Welcome to the Huberman Lab podcast where we discuss science and science-based tools for everyday life. I'm Andrew Huberman and I'm a professor of neurobiology and ophthalmology at Stanford School of Medicine. Today my guest is Dr. David Spiegel. Dr. Spiegel is the associate chair of psychiatry and behavioral sciences at Stanford University School of Medicine. He is also the director of the Stanford Center on Stress and Health. Dr. Spiegel is both a researcher and a clinician, meaning he runs a laboratory that studies the brain and the body and neural mechanisms of how the brain and body interact, and he sees patients as a psychiatrist at Stanford. His work is incredibly unique in that it bridges mind and body, but it also has a particular focus on the clinical applications of hypnosis. As you learn today, hypnosis is a unique brain state in which neuroplasticity, the brain's ability to change in response to experience may be heightened. And indeed, the use of clinical hypnosis by Dr. Spiegel and colleagues has been shown to improve symptoms of stress, chronic anxiety, chronic pain, and various other illnesses, including many psychiatric illnesses, and even outcomes in cancer. Today we discuss hypnosis in the context of what's called self hypnosis to distinguish it from stage hypnosis. Many of you are probably familiar with stage hypnosis, which is really about a hypnotist getting a person to do things that they would not otherwise do. In contrast, clinical hypnosis, and the use of hypnosis for the treatment of various ailments of mind and body, is vastly different. It involves getting people to change their brain state, and to use that brain state as a portal to make adjustments in their brain and body, and other aspects of their biology and psychology that benefit them. And it's been shown over and over again in studies by Dr. Spiegel and colleagues that those changes can occur extremely quickly. Now, not everybody can be hypnotized as readily as the next. And so today we also discuss a simple test developed by Dr. Spiegel that can help you determine whether or not you have a high medium or low degree of what we call hypnotized ability. Dr. Spiegel is truly an expert in this area. He has published over 480 journal articles, 170 book chapters on hypnosis, and on things like psychosocial oncology, which is the interaction of mind and body in the treatment of cancer and cancer outcomes, on stress physiology, trauma, and other aspects of psychotherapy. He's published 13 books. So he's truly the world expert in hypnosis and clinical applications of hypnosis for mind and body. I'm certain that in listening to today's episode, you're going to learn a tremendous amount about how the brain and body interact, about various treatments for all sorts of common ailments of mind and body, and you are going to get access to tools in particular a tool that was developed by Dr. Spiegel, which is the Reverie app, R-E-V-E-R-I. The Reverie app is currently only available for Apple, but will soon also be available for Android. It does carry a nominal cost, but there is a seven day free trial. If you'd like to try it, we're providing a link in the show notes. The Reverie app is special in that it is based on clinical studies and research done in the Spiegel lab at Stanford. So unlike a lot of hypnosis apps out there and resources for hypnosis, it was developed with clinical treatments in mind. Today we also discuss the use of breath work, and I'm very fortunate that my research lab at Stanford has been collaborating very closely with Dr. Spiegel in testing and developing specific breath work protocols to adjust mine and body for things like anxiety, improving mood, and improving sleep. Based on his incredible and unique expertise and the clarity with which Dr. Spiegel communicates information, I anticipate that you will really enjoy today's episode and that it'll come away from it with a lot of actionable tools. Some of you might be curious what a clinical hypnosis session looks like, and for that reason we had Dr. Spiegel hypnotize me. A clip of that hypnosis session is going to be posted to the Huberman Lab Clips channel, which is available on YouTube. Before we begin, I'd like to emphasize that this podcast is separate from my teaching and research roles at Stanford. It is however part of my desire and effort to bring zero cost to consumer information about science and science related tools to the general public. And now for my discussion with Dr. David Spiegel. David, thank you so much for being here. Andrew, my pleasure. Can you tell us what is hypnosis? Hypnosis is a state of highly focused attention. It's something like looking through the telephoto lens of a camera in consciousness, which you see with great detail, but devoid of context. If you've had the experience of getting so caught up in a good movie that you forget you're watching a movie and enter the imagined world, you're part of the movie not part of the audience. You're experiencing it. You're not evaluating it. That's a hypnotic-like experience that many people have in their everyday lives. So is any experience that really draws us in hypnotic in that sense? Or let me give a different example. If I'm watching a sports game and I'm really wrapped up in the game, but I'm also in touch with how it makes me feel in my body, kind of registering, you know, the excitement or the anticipation. Is that a state of hypnosis also? Because you mentioned there's kind of a narrowing of context, but a kind of losing of the self. Or is it, do I have that right? Yes, it is true that you're to the extent that your somatic your body experience is a part of the sport event that you're engaged with. I'd say that is a self-altering hypnotic experience. If your physical reactions are distracting you or make you think about something else, that's when it's less hypnotic-like and more just one of a series of experiences. So I have to ask, how did you get into this business of hypnosis? Because I think for most people when they hear hypnosis or they think about hypnosis, they think of stage hypnosis. I think of somebody with a pendant going back and forth or people up on a stage, behaving abnormally for the entertainment of others. How did you get into hypnosis as an interest, as a practice? And could you contrast the sort of hypnosis that you do in the clinical setting with the sort of hypnosis that a stage hypnotist does? Sure. Well, it is something of a genetic illness in my family. Both of my parents were a psychiatrist and psychoanalyst. And they told me I was free to be any kind of psychiatrist. I