me. The other thing is that I live in a community of memory researchers and most of us have terrible memories. At least that's what we tell ourselves.

Dave Asprey ([00:14:32](#)):

I have a problem I want to ask you about. I think I'm several standard deviations worse than average person. It feels like some people I know every memory they have is time and date stamped, and you can say, what'd you do last month? And they know, what'd you do five years ago? Oh my god, they know. And for me, two weeks ago or six weeks ago, I just did a bunch of crap in the before time and I have no indexing of time on my memories whatsoever. It makes me really focus on the present and on creating the future. But I always imagine if I had to go to court and they're like, what were you doing with whatever with the plaintiff two weeks ago? I'd say, if I can't look at my phone, I have no idea what I was doing. It's a blank. How do we remember time?

Dr. Charan Ranganath ([00:15:20](#)):

Well, so time, there's a lot of different theories about this. I'll give you my take. So my take would be that when we remember time, we're usually reconstructing it, right? You don't have a stamp in your brain that tells you, Hey, it's 1130 right now, but for instance right now it's very bright outside. I can have a sense that it's morning time just from looking outside. And so if I remember this event later on, I could go, yeah, we did this interview in the morning. I can also start to make some inferences based on my knowledge. I usually do my podcast interviews in the morning that allows me to get a little bit more precision and so forth. Some people are very kind of OCDish about the time and the date and they really do attend to it and think about it. But for a lot of time in the brain, what you see is there's just states that happen over time. I'm more awake in the morning, I'm more sleepy in the afternoon. And all of those things make this moment in time unique. Now, when people will often say, this happened on this date at this time, sometimes they're accurate, sometimes they're not. But sometimes people can be quite confident and just misremember a date in time. So I wouldn't necessarily say if people say I remember everything and I remember perfectly, I wouldn't necessarily trust them.

Dave Asprey ([00:16:41](#)):

Interesting. And some people are probably more memorable than others. Has your research on memory had any effect on people testifying in court? It feels like people's memories are pretty much random access and they remember a bunch of stuff that didn't happen. When you present your research to the legal system, what would that do?

Dr. Charan Ranganath ([00:17:05](#)):

Well, there's other people I think who do more interactions with the legal system than I do. So for instance, Elizabeth Loftus at UC, Irvine's done a lot with this, and so I haven't had that much of an opportunity. I have talked to some people and I had described one in the book, but one of the interesting things I think that comes up when you have to talk to law enforcement is about this idea that memories neither true nor false. And I think this is something that a lot of people just have trouble wrapping their head around is uncertainty. Because really I can remember some parts of an event very, very well and other parts of an event completely wrong. Sometimes I can remember all of the elements of the event and put it together in a story that's entirely false. And so there's a lot of care that needs to be taken in terms of questioning people, for instance, if they're accused of a crime, and making sure you don't suggest the details of the crime to the person that is being questioned because that can later become incorporated into their own memories because just the act of trying to remember something can create a new memory.

Dave Asprey ([00:18:15](#)):

One thing I've learned through hundreds and hundreds of hours of meditating with electrodes on my head with my neurofeedback clinic called 40 Years Zen, is that my powers of self-deception are legion. I will believe whatever the heck I feel or I remember whether or not it's fully accurate or not, and I'll be fully convinced and then I'll see a video or something. Oh my gosh, I remembered it that way, but it wasn't, why do we believe our made up memories so much?

Dr. Charan Ranganath ([00:18:49](#)):

Well, I think we have this idea that memory is supposed to be a replay of the past. And so if that's true, then if you remember something, it must be true. And what I like to tell people is as a scientist, I collect data, but then I generate theories to explain the data, and then I try to test the theories. And I think a lot of what happens in memory is that you get little bits and pieces of our past experience and then we

generate theories to explain what happened based on that. But that theory is different from the data itself. It's an act of imagination. If you actually scan people's brains while they imagine things that have never happened and you scan them while they're remembering things that did happen, those brain activity patterns look very, very similar to each other. It's hard for an expert to tell the difference. Wow. So what that tells you is that our ability to conceptualize an event is really critical to our ability to remember the event, but it's also something that's a piece together. It's a narrative that we create in our heads, and it can be an extraordinarily convincing illusion that can make us believe that everything is accurate, even though it's not because often not aware of that storytelling element. We just confuse it with the data and memory.

Dave Asprey ([00:20:14](#)):

You're an expert on memory. If you could get say, Neuralink, and it gave you fully accurate memory to everything you've experienced, what effect would that have on your memory?

Dr. Charan Ranganath ([00:20:27](#)):

Ooh, this is a good question. So actually I was supposed to have a meeting with one of my colleagues who does brain computer interface this last week, and it turned out I broke my arm, so I to postpone it. So this is a good question for preparing for that meeting. I would say that we have to be careful because there's really, I think again, this issue is like we want to remember more and more and more, and I think, no, you want to remember better. And so the problem is not necessarily getting, actually, I mean, I'm sorry if I sound like a rambling, but it's like just thinking this is such a rich question and I just want to go to town with this. Go for it. But I have a postdoctoral researcher I'm working with, and he's coming from the world of computer vision actually.

([00:21:16](#)):

And one of the things that he's been studying is limitations of computer vision models at certain kinds of challenges. For instance, if you give an image and it can't tell which ones are the same and which ones are different, and it turns out the ones that the computer vision models struggle on and people do well, it's because people never actually see an entire image. They just move their eyes and grab little bits and pieces, and then the brain stitches that together into a feeling of what's in front of you, a meaningfully integrated image. And it turns out that the problems that these computer vision models have are on images that require people to make a lot of series of eye movements and then integrate that information. So what this tells us is people on the one hand are getting less information than a computer vision model. A computer vision model gets every pixel of an image

Dave Asprey ([00:22:12](#)):

All at once.

Dr. Charan Ranganath ([00:22:13](#)):

A human is just grabbing little bits and pieces, but then the brain is meaningfully integrate that sequence, integrating the information that comes in from that sequence of eye movements into a meaningful representation of what's in front of you. And that's the magic of vision. That's the magic of memory. It's the magic of language is that ability to make the most out of a small amount of information. And so to me, I think the challenge with something like if you were to come up with some kind of prosthetic is you have to move away from this idea of recording as being the function of memory and something that's much more strategic, opportunistic, getting the information that's most new and useful and prioritizing that in building together a memory. And so I think Neuralink is really brilliant in

terms of the hardware, in terms of the ai, I don't think they're really that far ahead at all, but the hardware has been absolute genius, and I don't think they're anywhere nearly close enough to understanding anything to do with human memory.