wanted to be. So here I am. My father was training to be a psychoanalyst in 1943. And he ran into a V&E's refugee who couldn't serve in the army but who had studied hypnosis. And actually it would interest you doing your ophthalmological research. He had a smallpox scar right in the middle of his forehead. And he did forensic examinations. And he noticed that some of the prisoners would focus on that spot on his forehead and then close their eyes and seem to go to sleep but they were in some altered state. So he got interested in hypnosis. He used it forensically. His name was Gustav von Schaffenberg. And he offered to teach young psychiatrists how to use hypnosis when they went off into the war. And so he trained my father. And my father got off the analytic couch and asked the analyst mentioned it to him. That's how he found out about it. And my father said, did I say something wrong in analysis? Why is he talking to me? And he found it very useful in helping soldiers who had acute pain when they were wounded and helping people with conversion post-traumatic stress disorders. And when he came back, he went back to his training. But he still was sort of interested in it. And he had his one of his supervisors was Frida Firmreichman who was a very famous psychoanalyst. And he said that he had been told to stop doing hypnosis because it would ruin his reputation as an analyst. And she said to him, what are you so worried about your reputation for? You're going to give a course at the Institute in hypnosis. And I know you're going to do it because I'm going to take it. So he was teaching Frida Firmreichman hypnosis. And he just kept doing it. And after a while he discovered that he was getting better results with a few sessions of hypnosis than he was with daily psychoanalysis with his patients. And so he switched his practice. And so the dinner table conversations were pretty interesting. And occasionally when he was making a movie of a patient, I would get to watch that. And so when I went to medical school, I figured I'll take a course. It was Tom Hackett who was a chair of psychiatry of mass general was teaching. And it was a very interesting course. And the day that converted me was I was doing my rotation to children's hospital in Boston. And the nurses telling me, Spiegel, you're an ex-patient as an asthmatic in room 437 or something. And I'm just following the sound of the weasers down the hall. I go in the room. This is 16 year old girl knuckles white bolt upright in bed struggling for breath. You can hear the weasin. She twice had subcutaneous epinephrine didn't work. They were thinking about general anesthesia and starting around steroids. And her mother's there crying. And I said, I don't know what else to do. So I said, want to learn a breathing exercise and she nods. And I got her hypnotized. And then I realized we hadn't gotten the asthma in the course yet. So I made up something very complex. I said, each breath you take will be a little deeper and a little easier. And within five minutes, she's lying back in bed. Her knuckles aren't white. She's not weasin. Her mother stopped crying. The nurse ran out of the room. And the intern, my intern comes to find me. And I figure he's going to pat me on the back and say nice job, Spiegel. He said the nurse has filed a complaint with a nursing supervisor that you violated a Massachusetts law by hypnotizing a minor without parental consent. And I thought, you know, well, that's nice. You know, I doubt there is a law like this. So the intern says you're going to have to stop doing this with her. And I said, why he said it's dangerous. I said, you're going to give her generalize. He's your reporter on steroids and talking to her is dangerous, you know, said, well, you have to do it. And I said, I'll tell you what, take me off the case if you want. But I'm not going to tell a patient to mine anything I know is not true. So there was a battle over the weekend about what to do in the intern, the chief resident, tending, we're all arguing about it. And on Monday, they came back with a radical idea. They said, let's ask the patient. I don't think it's ever been done at children's hospital before. And she said, oh, I like this. You know, she'd been hospitalized every month for three months in status as Maddicas. You know, one subsequent hospitalization, but after that went on to study to be a respiratory therapist. And I thought that anything that can help a patient that much violated non-existent Massachusetts law, frustrate the nursing supervisor had to be worth looking into. So I just kept doing it. I discovered that there were, you know, all of my classmates in medical school had just read the new issue of the New England Journal and had some new medication to suggest. And I would, you know, surgeons would say, look, if you can help this guy with his pain or his anxiety, anything above the neck, that's yours, do it, Spiegel. So, you know, I was having fun and being able to learn how to help people in a way that just otherwise was not being done. And so it got me thinking about the fact that, you know, we're born with this brain, but we don't have a user's manual for it. And we don't use it nearly as well as we can. And that's something your research is all about too. And so I thought, I want to, I want to understand this better. And I want to see what we can do. Stage hypnotists drive me nuts, you know, they, they make fools out of people. There was one, my, this is a case my father was involved. He got a call from, he was a Columbia. He got a call, Spiegel, you got to come see this woman. She's in the ER and she's in some kind of weird, upsets state that happened and it turned out she'd been on the show with a stage hypnotist. And what they do, by the way, is they cycle around, you know, they have a, the beginning of the show, they don't just grab somebody and say, we're doing this, they get a bunch of people up, they do what amounts of hypnotizability testing to see if people, and they get the ones who are the most hypnotizable. So she was the one. And he said, there's now a little bird in your hand and you're going to play with the bird. And she starts to cry and scream and he just gets her off the stage because it's very upsetting. And she's wanting around New York City in the middle of the night, dissociated and brought to Columbia. And that's where my father saw her. She was still in a kind of uncomfortable, trans-like state. And it turned out that she was the trophy wife of a very wealthy guy. And she felt like a bird in a gilded cage. And so to her, that image just