Dave Asprey ([00:23:20](#)):

It seems like human vision, we have this dodic movement of our eyes, so it seems like we're getting little tiny images in a series over time. They're not even coming in all at once. So we never get all the images we think we do. We fill in the blanks between them automatically. So if you were going to do computer vision, you would teach an AI model on little bits of the image, except I will bet you something good like a cup of coffee that our bodies, probably our mitochondria are selecting how those dodic movement works and how it prioritizes images. And we just dunno how it does that. So even if you randomly picked images from the image and gave it to an ammo, that wouldn't work because there is inherent cell level intelligence. That's why we have extra mitochondria in our retinal cells, for instance. And there's a lot of just beautiful nuance to hidden systems. I call the meat operating system. And because we perceive the very highest level, what comes out of the computer monitor, we think that's what it is, but it really isn't. How soon do you think it's going to be given the advances in knowledge and imaging and AI before we have a really accurate view of how it's working in the brain? It's a five-year problem or a 50 year problem?

Dr. Charan Ranganath ([00:24:41](#)):

Well, I would say that in terms of just what guides our eye movements, I think a lot of that is figured out already in the sense of, so I have a colleague named John Henderson who studies eye movements. So one of the things he finds is that people's eyes gravitate towards, it used to be thought, oh, this is bright and shiny. Your eyes should be gravitating towards that. And now what we realize is that people gravitate towards the most meaningful parts of an image. So if I took a scene in front of you and I just deleted parts of it, the places where you move your eyes are the ones where if you deleted it, you'd actually have trouble understanding what you're looking at. And so there's a very active sampling going on. And so I would argue it seems stochastic if you're looking at it from the outside, but actually there's a method to it. And that method is based on a lot based on memory actually and knowledge. And so I think we're farther along on that problem, but then figuring out how to teach a computer vision system to do that, that's a whole nother thing because they're not designed the brain. They're really designed for too much information.

Dave Asprey ([00:25:51](#)):

So interesting. Some people think it's evil that we want to solve this problem. I'm pretty neutral about it. You can do evil with a tractor or you can grow food with a tractor. It depends on how you use it. So I'm hopeful that we build AI to do good things for humanity, and one of them would be understanding ourselves better. And I think from a longevity standpoint, that's already happening and building a system for that many others are. And I am very hopeful that in the world of neuroscience, I'm also doing a little bit of work there just around more trauma resolution and increasing cognitive performance that we're also about to make some major breakthroughs. But one of the things that's most basic for improving your memory is exercise. In your book you about why exercise is so important for memory, why?

Dr. Charan Ranganath ([00:26:47](#)):

Well, it has so many great effects. One is, and I think you probably have talked to your listeners about this, I imagine probably one of the biggest ones is it improves the vasculature. It improves the ability of the body to deliver blood flow to the brain. And so that allows you to more rapidly convert energy and be able to use it to power the brain to do various things. It has an anti-inflammatory effect. It can improve resilience to stress, it can improve sleep, it can stimulate neurogenesis, which is the creation of new cells in the hippocampus, which is an area of the brain that's important for memory, and that's just scratching the surface. The number of benefits that you get is just amazing. So I definitely do recommend exercise.

Dave Asprey ([00:27:41](#)):

I use microdose Cialis to get a similar effect in my brain. There's studies now showing that people who use the larger doses for ED actually have a much lower incidence of Alzheimer's, but it looks like about six milligrams is a longevity dose because it improves blood flow in the brain. One of my goals is to not die of Alzheimer's or with Alzheimer's disease. And I feel like exercise and microdosing Cialis is a good combination for that. Good idea, bad idea.

Dr. Charan Ranganath ([00:28:12](#)):

I do not know nearly enough about the topic. I think it's very important as a scientist when I say I have no idea, and I would say, I have no idea about something like that. And I doubt there's clinical trials really that would give you any kind of insight.

Dave Asprey ([00:28:26](#)):

I think there are actually, there are some showing increases in blood flow in the brain using either FMRI or spect. Oh,

Dr. Charan Ranganath ([00:28:33](#)):

Yeah. Well, and then translating that to Alzheimer's risk is just extraordinarily difficult. I

Dave Asprey ([00:28:39](#)):

Mean, oh, there are definitely epidemiological data points. We're very strong. So like a 70 or 80% reduction in people who regularly take ed medications.

Dr. Charan Ranganath ([00:28:49](#)):

I don't know about that data and I don't want to come off. I'm an expert.

Dave Asprey ([00:28:53](#)):

Yeah, no, you can endorse the data. So you see the

Dr. Charan Ranganath ([00:28:55](#)):

Study. Yeah, yeah. But what I can say is that there's so much, I mean, I think it's like the thing that I really want people to walk away with is this understanding that your brain is a part of your body and everything's connected. People sometimes say, oh, trauma is stored in your body, or blah, blah, blah. But everything's connected. And so gut microbiome hugely important for brain function, oral hygiene, hugely important for brain function. We're learning so much even now about things that are involved in bodily health that can affect your resilience, your cognitive ability to maintain cognition as you get older

and reducing your risk for Alzheimer's. And so I would really encourage people to just think about the lowest hanging fruit. Are you getting enough sleep? Are you getting exercise? Are you engaging in practices that can be allowing you to focus on the information that matters? I think I'm sure your show probably emphasizes a whole lot of tangible ways where people can at no cost really improve the quality of their cognition over time.

Dave Asprey ([00:30:00](#)):

Does having an active love life improve your memory?

Dr. Charan Ranganath ([00:30:04](#)):

We know that social isolation can be a risk factor for dementia, having an active love life, it depends on how you want to think about that. Are we talking sex life or are we talking love life?

Dave Asprey ([00:30:17](#)):

I'm talking about sex life and love together, but it could be just an act of sex life. But

Dr. Charan Ranganath ([00:30:23](#)):

I guess I would say for both, you're probably living a more memorable life. If you

Dave Asprey ([00:30:28](#)):

Didn't, you just say you had a bad memory. I'm just kidding. Well,

Dr. Charan Ranganath ([00:30:32](#)):

I didn't tell you about some of the things I do remember, but just getting me in serious trouble. But yeah, getting back to the issue, I think that their social connection is a huge part in maintaining our cognitive health over time. And one of the things that I noticed, and I know this is a bit tangential to your question, but it's very serious, and so that's why it could convey it to your listeners is that I used to do work in neuropsychology where we would test people for their risks for Alzheimer's. And what we found was that people who are older who were clinically depressed were very, very hard to distinguish from people who actually were in the early stages of Alzheimer's disease. Mental health is hugely important for cognitive health and actually can even increase your risk factor if you have serious mental illness, it can increase your risk factors for all sorts of neurodegenerative disease. So I think things like having a good love life, having social relationships with people you care about is hugely important as we get older.

Dave Asprey ([00:31:37](#)):

I've definitely seen even studies that show that having a connected love life to intimacy plus relationship does reduce your risk of all sorts of diseases and all sorts of mental illness. So I look at that as one of the nutrients that powers extended longevity and being socially isolated and living forever is probably not going to happen. And there's a lot of individual variables there, but it feels like because emotions are connected both to intimacy and to memory, that having more intimacy would give you more emotions and you might remember more, but that's totally going out on a limb.

Dr. Charan Ranganath ([00:32:21](#)):

Well, you'll have probably, you'll have emotions. And I think the issue is what kinds of memories do you want to have, first of all? And I think having intimate relationships gives you the kinds of memories that will be good for your mental health later on. And yeah, as you mentioned, I think when you don't have these intimate relationships, it can have toxic effects on your health and that can have very bad effects on cognition and memory. I can imagine you can have no good relationships and you can have lots of memories that are terrible memories of fights that you're starting with people and being scared and being anxious all the time or whatever. But those aren't necessarily the memories you want to have and it's not going to be good for your cognitive health in the long run. For sure. And we can see this in people with chronic stress that if you have chronic severe stress, it can absolutely be neurotoxic

Dave Asprey ([00:33:18](#)):

For sure. It's like an injury to the brain. In your book, why We remember you talk about episodic memory and semantic memory, what's the difference?

Dr. Charan Ranganath ([00:33:28](#)):

So semantic memory is our knowledge of the world. It's like, for instance, if I just ask you about San Francisco, you could probably rattle off a thousand facts about San Francisco, but if I ask you about the last time you've been to San Francisco, you would be referring to something that happened at one moment in time, and that is your personal lived experience in that moment. So semantic memory is something that knowledge that we can take anywhere to describe any time, but episodic memory specific to a place in time. I like to say that chat GPT is more like semantic memory, and there's nothing I've seen in AI yet that comes close to what episodic memory is like.

Dave Asprey ([00:34:14](#)):

You don't think that chat GPT is going to be able to say this one time at band camp and then tell you the whole story, right?

Dr. Charan Ranganath ([00:34:21](#)):

Well, it could, but it's not necessarily going to do it in a way that's similar to the way people do it. I mean, it could eventually, I mean think it's like if I were to, I don't think it's an unsolvable problem at all. I don't think that there's quite enough of an understanding of what episodic memory is in the tech community to really motivate people to do it right. But I think it is doable. But a big part of episodic memory why it's so important to humans is the randomness of our lives. So if you have this memory system that allows you to remember one thing that happened at one moment and you just happen to be in line with or sitting next to somebody on a flight and they tell you a story and that story sparks something in you, and you can recall that one event later on and come up with some good idea from that random conversation you had, that can give you a whole wealth of imaginative creations that you can come up with. But that's from a lived experience that came up through a single random connection, that kind of agility is not what you see in AI. It's really powered by gobs and gobs of data, and it's much more just massive statistical learning. It's not episodic. Does that make sense?

Dave Asprey ([00:35:46](#)):

It makes very good sense. And when you have really good semantic and episodic memory, you can write just a couple sentences and they're going to tell you about when it happened and the story and the meaning. And if you go to one of the AI models, it's going to spit out a whole bunch of words, like four paragraphs that tell you only a third of the story. And I think that's the difference where you have, here's

what San Francisco means and here's what I did there, and you fuse 'em together and you say, the last time I went there, it reminded me and it's easy, but it's not working in these artificial systems.

Dr. Charan Ranganath ([00:36:22](#)):

And I think what it really gives you is this huge amount of economy and flexibility because if you have a lot of semantic memory, then an episodic memory, what you need is to say what makes this moment unique and different from anything I've ever experienced. And you prioritize that information to be encoded. And with semantic memory, you don't want to change it very quickly. You can kind of allow it to slowly grow just with the information that comes in, but you supplement it with the most informative bits, which is episodic memory. And so these unique experiences we have can be used to rapidly improve our knowledge base, but the knowledge base allows us to fill in the blanks of our memories that happen at one point in time. So you're absolutely right. I mean, having both is the key. You don't want to have one or the other.

Dave Asprey ([00:37:13](#)):

Talk to me about the hippocampus. Why does it matter?

Dr. Charan Ranganath ([00:37:15](#)):

Well, the hippocampus is evolutionarily a very old structure. Birds have a rudimentary hippocampus. Fish have a rudimentary hippocampus, lizards, and of course primates and mammals of all kinds do. So the hippocampus is thought to have played a critical role in animals learning where they are in the world, like learning locations. And there's some debate about whether that's the function for the hippocampus, but what we know is in humans, it's absolutely critical for episodic memory. So you can lose the hippocampus. And what you find is that people can still learn certain kinds of information, but they have no ability to remember their past and they feel subjectively lost and disoriented. And so it's critical for that sense of being able to ground ourselves in time and space. And it's also one of the first areas to get hit in Alzheimer's disease.

Dave Asprey ([00:38:16](#)):

Yeah, my grandmother just recently passed at 101 and she had some Alzheimer's for sure, and I definitely am planning to not get Alzheimer's. It sounds like an inconvenient thing to have for all sorts of reasons. I've studied this pretty extensively. In fact, one of my books was a New York Times bestselling science book on the monthly list about mitochondria in the brain. And I went really deep on this stuff, and I measured my hippocampal volume. It's 87th percentile. So I have a younger hippocampus than most people who are my calendar age, but that makes sense because my biological age is much younger than my chronological age. What can people do to have a big and strong hippocampus as they age?

Dr. Charan Ranganath ([00:39:04](#)):

Well, we talked about one which is exercise, and we've talked about some others which would be reducing chronic stress for instance, and improving sleep. And I think those are some of the biggest, most obvious ones. We're seeing a lot of success with the Mediterranean diet, and you study diet, I know much more than I do. So you might have different ideas on that, but that's at least what my understanding of literature is.