triggered all of this sense of dissatisfaction, discomfort, fear about her life. And he was able to get her reoriented and talk with her about what she was going to do with her life. But I don't like stage of noses. You're making fools out of people. And you're using the fact that that's what scares people about hypnosis. They think you're losing control. Your gaining control. Self hypnosis is a way of enhancing your control over your mind and your body. It can work very well. But because it gives you a kind of cognitive flexibility, you're able to shift sets very easily. To give up judging and evaluating the way you usually do. And see something from a different point of view. That's a great therapeutic opportunity. But if misused, it could be a danger to. And that's what scares people about it. It is that very ability to suspend critical judgment and just have an experience and see what happens. That can be a great therapeutic opportunity. But if somebody's misusing it can be a way to harm people. And you know, there are plenty of examples of people having fantasies imposed on them that they come to think are realities. It's not unusual these days. So it's an ability that if people learn to recognize and understand it can be a tremendous therapeutic tool. I've been stage hypnotized. And I've been clinically hypnotized many times through self hypnosis app. We'll talk about later. And then I know we have plans for you to hypnotize me today. You've done it once before. And I'm very hypnotizable as we both know. We'll talk about how one can engage their hypnotizability. Sure. But the stage hypnosis was interesting. This was in college. You know, they brought someone out to the dormitory and I recall being one of the people that was selected. And engaging in very bizarre behavior. It wasn't thoroughly embarrassing, but it was pretty embarrassing. And then being sent off the stage. And as I was exiting suddenly screaming something out because he had planted a suggestion of some sort. And then I was told to look in my pocket. And there was like a I think a torn up dollar bill. There were a bunch of things that I have vague recollection of. But it raises a set of questions that really boil down to you know as a biologist I always think that you know there's no there's no events in the brain. They're processes. And so hypnosis we know has an induction. Then one is hypnotized. I imagine. And then it sounds like this woman in this example of the bird. And being in being distraught in New York City is a failure to exit the hypnotic state. Do we know what sorts of brain areas are active during the induction the what's called the deep hypnosis. And then what's shutting off or changing as people exit hypnosis. Yes, yes, we do. We've studied that. We've been very interested in that. And so we did a study where we selected highly and non-hematizable people. So we could do the comparison and then hypnotize them in the functional MRI scanner. And we found three things characterize the entry into the hypnotic state. The first is turning down activity in the door cilantro is singular cortex. So the DACC is in the central front middle part of the brain as you well know. And it's part of what we call the salience network. It's a conflict detector. So if you're engaged in work and you hear a loud noise that you think might be a gunshot, that's your anterior singular cortex saying, hey, wait a minute. There's some potential danger over there. You better pay attention to it. So it's a it compares what you're doing with what else is going on and helps you decide what to do. And as you can imagine turning down activity in that region, make it less likely that you'll be distracted and pulled out of whatever you're in. And in another study, we found that highly and hypnotizable people, even without being hypnotized, have more functional connectivity between the DACC, the anterior singular cortex and the left or cilantro prefrontal cortex. So which is part of the key region and the executive control network. So when you're engaging in tasks, you're enacting a plan, you're writing a paper, you're doing whatever you're doing, that's the the prefrontal cortex is doing that. And so if that is coordinated, we found more functional connectivity. So when one is up, the other's up and one is down, the other's down, that coordination implies that the brain is saying, OK, go ahead. And you know what you're doing, carry out that plan and don't worry about other possibilities. So two other things happen when people are hypnotized. One is that that DLPFC has higher functional connectivity with the insula. Another part of the salience network, it's a part of the mind body control system sensitive to what's happening in the body. It's part of the pain network as well. A region of the brain where you can control things in your body that you wouldn't think you could. For example, we did a study years ago where we took people, we were highly hypnotizable hypnotized them and told them to imagine we went on an imaginary culinary tour. So we would they would eat their favorite foods and we found that they increased their gastric acids accretion like by 87%. So their stomach was acting as though it was about to get. I mean, there was one woman, it was so vivid for her that halfway through she said, let's stop. I'm full. You know eating these imagine having never eaten. And never eat an actual no incredible and then we got them to relax and think of anything but food or drink and we got like a 40% decrease in gastric acid secretions. So they could and that was DLPFC through the insula telling the stomach, you're getting food or you're not getting food. And even we injected them with pentagastron, which triggers gastric acid release. And even then in the hypnosis condition, they had a 19% reduction in gastric acid. So the brain has this amazing ability to control what's going on in the body in ways that we don't think we have ability to control. That's just one example. So that's the DLPFC insulate connection. And the thing that happens and this relates to what you did on the stage is you have inverse functional connectivity between the DLPFC and the posterior singular cortex. The posterior single it is part of the default mode network. It's in the back of the brain. It's an area whose activity goes down, for example, in meditators and in meditation, you're supposed to be selfless. You're supposed to de-selfish in illusion. You're supposed to let it dissolve and just experience things. And when you're doing that, the posterior single is decreasing in activity. The inverse