Dave Asprey ([00:39:32](#)):

My only question is I've never seen two pieces of literature that defined the Mediterranean diet the same way. So I don't know what that is, but it might be good for you.

Dr. Charan Ranganath ([00:39:41](#)):

Fair enough, fair enough. And I do think a lot of, there is some interesting thing. I mean, there's so much that we don't know. I mean, one of the things that just gets me excited about this work is just how much we don't know. And especially when you get into this world of diet, so many of us are just so different in so many ways. You have people who've come from places where vegetables couldn't grow pretty much to people who come from generations where by people, generations of vegetarians and so forth. Then probably there are going to be differences in some of the gut bacteria that are adapted for different genetic profiles.

Dave Asprey ([00:40:19](#)):

There'll be some differences in the matching of the mitochondrial DNA with the nuclear DNA as well. Oh, if your people have been in a region for thousands of years, it's even shown in animal models. So it is complex. And if you're from the middle of the desert, you probably didn't eat a lot of green vegetables. It's just how it works. And then that's okay, right? So we're right on the edge now of being able to say, well, for you, this is biologically compatible food. And for that person, even if you're married to them, this is their set of food and it may not overlap that much. So for me, I'm going to be eating the steak. In fact, one of my dear friends, Naveen Jane, who runs em, he sit and eats legumes and all sorts of beans and rice and grains. I touched that stuff. It's ruinous. I'm sitting there eating the steak, and it's kind of funny. We could order a meal and I'll eat the meat and he'll eat the veggies, and we're both healthy. So it is very personalized, that's for sure. And we can say toxins are bad for all of us, but even then some neurotoxins won't affect you the way they would affect me. So everything is personal. I think it's going to take AI for us to really know who's susceptible to what.

Dr. Charan Ranganath ([00:41:28](#)):

Well, so much of this is connected. One of my favorite studies was done by a, that I just learned about from talking to this guy. He presented at this conference, and it was a symposium on food in the brain, and he was studying this animal model in which they gave these rats the equivalent of a can of coke per day. And so these rats that got the equivalent of a coke per day in rat coke or whatever, a Coca-Cola, that is not rat cocaine. So they're having this rat Coca-Cola every day. What they found was unsurprisingly become adults, they're unhealthy, their memory functions are compromised, and they have damage to the hippocampus. Now, the interesting thing was they took those rats that had the Coca-Cola diet and they injected their gut bacteria into rats that did not have that diet. And it turned out by adulthood they had many of the same changes, many of the same memory changes, and the same brain changes that were happening in the ones that had the Coca-Cola. So what seemed to be the case is that this diet was not just directly affecting the brain, it was also indirectly affecting the brain through this gut brain interaction that is still, I think, poorly understood. But I think it hammers home some of the complexity of what we're talking about. And also just the fact that yeah, everything's so connected,

Dave Asprey ([00:42:51](#)):

It's very hard to tease it apart. And one of the difficulties is that in western medicine, we're always looking for the root cause or the one cause. Yet I've never seen a double blind placebo controlled study that says that there is always one cause of a disease condition. In fact, most often it's multiple causes. And all of our research, or at least most of it, especially in pharmaceuticals, it's designed to find the one

thing. It's like, well, what's the one thing that makes a school of fish turn left? It's many, many different things happening at the same time. So maybe we'll get to the one thing, but I suspect we're going to find out, it's a vast bucket of things that shifts around, but we will know some things that work universally. And one of the things you write about in your book is you write about pattern recognition and chess masters. What good is pattern matching in humans?

Dr. Charan Ranganath ([00:43:51](#)):

Well, a lot of the way that our brains are engaging with the world is that it's not that we're just passively recognizing patterns, but we're seeking the patterns. We're trying to find the most informative bits of information. And so one of the things about chess masters, as I mentioned, is a chess master can watch, let's say you and some other smart person sit around, play chess for an hour. They watch the match you and the match, let's say, and a chess grand watching a video of this could later on reconstruct that entire series of moves with extraordinary accuracy. So they have this ability to take this massive amount of information and compress it into something that they can encode into memory while preserving a lot of that detail. And the reason is it's not just that they're recognizing the patterns, but they're actually looking for them that their eyes know what to look at, that their brain is generating predictions about where the match will go in real time.

([00:44:54](#)):

And the most unpredictable elements are going to be emphasized in memory. And so that is the key, because if you know the patterns, you're going to look for them, but then you're also going to be more attuned to the events that violate the patterns. And that's the most informative stuff. I think it's just as, I realize this isn't so scientific, but I do think it's one of those things that I find philosophically very important is the most informative information to our brain and the most informative information to our lives is the stuff that violates our predictions, is the stuff that makes us uncomfortable because it's unexpected. And so I think a big part of being able to see patterns is to identify the things that don't fit with those patterns. If you look for it,

Dave Asprey ([00:45:44](#)):

Are you familiar with Jeff Hawkins book on intelligence?

Dr. Charan Ranganath ([00:45:48](#)):

I'm familiar with it. I haven't read it in. I've read parts of it, but I haven't read the whole thing.

Dave Asprey ([00:45:52](#)):

Yeah, one of the big theories in that book is that our brains are really predictive machines predicting microsecond in the future and things that don't match really stand out. And I find a lot of wisdom in that, and that's informed some of my thinking about biohacking and how low level decision networks in the body work even outside the brain in order to do that as a survival behavior. And it seems to be a great model, but whether it's fully accurate, I don't know.

Dr. Charan Ranganath ([00:46:19](#)):

Yeah, no, I think that there's always going to be disagreement, but I think that's a generally accepted idea that our brains do generate predictions about the world. Yeah, I mean, I know Jeff's gotten some mileage out of that. It's an old idea in computational neuroscience, and definitely it has enormous value because on the one hand, you want to be learning from the information that's most informative. So you

go back even to information theory, you find the information that's most informative violates your expectations. So just the act of generating expectations gives the brain a way to do this kind of a, it's equivalent to supervise learning in ai, if you're familiar with that, that it's like back propagation for instance, or gradient descent. All these techniques work because you're not teaching the brain, you're not teaching a neural network to memorize everything you're teaching the neural network to basically just tweak the connections in the network to optimize for the things that it didn't already know. And that's a key principle that comes up in my, is something called error driven learning, which is this idea that if we generate these predictions and information that comes in that violates these predictions, that gives us the most opportunity for learning. And that's why when we're stress testing our memory, we can get the most bang for a buck in terms of learning.