connection is I'm doing something, but I'm not thinking about what it means for me. I may not even remember much of it. If I do, I don't care that much about it. And so that is part of the dissociation that occurs with hypnosis. So it's how you put things outside of consciousness awareness and don't worry about what it means. It also adds to cognitive flexibility. If you're thinking, well, people like me don't usually do this, that may inhibit you from enacting a new form of psychotherapy, for example, that you've never done before. But if you're having this decreased activity in the part of your brain that reflects on what it means, you're more likely to be cognitively flexible and willing to give it a try. And that's one of the therapeutic advantages of hypnosis as well. Fascinating. And it's really, I'm going to put an embarrassing here a little bit in the positive sense. Your laboratory is really the one that's pioneered brain imaging of hypnotic states. And it sounds like that's my understanding. Is that correct? Yeah, I mean, there are other people who have done excellent research too. But pure rainbow and Montreal and several other people. But we're one of the leading lamps and neuro imaging of hypnosis. I have to ask about attention deficit hyperactivity disorder. I get a lot of questions about this. And I think a lot of people just struggle with holding attention nowadays because of, you know, interference with phones and devices. And I, of course, there is a lot of clinically legitimate ADHD out there. But the way that you describe the dorsal interior, Singulate and the saline network and this conflict detector of, you know, my focusing on something or am I splitting my attention? How distractable am I seems to relate to some extent to activity in the dorsal interior, Singulate cortex? Do people with ADHD display disruptions in elements of these networks and has hypnosis ever been used to or self hypnosis, I should be to distinguish from stage hypnosis clinical and self hypnosis been used to enhance people's ability to focus and hold attention. Because that's such a built in component of the hypnotic state. It's a great question. There are, there's sort of two ways to think about it in terms of enhancing focus. Yes, it has been very helpful in teaching people to just prepare your mind to narrow and focus on something. And when, you know, when you're really engaged in reading something or you're writing a paper, I mean, I'll have that sometimes I'm thinking, Oh God, I have to do this for another hour other times, an hour ago by and I'll think, Hey, great, because when you're in the, it feels game like to, you know, you're just assembling the parts of the puzzle and putting them together. It's fun. You just get absorbed that for me, that's a hypnotic like experience when I'm having trouble when I'm struggling sometimes doing things like self hypnosis can help. I'm not an expert on ADHD. My impression is that you're right that these are people who are constantly distracted and and rather rigid the other part of it is they're easily distractable. They're very upset when they get distracted and they're rather rigid and what they want to attend to and what they can't I think as a way of controlling this distractability, frankly. I, my guess is that many people with ADHD would not be that hypnotizable, but I haven't, I haven't studied it. So it's possible that for some people with that disorder training itself of noses might help, but we'd have to see how hypnotizable they were and take it from there. I want to return to some of the underlying neural networks and the clinical applications, but what sorts of things aside from the asthma have you used hypnosis successfully for or have others used clinical hypnosis for and are there any particular areas of psychiatric challenges or illnesses, I guess they're called. That are particularly amenable to hypnotic treatment. Yes, there are hypnosis is very good as a problem focused treatment. It's really it's the oldest Western conception of a psychotherapy and it can be used for specific problems in a way that's very helpful. We found it very helpful for stress reduction for helping people deal we're all dealing with stress these days and it's helpful that mind body connection is very helpful because part of the problem with stress is your perception, you mentioned it earlier in a sort of good sense, you're at a, you know, football game or something and you feel the physical reaction. That can be a reinforcing thing wow this is exciting let's do it it can also be very distracting so you're worried about getting coven or you're worried about some other physical problem you have and you notice it in your body you body tenses up you start to sweat the sympathetic nervous system goes your heart rate goes up. And when you notice that you think oh god this is really bad and then you feel worse so it's like a snowball rolling down hill and then you feel worse and then your body gets worse if notice can be very helpful in dissociating somatic reaction from psychological reaction so we teach people to imagine their body floating somewhere safe and comfortable like a bath a lake a hot tub or floating in space and then picture the problem that they're stressing them. On an imaginary screen with a rule in a matter of which is see on the screen you keep your body comfortable so at this point you can't you still can't control the stress but you can control your physical reaction to it and that starts you feeling more in control at least there's one thing I can manage and then you can use it to think through or visualize through one thing you might do about that stress so if notice is very helpful in controlling mind body interaction in relation to stress. And it's very helpful for people to get to sleep we're having a lot of fun with that I'm getting emails from people who said you know I haven't slept right in 15 years and now for the first time. You know I'm listening to your app and I can sleep at night you know so it's very helpful and again you know if you wake up in the middle of the night you know I tell people don't look at the clock that's in arousal queue you know you just wake up more. But I'm that picture whatever you're thinking about a worrying about on that imaginary screen while your body's floating so watch your own movie but keep your body floating and many people can use that to get back to sleep I've been using the self hypnosis for sleep for a long time. And now the referee app and we'll talk about our relationship to the referee app and its uses I find it incredibly useful