Dave Asprey ([00:47:48](#)):

Back when I worked in tech, friends would just look at me weirdly and say, Dave, you're an event correlation machine. Because I had very strong pattern matching. It probably has to do with a history of Asperger's earlier in life that I've, I would argue I've reversed it. And that's a whole long conversation about retraining visual and memory networks and neurofeedback and mitochondrial healing and all kinds of stuff. But it did leave me with the ability just to see patterns that others don't. And sometimes it's frustrating. I'm like, I couldn't see what's going to happen there, and they don't. I'm like, man, that's going to hurt if you do that. And then they do it and then they look surprised. It's not that surprising if you're me, right? But I'm sure I have my blind spots too that they make fun of me for. So maybe that's why teams of people work. I want to ask you about some of the things I've looked into and get a quick, there's meat on that bone or don't waste your time memory enhancing supplements. Is there such a thing?

Dr. Charan Ranganath ([00:48:51](#)):

There is a little bit of evidence that's come out, especially now about taking multivitamins, is staving off cognitive decline. I think that there's not a lot of evidence that you get big effects from just taking a supplement period. And I think part of the problem is that there's a more is better kind of mentality out there. And that's not really true. If you think about anything, it's like, I like coffee, but there's only so much coffee I can have before I stop functioning. And I know certain people where if they have a single cup of coffee, they can't function at all. So what I would say is that there are things that you want to do to make sure that you are capturing all your nutritional demands and so forth. And then there's certain factors, things, supplements that might increase your attention and your arousal, for instance, that can be good in particular situations and not necessarily in others. So I would say that everything's going to be more complicated than you think, but one of the things I'll tell people is that if it doesn't harm, you might as well believe in it because the placebo effect is very real. You could see placebo effects in all sorts of neurological disease research, and they can sometimes be large. So at least if you believe in something, that in and of itself will have an effect.

Dave Asprey ([00:50:14](#)):

Well, there you go. It's free. In fact, a friend years ago made placebo pills and it says placebo on the bottle. They're just empty capsules and the is you put in a little bottle and you write on the front of it what you want your body to believe, then you take it. And what do you know he found when he did double-blind trials on it. In other words, he's people who are taking empty pills that don't say anything versus pills that say something. There was more of an effect statistically significant from the placebo labeled pills. So who the heck really knows what's going on with that? But it's interesting, interesting perspective.

Dr. Charan Ranganath ([00:50:47](#)):

Yeah. Yeah.

Dave Asprey ([00:50:48](#)):

I've been taking nootropics now for 30 years. In fact, I would not have had my career in Silicon Valley. I wouldn't have graduated from Wharton without them. A mix of pharmaceuticals and a lot of natural substances. And I've formulated some that lots and lots of people have taken and it is very nuanced, and people who are younger probably shouldn't crank up acetylcholine because look at headaches. But as we age, it's probably a good thing. So it's very state dependent on what do you want to do today dependent. But the ones that got my attention the most are ones that raise BDNF or brain derived neurotrophic factor, which clearly you know what that is. But just defining that for listeners or NGF nerve growth factor and things like the right extracts of lion's mane. Most of the lion's mane you see in coffee today doesn't actually do that.

([00:51:35](#)):

They're just taking Chinese roots. But if you get alcohol and heat extracted tincture, I noticed a difference. And I'm an investor in Paul Davis' company that's using microdose psilocybin with niacin and properly extracted lion's mane, and they're showing regrowth of neurons throughout the entire brain. And this is a pharmaceutical company that's pursuing this, and I'm going, all right, if I can raise plasticity or neuroplasticity in my brain as I age so I can learn more easily like a younger person, those are probably some natural compounds worth investigating to see if they improve things for you or not. Do those strategies sound possible or useful or like not enough research

Dr. Charan Ranganath ([00:52:21](#)):

Mean? Well, definitely as a scientist, you could always say more research is needed. You certainly brought up a lot of different directions. And so I'll tell people it's hard to study these things because there are so many interactions that you'll see you're taking some blood pressure medication or you have some particular genotype or you have some particular dietary thing. And these interactions can really make it hard to say conclusively that for every person who does this, you're going to see a benefit. It, you can get these averages, but the averages aren't that useful. They'll often show some small effect, if anything, and it can be very hard to really get a big effect, or at least to predict something that's going to have a big effect on everyone. So I think it's always good just to have some kind of a sense of pragmatism about what to expect from different kinds of intervention.

([00:53:23](#)):

But what I would say is that there's a lot, so I, and again, I'm sure in your show you go over so many of these things, but there's so much low hanging fruit out there that people aren't even grabbing right now in the moment. Like you said, we talked about fitness, this one talked about sleep and so forth, and dietary finding an optimal diet that's right for you. And so I would definitely say all those factors are good. And you mentioned psilocybin and so forth, and this is something that we mentioned right before we started recording. There's a lot of really interesting research being done now on psychedelics and plasticity. And my next door neighbor, actually David Olson, is involved in some of this research, and I think it's going to have some big implications for the way we look at mental illness, especially in the future. Yeah, I could talk more about that if you want.

Dave Asprey ([00:54:22](#)):

I'd love to. In fact, at 40 years of Zen, that's my neuroscience clinic for brain upgrades for executives and people. We are in the process of rolling out ketamine assisted neurofeedback where we do a dose of ketamine on the first or second day just because for 72 hours you get a huge increase in neuroplasticity. And since people are doing really substantial rewiring of networks in the brain, having more neuroplasticity is a really good thing. Plus certain psychedelics induce one of the states that's required for the type of reprogramming of your triggers. That's a part of the program. So kind of kills two birds with one stone. But the neuroplasticity effect of things like, I dunno if MDMA does it, but LSD, things like mushrooms and things like ketamine, they're, they're pretty good for you if you wanted to have a brain that could re-pattern. And they all have downsides, but what's your take on those? Are you interested? Are you concerned? Where are you?

Dr. Charan Ranganath ([00:55:24](#)):

I'm definitely interested, and I think one of the interesting things about psychedelics and also about some of these other drugs that you mentioned, like so ketamine isn't a classic psychedelic, but substances along these lines, they dry plasticity for sure. And there's something that they've talked about for a long time in computational neuroscience, which is called the stability plasticity dilemma. And the basic idea behind it is to say, well, sometimes you want the brain to be plastic, and other times you don't want the brain to be plastic because essentially anytime that you're writing something, you have the potential to delete or alter something else that you're not trying to effect, because memory is this big ecosystem. So where these drugs, I think really have potential, especially as in dealing with traumatic memories or dealing with habits or dealing with persistent thought patterns and so forth, basically ways in which the brain is generating retrieved memories or generating predictions about the world that need to be fundamentally changed and ramping up plasticity can really help rapidly alter those kinds of neural patterns.