for falling back asleep in the middle of the night. And it raises a question I've found and I think I understand this correctly that one can do self hypnosis during the daytime and then if there's an issue that comes up later like so for instance do self hypnosis for stress reduction away from the stressful event to prepare one to deal with stress better or do hypnosis for improving the return to sleep. And that can be done when you actually want to go to sleep but it's it's kind of a training up of these networks right. Is so is there evidence that these brain networks actually form stronger connections when people do self hypnosis over time. Well there's a rule in neuro biology as you know the neurons that fire together wire together and carla shots not Donald head by the way I keep trying to there's a there's a widespread myth in the world that is unfortunately all over the internet which is that the fire together wire together was said by the psychologist Donald have done with many important things but it is the neurobiologist carla shots that's exactly right yes is that Stanford but was also Berkeley and Harvard so that's right. And so that's the reason schools that but is that Stanford who said fire together wire together and so he deserves the credit for that statement. Yeah so with repeated use of self hypnosis one could imagine that these networks are getting stronger I would I would think so we don't have evidence of that yet but you know long term that provides a pathway and you've described them on your program a number of times that allow for repeated activation of a network to actually build new connections that work and at the least even from a learning and memory point of you you know our you know memory is all a network of associations that's how we remember things and you know the example I like to give is you go back to your grade school and and you see these little tiny lockers and you know the size is all wrong and you suddenly have a flood of memories that you you know we're obviously stored there but you just didn't think of so context and association is what memories about if you start to acquire memories about a problem so one thing we use hypnosis for is treating fobius for example and the problem with people who have fobius like airplane fobius or you know crossing a bridge or being up high is that the more they avoid it the more the only source of associations and memories is their fear they don't have any good experiences with it because they avoid it you know it's like get back on the horse after you fall off kind of thing and and with hypnosis if you can start people able to manage their anxiety enough that they can have more a wider array of experiences they start to have a network of associations that isn't so negative and may even be positive so it's almost like a started interrupt but I have to ask it's it's almost like a exposure therapy done in the mind it's always in the mind I mean even exposure to if I have a snake phobia which I don't I don't like snakes but I don't think it qualifies as a full blown phobia think of a healthy fear of snakes but if let's say I had a snake phobia the typical approach and would be cognitive behavioral approaches right would be to show a picture of a snake or then a rubber snake then a real snake eventually the person is you know holding a bow constrictor something like that with with that's all in the mind because the snake phobia and it's all translate into nervous system signals but with hypnosis sounds like you can give a number of positive experiences without having to use any props without having to bring any animals into the right drive someone across the bridge is that right yes I had a woman who is a very successful business woman high level and a corporation I had a terrible dog phobia and so I had her imagine that somebody brought in a dog to the room and I said what are you doing and you can see you're getting tens and she said I'm waiting to see why you're going to be able to what the dog does. And I said, if somebody who works for you comes into your office, would you freeze and wait to see what they did? And she said, of course not, and I tell them what to do, you know? And I said, well, so you're mobilizing yourself. The power isn't with the dog. It's with you. So imagine what you might do to engage the dog and help control the situation. And she said, thanks. And this reminds me of one of my favorite stories about hypnosis that my father was seeing a woman who lived in Midtown Manhattan and had a horrible dog phobia. You know, she'd drop things, she'd spill coffee, you know, she saw a dog. She would time her trips to the store when she thought it was least likely that people would be walking dogs. Now that wouldn't be possible. Everyone. It's like a fleet of French bulldogs taking over. So he taught her to think of a dog as a friend, have a neighbor who had a dog, bring the dog over, but hold the dog by the collar and make sure. And gradually she was able to stroke the dog and say dog friend and distinguish between wild and tame animals, there are animals, you should be afraid of it, so she seemed to be doing better. He called back about three months later and asked for her and said, well, who's calling this unsaid? And he said, Dr. Spiegel. And the boy said, that's weird. And my father said, what's weird? He said, Spiegel's in heat. She had bought a dog. I love it. And named it Spiegel. Talk about transfer. I love it. But it really speaks to the power of this. And it brings me back to this issue. So what is different about what your father did in that case with this woman in terms of what happened in hypnosis that allowed her to go from being completely terrified of dogs to owning a dog and naming it after your father, which I find amusing. But that's different than just the two of them sitting down and talking about it. Right? You know, in therapy, their narrative is a huge component. And in hypnosis narrative is a huge component. So it must be that the brain state is what is really different. Because we'll talk about trauma in a few minutes. But I think people who have trauma or phobias certainly could have a conversation about it. They, some of them might freeze up. Some of them might lose their articulation and so forth. But what is different about that state that combines with narrative? You think to allow these underlying neural networks to engage or to change? Because I find this so fascinating because we're all every attempt at dealing with stress or phobia in the clinical setting involves some discussion about what it is. But