([00:56:46](#)):

Does that make sense? So in other words, for instance, if you have PTSD, one of the things that we know is that a lot of behavior therapies geared towards essentially teaching the brain to sort of suppress memories for these traumas in particular context. But there's another approach which is called interfering with reconsolidation, which basically means that when you reactivate a memory, it can become labile again. It can become susceptible to change. And if you interfere change plasticity during those moments, you could basically allow that memory to be updated in a different way. So when people are on psychedelics, for instance, they report being able to recover these memories, but they experience it from a dramatically altered perspective. It's from a third person, and they're very distanced. And so that gives the brain the opportunity potentially. I'm saying very clearly, this is speculation on my part, but it does give the brain the opportunity to revise and update that memory so that you have a lot of the content of what happens, but the feeling is dramatically altered. You

Dave Asprey ([00:57:55](#)):

Just exactly explained the reset process that I bring clients through at 40 years Zen. It's about accessing a memory, using an emotion, and then changing the associated emotion so there's no longer a trigger that's tied to the memory so you can look at the memory and be done with it instead of it constantly changing your behavior all the time. I've done a lot of work on that on myself, and it makes it very hard to trigger me, which is really useful as an executive and just as a human being and it creates a kind of freedom that's really important for me. I think it's healthy, but I get a lot of clients who ask this question, can you delete a memory? How would you go about doing that?

Dr. Charan Ranganath ([00:58:38](#)):

Well, I would start by saying that you don't necessarily want to delete the memory because I think it's like you want to delete change the way that you think about that memory. Yes. And change the narrative that you put on that

Dave Asprey ([00:58:50](#)):

Memory. Change the pain of the memory, but don't lose the memory. Don't

Dr. Charan Ranganath ([00:58:54](#)):

Lose the memory itself. That's exactly right. Now it's true that the act of recalling a memory in and of itself can change it. And I think when I used to work in the clinic, one of the things that you'd find is that people weren't really happy until they shared a memory that, I mean when I say happy, I mean they really felt like what they were there for was to share these memories that they hadn't shared with anyone. And so when you have these memories, let's say, of a trauma shameful experience that you've never shared with anyone, your experience of it is entirely based on the story that you've created in your head. Once I tell you my story and you give it back to me from your perspective, that transforms the memory at least just a little bit. It transforms the emotional context, it transforms the meaning of it.

([00:59:48](#)):

And the more times that memory is shared and processed in different contexts and reframed and viewed from a different perspective, the more opportunity there is to revise the memory and change it. And we can see this in, we have all sorts of memories of things that are happy, but as you tell the story a thousand times, it could become kind of bland, right? In other words, it's like I don't relive this great memory of something after I've told the story for the thousandth time. And I think the same can be true with negative memories as well, that it's like as we share the memories and view them from different perspectives, it allows us to decouple the actual data from that feeling of which is the more radioactive part of it.

Dave Asprey ([01:00:37](#)):

I've had a few clients come through 40 years of Zen who were, let's say, members of toxic groups where they'd get together and they'd ruminate and complain about something in their life to each other and then validate each other's negativity. And it feels like some sort of a trap where you're doing that and instead of it being heal, I'm going to share my feelings. And then someone say, yes, your feelings are valid, you should be even more angry. And yeah, that's it. And it feels like we're almost building social media to create this effect on people. What's the downside of rumination?

Dr. Charan Ranganath ([01:01:09](#)):

Oh, well, rumination is basically all downside. There's basically reflecting in ways that are productive, which should be like, okay, so next time here's what I would do differently. Or you could reflect and be like, boy, that was terrible. I'm glad I passed that period. Now rumination would be you just keep regurgitating that negative memory over and over and over again, and it has a terrible effect on your mood at the present. I mean, researchers have shown, if I want to get you in a sad mood, all I have to do is ask you to recall one or two sad memories. And likewise, if I want to get you into a happy mood, all I have to do is get you to recall one or two happy memories. The emotions that are carried with these memories affect your mood in the present. And so what can happen with rumination is it can get you stuck in this loop of recalling something and regurgitating this information that's negative, but then that makes it easier to see other negative memories.

[\(01:02:09\)](#):

So pull up more negative memories. What happens when you pull up more negative memories? Well, now you're ruminating more and you feel even worse. And so you can get down into the cycle where retrieving negative memories just gets you into a worse and worse place. And so yeah, I never tell people, you just want to pull up a negative memory and just wallow in it. That does not help anything. It's not a matter of simply recovering the memory, and now that I'm aware of it, awareness is going to make everything okay. It's like you said, you can actually get this toxic level of wallowing in this negative memory that can be terrible, even though nostalgia can also be like this. Actually, as I talked about in the book, nostalgia used to be talked about as a disease, but because people, if they look at times to the past, they go, boy, everything was great then and now my life is terrible.

[\(01:03:04\)](#):

Well, that's not good for you. And it's also based probably on a biased and inaccurate view of your past. And if you look at every, I mean, it's basically the playbook of any person who wants to be like an authoritarian leader. What do they do? They start to revise history and say, everything used to be great, and now some outsider came in and screwed everything up and queue the next holocaust. You can see this on the collective level as well. This happens over and over and over again. I think people need to understand the limitations or the way in which memory affects them and understand the limitations of how selective they can be. If I'm remembering something like I'm getting into a fight with somebody who I really care about, I can pull up a thousand things that are wrong with this person based on all these negative experiences I've had. But then once we're getting along, not only can I not remember those thousand things, I don't even remember what we were fighting about. So our memories can be extraordinarily selective and I think people need to appreciate that it can get them in trouble. Otherwise,

Dave Asprey [\(01:04:10\)](#):

I go through this model. In fact, this is in my next book that I'm writing right now. It's a model that comes from loud zoo's work, and it's that there's kind of four kinds of people, and this is all about memory. And there's some people who are win-win all the time, so they do something. The other person always wins. Not a lot of those people, but we like 'em. Most people, they're usually win-win, they screw up, they don't see something, but you tell 'em, Hey, that sucked. And then they say they're sorry and they make it right. So these are normal progressing humans. But then you get into the category. So there's category one, category two, then category three, and these are people who regularly ruin relationships and companies and I work with several. And the idea here is they're win lose, but they rewrite their memory to believe that they're the people.