here we're not talking about any medication being introduced at least not in these particular circumstances. So I just I realized it's kind of an obvious question. Like it has to be some difference in brain activity. But I find that to be incredible. The control variable there is the brain state. It's not what's spoken. You're raising a couple of very important issues, Andrew. We talked earlier about systematic desensitization where you sort of lay out a hierarchy of things into a one at a time. I think of this as unsystematic desensitization because you're changing mental states. And I think there's more and more evidence that mental state change itself has therapeutic potential. We're seeing that with ketamine treating depression and a sociogenic drug. We see it. We know at every morning when we wake up that problem, you know, you made the mistake of reading an SD email at 11 p.m. You didn't know what to do. You wake up in the morning and think, oh, that idiot. Yeah, here's what I'm going to do. So just changing mental state itself has therapeutic potential. And I think we underestimate our ability to regulate and change responses, to be cognitively emotionally and somatically flexible. And so we do things you write that follow similar principles of facing a problem, seeing it from a different point of view. And you've done a really nice podcast on trauma and stress and how you have to expose yourself to it, not avoid it as we talked about before. And then find some way to reconnect to it, to substitute something that can make you feel good rather than bad so that you activate other centers of the brain like mesolimbic reward system. And so I do that with hypnosis and you can do it much faster. People don't think they can, but they can. If you're having right now that physical experience, I'm thinking about this, but I'm not feeling as bad as I used to. That can be a powerful thing. And you can do it with hypnosis. So I had a woman came to see me who had suffered an attempted rape. It was getting dark. She was coming back from the grocery store and this guy grabs her and wants to get her up into her apartment. It's outside her apartment. And she starts fighting with them and she winds up with a bazzle or skull fracture. He runs away. The cops come since she hadn't been raped. They left. They weren't interested in it. She wanted to use hypnosis to get a better image of what this guy looked like, which is a painful upsetting thing. So she was quite hypnotizable. I got her floating. I say you're safe and comfortable now. Nothing can happen that will harm your body. But on the left side of the screen, I want you to picture this guy and his approaching and what's happening. And she said, I really, the light with it was getting dark. I really can't see much of his facial features. But I do recognize something I hadn't allowed myself to remember. If he gets me upstairs, he doesn't just want to rape me. He's going to kill me. And so in some ways, what you was seeing was even worse. So you know, you're thinking good, speak old. You made her even more frightened than she was before. But as you had pointed out in your PTSD stress lecture, you've got to confront the trauma to to restructure your understanding of it. So on the other side of the screen, I had her picture. What what are you doing to protect yourself? And everybody in a trauma situation engages in some strategy of self protection. You know, that's the saline's network kicking in. And she said, you know what? He's surprised and I'm fighting that hard. He didn't think I would. And so she realized on the one hand that it was even worse than she thought it was. But on the other hand, that she actually probably saved her life. And so it was a way of helping her restructure her experience of the trauma and make it more tolerable. So that helped with her. She didn't wreck it. She couldn't identify the guy, but it helped her restructure and understand her experience. And that's something that you can do in just talking straight out psychotherapy. But sometimes you can do what hell of a lot faster and more efficiently using hypnosis. And there is one randomized trial out of Israel that shows that adding hypnosis to PTSD treatment actually improves outcome. So it's it's a way of accomplishing things that we understand in the broader psychotherapy world, but much more quickly and sometimes effectively. Yeah, it sounds like going into somewhat into the state that one is trying to deal with, but then dissociating from that state is key. And I can imagine and you know, I've been open about this on various podcasts. I've done a lot of analysis over the years. So in but in I've experienced myself that in in those sessions, depending on how I show up to them, I might just get in kind of a laundry list of what happened as opposed to actually feeling anything around what happened. And I think people probably vary the extent to which they can drop into feeling states and it can depend on the day. It can be depend on how well you slept the night before and so on. There's one thing I might add into that is, you know, there's a notion the late Gordon Bauer, he did, we just had a memorial for Gordon at Stanford. He died about a year ago, brilliant cognitive psychologist. So he's one of the founders of cognitive psychology at Stanford and a great picture. He almost, he almost became a major league pitcher, but he decided to go to grad school instead and I'm glad he did. But Gordon helped establish the concept of state dependent memory that when you're in a certain mental state, you enhance your ability to remember things about it. And the sort of the bad example of that is the drunk who hides the bottle and can't remember where he put it until he gets drunk again. And he's in that same mental state. People go into dissociative states when they're traumatized. So in a way, hypnosis is helping them remember and deal with the memories better because they're more in the mental state that is more like what happened. And most rate victims will tell you I was floating above my body, feeling sorry for the woman being assaulted below. People in traumatic episodes, they just say, you know, I blank out. I don't know what's happening. I'm on autopilot. And that's a kind of self hypnotic state. So when you use hypnosis to help them deal with the traumatic memory, you're making the state they're in right there in your office with you more congruent to the state they were likely in when the trauma happened. And I think that is part of what helps facilitate treatment of trauma related disorders. You see, so that makes me have to ask every question I have to ask because I really feel it as almost a compulsion. Then if dissociation during a traumatic episode is part of the adaptive strategy, but it creates certain issues. It creates problems. Why would something like ketamine, which creates a dissociative state, be useful for the treatment of trauma? This is what I'm confused about these days because our colleague Carl Diceroth who's also been on this podcast and his co-workers have figured out, okay, there's these layer one networks in court in the neocortex and those are involved in the dissociative state. And so we're starting to gain some understanding of how ketamine works at a neural level. It does seem as if for certain populations, it's a can be a useful treatment. I don't know. I've never tried it. I don't know what the current status of that is, but it is legal. It is allowed, at least in its FDA approved. And it's in use. Why would dissociative states be useful if some element of dissociation is what gave rise to the trauma memory in the first place? Well, yeah. Carl had a brilliant paper in nature where he was from rats to humans in one paper. And he showed that there's this rhythmic discharge in the retrospective renewal region that is associated with that is triggered by ketamine. And the rats actually showed dissociative-like behavior in that they would touch a hot pad that they ordinarily wouldn't and they didn't seem to have much pain in their paw. And he then had a male subject who had implanted electrodes. A human subject. Yeah. Human subject. And the electrodes had picked up this rhythmic activity. And when they did, he would report being in a dissociative state. And his description was, it's like being a pilot of an airplane. And then I felt myself walking out of the cockpit and the plane was still flying. I was terrified. I was terrified. I want to be in my body most of the time. That's right. But the point is, in a way, the principle is like the principle you said that you need to re-confront a traumatic situation before you can modulate your associations to it. So you have to accept it, accept the arousal, put some boundaries around it and then figure out how you can approach that problem or how you did approach that problem from a different point of view. So it does not surprise. In fact, we've studied people who dissociated during the Loma Prieta earthquake and the Oakland Berkeley firestorm. Remember both those well. Yeah. It's quakes follow me. And then I move south and in the North Ridge. I'm going to keep the other one there this afternoon. I'm starting to dissociate in. So dissociation does compartmentalize experience. But that means from the point of view of treating trauma, it's an inhibition. You don't engage it. It's like it happened over there. And I think what happens is that people are sometimes too good at being able to separate themselves from the recollection. So it's in there somewhere. It doesn't, it's out of sight, but it's not out of mind. It's having effects on you. But you can't deal with it. You can't reprocess it. So I do think one reason ketamine might work is that in fact, it allows you to keep, do we approach the dissociative experience in a way that you can then start to think about and do something about it? And just the fact you can turn it on and off. And that's also where it self hypnosis is so helpful. It's not something that just comes over you and happens to you. It's something you can make happen. You can control it. You can do something with it. So you feel less helpless and out of control. The essence of trauma is helplessness. It's not fear. It's not pain. It's helplessness. You become an object. You become just your body. You don't control what's going on. We're not used to that. You know, you and I've discussed this, this, this, this brilliant paper on anticipation of breathing. And it's not whether you breathe inhale or exhale or hold your breath. It's that if you think you can inhale and you can't, that is really upsetting, understandably. And so it's the, the issue is control. And hypnosis, which has this terrible reputation of taking away control is actually a superb way of enhancing your control, overmind, embody. I love that. And it reminds me that naming is so important. You almost wonder if self hypnosis and clinical hypnosis had been called something else that it would have, it separated out from stage hypnosis in a way that would make it less, you know, less scary, weird, complicated for people to embrace. But, you know, the part of the reason for having this discussion is I, I've had great experiences with hypnosis. I've seen the data, you know, we're talking about a lot of clinical examples. It's incredibly powerful. And it boils right down to neural brain states. And, you know, I think in the years to come it's going to become more widespread. Along those lines, how quickly you've described some examples of people getting relief very quickly. How permanent are those changes? Is there a need for follow-up? And related to that, I'm sure a number of people are listening to this and thinking, wonderful. I'd love to get hypnotized for any number of different things by Dr. Speagle or somebody else expert in clinical hypnosis, but they might not have access to you or somebody with similar training. So, how quickly does it work? How long lasting are those changes? And then, is it necessary to work with a clinical hypnotist? And is it better to do that than self-hypnosis and so on and so forth? Maybe you could just give us a contour of the landscape of directed and self-directed treatment. Well, typically most people start by coming to see a clinician like me. It's better to see someone who's like, has licensing and training in their professional discipline, medicine, psychology, dentistry, whatever. Because there are a lot of hypnotists out there who are just hypnotists. Just hypnotists. And the key issue is somebody who can really assess what your problem is and make sure that you're not talking someone into reducing their chest pain rather than getting their coronary artery problem. Because they could have a real issue there. They could. Right. But, hypnosis might adjust, but wouldn't deal with the deeper underlying issue. That's right. On the other hand, and typically when I use it with people, I often only see them once or twice or periodically, but not every week. And certainly not every day if they have a pain problem. Hypnosis is very helpful for pain. And so, what I'm doing is identifying how hypnotizable they are. I give them a standard brief test of their