[\(01:04:57\)](#):

They're standing, holding a knife covered in blood in a locked room with video of them murdering someone and they say, well, it wasn't me. I couldn't have done it. I'm a good person. And then they remember that they didn't do it, but they did. They believed their own bs. And then there's category four, they're sociopaths. They know they did it, they're just lying and they're good at it. And it's the category threes that regularly. People, sometimes people label that as narcissism, but it's just a willingness or maybe a flaw where you just believe your own bs, which is rewriting memories. What's going on with our predisposition to doing that?

Dr. Charan Ranganath [\(01:05:31\)](#):

Well, when we recall an event, we recall it from a particular perspective based on our beliefs in the moment. So I think you pretty much said it. If I believe I'm a good person and I'm recalling all these bits

and pieces of the past, my beliefs are going to shape that story that I tell when I reimagine how that event took place. And so as a result, I'm going to focus on the things that are more consistent with my beliefs. And I'm not going to look for the information in memory that's inconsistent with my beliefs. My beliefs about who I am as a person will determine what I can see in memory, and then it will determine the story that I tell from those bits that I actually do pull up and it can blind us to the parts that are inconsistent with my beliefs.

[\(01:06:21\)](#):

So if we don't surround us with people who are willing to, for lack of a better word, call us on our bullshit, we are going to be very biased in our memories. On average, people tend to have a positive bias in their memory, and they tend to remember themselves more positively than they really were. So this is kind of a normative thing, and I'm sure some people are much more extreme than others, but I think again, it's important to appreciate the fact that our memories are based on our beliefs. That doesn't mean they can't change, that we can benefit from other people's perspectives, but by and large, if I'm a fan of a particular football team and I watch that game, I'm going to remember the things that are consistent with my beliefs about the team in the first place. And if you want to be accurate, you might want to ask yourself, what doesn't fit with my expectations? What doesn't fit with my beliefs?

Dave Asprey [\(01:07:18\)](#):

If you're in a relationship with someone, look everyone misremembers, but if they constantly misremember and they're always the winner, or you have an executive who maybe loses \$28 million in one year while believing they're losing \$4 million, I had that happen once and that same person misremembers that she was running the company successfully despite the obvious outcome of that kind of behavior. This is a few years ago. And so obviously if you're dating or you're working with someone in your company who behaves that way, my recommendation, especially in the next book, but in general is stop working with them. But if you're one of those people and maybe you're questioning, my God, everyone says I'm a narcissist or there's something wrong with me, how would you go about learning how to remember accurately instead of having an imaginative memory?

Dr. Charan Ranganath [\(01:08:10\)](#):

Well, you want to start off by appreciating the fact that we do have an imaginative memory, that imagination is part of memory. So if you start off with the assumption that I'm going to have these biases, then you have to ask yourself, what can I do to counter the bias? You don't want to say, is the bias not going to be there? It's going to be there. The question is, what can you do to counter? So a big thing that I talk about, especially in the book is curiosity can be very important. And I think a lot of times our biases lead us to not be curious. Our biases blind us to what's right in front of us. Sometimes that doesn't agree with what our predictions are about the world. I often say in science, if somebody says something and half the people in the audience say, oh, we already knew that, and half the people in the audience say, it's totally wrong.

[\(01:09:03\)](#):

Well, that's going to be your novel innovative idea. And often I think people respond to things that deviate from their beliefs or expectations or predictions with a little bit of anxiety or fear. They want to cover it up, which pretend it's not there, explain it away. And so I think really approaching the past with a perspective of curiosity and approaching the present with a perspective of curiosity is very important. And checking with other people sometimes if need be to the more feedback you get, the better. Nate Silver talks about it, this of the book Signal and the Noise, and you could see this in Danny Kahneman's work on decision-making that it's like the people who are the most accurate in any field are the ones

who actually get feedback and are able to learn from that feedback. But if we blind ourselves to the feedback in the first place, or if we just look for what we want in the feedback that we get, we're denying ourselves this massive opportunity to not just remember more accurately, but to learn and perform better in the real world.

Dave Asprey ([01:10:06](#)):

Yeah, I believe that having a network of friends willing to tell you the hard stuff, who are courageous enough and trusting enough that you're not going to bite their head off, it's rare and it's something I've cultivated. So if you're one of those friends, you know who you are. And I sure appreciate you guys because like I said at the beginning, one of the things I've learned on my path is that all humans, my powers of self-deception are very strong. They're just invisible. And so it's our job to make sure there's systems in place so that we don't believe our own bullshit because that causes a lot of harm if you do. Now, there's some other stuff out there that some people would call bs. Some people might call it ESP or some sort of psychic power, but you talk about spider sense.

Dr. Charan Ranganath ([01:10:53](#)):

What

Dave Asprey ([01:10:53](#)):

Is your definition of spider sense and how has it affected you?

Dr. Charan Ranganath ([01:10:57](#)):

One of the things that I argue about in the book is that a big part of memory is really generating predictions about the future. So the future hasn't happened yet, and so if I tell you I can predict the future, basically you could say, well, this is ESB, this is superstition. This can't possibly be true. But we do this routinely all the time, and in fact, we're actually pretty accurate at it. So as we've been talking right now, you're probably not just hearing every word I say, but you're thinking, where's he going with this? What's the point? Where is he going and sharing these predictions about where things will go? Likewise, everyday life I go through and I order a cup of coffee at a cafe. I'm fully expecting a barista to make my cup of coffee and hand it to me. I'm not expecting the barista to throw that coffee in my face. It could happen, right? It's not that the future hasn't happened yet, but memory gives us the ability to generate these expectations. And you can see this even without our awareness. So for instance, in some work that my colleagues have done, and I've done some work on this, if you look at people's eyes, our eyes will gravitate towards areas in our environment based on our predictions about what's likely to happen.

([01:12:20](#)):

And if we have things that violate these predictions, our eyes will go right to them. So I describe in the book a story of coming to my apartment and my eyes just gravitating towards these spots in my apartment where I could just immediately tell something changed. And so I talked about it as a spider sense because in the old Spider-Man cartoons, you might remember that Spider-Man would have this sense that that danger was afoot and something was wrong. You'd have to mobilize. They cut that out of the movies for some reason. I have no idea why, but it was a big part of the cartoons, and I loved it because it captures that feeling that you have when something's not right, when memories told you that the world doesn't fit with how it used to be. And those are the moments again, which are just so informative and so valuable. And that's one of the things that I really enjoyed writing about in the book was just how memory attunes us not only to what is expected, but also to the unexpected as well.

Dave Asprey ([01:13:21](#)):

Do you think that the spider sense you're talking about is something that's done consciously through memory in the brain, or is this done in the body? Where does it come

Dr. Charan Ranganath ([01:13:33](#)):

From? I would say that it is the brain's part of your body and it's interconnected. So one of the things that I think that happens, for instance with phobias and anxiety disorders is that they're accused that people process and that can mobilize these physiological responses to a threat that may never come. Your heart rate starts to increase, your eyes start to dilate a little bit, and those are all responses to something that may or may not happen yet, but it's also driven by associations in your brain that are linking up these features in your environment, these things that you perceive to these bodily responses that you need to prepare for a threat, for instance. So a lot of anxiety is really in fear, is driven by expectations and predictions about things that your brain is trying to generate. And the problem with anxiety and fear is that when something bad happens on average, if you think about it from an evolutionary perspective, it's better for your brain to err on the side of over predicting than under predicting. It's better for your brain to have predicted a threat and have it not be there than to miss a threat and have it be there. But that's what leaves us often with this overly active fear and stress responses because we're constantly generating these responses to things that never actually happen in the first place. And it can be slow to overlearn that those responses aren't correct. And that's a big part of behavior therapy is just brute forcing the brain into altering those associations in the first place.

Dave Asprey ([01:15:23](#)):

I like how you described that, and I believe a lot of this comes from emergent decisions from a highly distributed network of mitochondria, which are ultimately environmental sensors, and they're doing all kinds of invisible processing and filtering, and then we get that feeling of unease and then our eyes are drawn to those points, and then we just know because it was almost like a pre-processing knowing, and then we thought about it and then like, ah, there must be a bad guy in here, or whatever the deal is. And it's hard for us to see it in ourselves in real time unless you really consciously cultivate a process for that. And that's something I've worked for years on as part of my meditation process is just being aware of how I'm being aware and that curiosity seems to be paying benefits over time. But I'll tell you when I'm 180. Now, let me ask you this as a final question in a very fascinating interview. If you could be as he or healthier than you are now, how long would you want to live?

Dr. Charan Ranganath ([01:16:24](#)):

If I could be as healthy or as healthier as I am now, how long would I want to live? God, that's such a good question. I should have prepared for this question. I honestly would say maybe a hundred. I really feel like I've got a place in this universe, but it's just like I'm one part of this bigger system and I don't need to be around forever. I think. I guess I would like to be a part of this whole connected universe as long as I can make it a slightly better place at least. And you can't necessarily control all the factors that are going on in the world, the fate factors that will allow you to make those contributions. But yeah, I guess I'm sorry if it's such a stupid answer to your question, but it's like it's

Dave Asprey ([01:17:20](#)):

Not stupid at all. It's a deep question. A lot of people say around a hundred because that's what we're programmed for when we go pattern matching historically. And my number is at least 180, and that's after writing a very detailed book on longevity and going through all the things that are extending

lifespan, not health span, but extending lifespan in mammals by 30%, by 90%, and then knowing the CEOs and head scientists at a bunch of companies doing research, I'm like, oh my God, we're actually all over the globe cracking the code right now. I've been doing longevity for 25 years. And so it is interesting to have people ponder that. Well, if I felt this good and I felt this motivated to give back, but I had wisdom and pattern matching going back a hundred years, I hope I feel like I'm just getting going when I'm a hundred, I can finally really give back. I want to have that kind of wisdom of the ages and be young and happy and be willing to share it with people who care. And that seems like fun. And if it's not, you can always skydive without a parachute. It's like you can't end it when you're done. So that's where I'm sitting right now. I think 180 is conservative. It's just 50% better than our current best with technology's help. Doesn't seem crazy, but maybe it's,

Dr. Charan Ranganath ([01:18:34](#)):

Well, I want to last just as long as the people I love for are around, so I'd want to make sure that they're also able to have that same longevity. You're

Dave Asprey ([01:18:42](#)):

Going to have to join the longevity movement then because you're going to have to keep all the people around you that you like, keep 'em young, but the people you don't like those category threes, they might just fall into a wood chipper or something, and that's their own problem and not yours. So I'm with you there.

Dr. Charan Ranganath ([01:18:58](#)):

Yeah. Well, one of the things that you brought up too reminds me of something that came up for me in writing the book is The Brain does Change over Time and some of those changes as you pointed out, you don't want, and we can stave them off, and there's all sorts of things that people could do with their health to improve it. But I would also say that it's like don't want necessarily, I mean your brain should be changing over time, that there are different stages of life that we have, and I think you brought up a very important point about at some point, transitioning from having life be about just acquiring more and more episodic memories to being able to transition to sharing more of your wisdom and the semantic knowledge that you've got from a lifetime of having essentially overcome mistakes and error driven learning so that other people don't have to deal with making the same mistakes that you did over time.

Dave Asprey ([01:19:54](#)):

I'm only here today because in my twenties when I was 300 pounds and really sick with Brain Fog, some people in their eighties and nineties that ran a longevity group took me under their wing and mentored me. It taught me all the secrets of longevity. It was cool, and that became biohacking and it was learning from my elders. I was pretty much too frustrated with failing myself. So I'm a huge fan of wisdom, and all of my friends over 80 are some of the most precious friends I have because they know so much and they're so happy to share. For listeners, you help older people stay young when you hang out with them, and they help you become wise when hanging out with you, and that's going to give you the kind of memories that you want, which is going to motivate you to read Why We Remember, which is a fantastic book.

[\(01:20:38\)](#):

Thank you for being here. Thanks a lot. It's been a lot of fun. If you liked today's episode, go ahead and click subscribe on YouTube, or if you're on another podcast platform, make sure you're subscribed. You

get two episodes a week where you hear interesting questions with more interesting guests, and you always learn something. If you want to live a very long time or be smarter than you are today or better looking, or just be happier and more fulfilled, there's 1200 episodes to teach you how, and there are AI tools based on all of this coming your way. I'm just going to tell you what to do in the least possible time to be the person you want to be. Stay tuned. You are listening to The Human Upgrade with Dave Asprey.