ability to experience hypnosis. And then, going through a self-hypnosis exercise with them to deal with the problem, seeing how they respond to it. And then teaching them how to do it for themselves. And in the old days, I used to have them use their iPhone and record that part of the session so they could play back the hypnosis experience. Now, we've developed an app, a rivery that can teach people and step them through dealing with pain, stress, focus, insomnia, and help people eat better and stop smoking. And we have elements that take about 15 minutes and elements that just take one or two minutes that people can refresh and reinforce. So, the hypnosis. Yes. And it's one to two minutes now. And we're finding that two-thirds of the people find that even just the one minute refresher helps them feel better. They're reporting they feel better. So, the nice thing is you know right away whether it's likely to help you or not. And we've done studies looking at hypnosis for pain relief in acute medical procedures. We did a randomized trial that we published in the Lancet. Three conditions. People getting arterial cut downs to chemo-embellized tumors in the liver or visualize renal artery stenosis. You don't use general anesthesia for this. It's very uncomfortable and people are anxious. And we had three conditions. One was standard care. They could push a button and get opioids IV. It's during the surgery. During the surgery. The second is they could do that plus they had a friendly nurse comforting them. So, we controlled for pleasant attention and support. And the third was we taught them self hypnosis for pain control. So, you're you're feeling you can change the temperature. Your your body is cool, tingling a numb. You're floating in ice water and feeling comfortable. Or go somewhere else. Leave your body here and go to a desert island and enjoy yourself. And we found that it it's about two and a half hour procedure that after by the and by an hour and a half the hypnosis group had reduced their pain by 80 percent compared to the standard care group using half the amount of opioids. They had fewer complications and the procedure took 17 minutes less time on average to get done because not only was the patient more relaxed so was the treatment staff. They could they weren't dealing with someone who's struggling and uncomfortable. We measured their anxiety and same thing they have no stress. I was worried they were old dead. They had no anxiety after an hour and a half. They were saying I'm fine, you know. And they were fine. And the and the standard care group had five out of ten anxieties scores at that point. So, we published that in the Lancet big randomized trial. If we had a drug that did that every hospital in the country would be using it now. You know, but there's no industry to push it. So, that's part of what helped us decide that we needed to help people, you know, do this with with reverie and teach them how to do it and provide interactive support for them to do it. And does it, you know, the question, although, is does it work long-term? Because what we can do acutely doesn't necessarily carry on. So, we did a randomized trial of women with metastatic breast cancer. They had advancing disease. We met with them in a support group once a week and taught them self hypnosis for stress and anxiety and pain control at the end. And by the end of a year, the treatment group had half the pain the control group did on the same and very low amounts of medication. So, it lasts and they would say when I felt that pain in my chest and thought it was a metastasis, I just did the exercise. I got myself in a warm bath and I felt fine. So, it works because it becomes a skill that people acquire. But they can tell right away whether it's likely to help them working with a clinician or now using the other ways of helping them learn to use it as a skill. So, the nice thing is you will know very quickly whether it's likely to help you or not. And if it is, you can learn to do it for yourself. That's great. And we will, again, there will be a link to Revery in the caption that's available for Apple and Android. And I think even though there's a nominal cost there, I think that, you know, the, as you mentioned, medications and other approaches to dealing with these problems are quite expensive. And potential have all the potential for side effects and things. Not that some of those aren't also useful. Could I, before you get to that, just one thing, we've worked very hard on the app. We have an iOS app for Apple. We decided to table for a moment redoing the Android app. So, it's not, it was available when we were working through the Alexa platform. It's not at the moment, but it will be soon. So, I just don't want people to be disappointed if they're looking for it for Android. It's on our agenda, but we don't have it at the moment. Great. Thanks for that clarification. So, roughly in time for both. I get asked a lot about obsessive thoughts or intrusive thoughts. I also get asked a lot about OCD. Is there any evidence that hypnosis or self hypnosis can be used for dealing with obsessive thoughts? Sometimes, there are some very obsessional people who just turn out not to be that hypnotizable for, yeah, and it's not random. They, you know, they tend to be so over-controlling of flight. They're all busy evaluating rather than experiencing. So, in some way, people like that, it sounds like an adaptive mindset for a lot of professions. And that we get trained up in that, during school, you know, how to obsess over the exam, obsess over the our social interactions. I mean, it's part of becoming a functional human being, and yet you can take us down a different way. We sometimes overdo it. I mean, I'll tell you one example from extreme situations. Because you know, you're judging, evaluating, you're not lighting yourself experience, including emotionally. I know somebody who listens to the tapes from airplanes that they go down. So, they get the black box and they listen to it. And he said to me, you know, that's his profession, or he does this record. No, it's his profession. That's what he did. And because they're trying to do accident prevention and how to handle things. And he said that, you worry about people panicking, right? And here these guys know that they've got 30 seconds, there's some 45 seconds, and they're just going through their checklist. He said, they don't panic enough. They're taught that this is what you're doing, and there is reason. There's good reason for it. But sometimes they overdo it. And it's painful to listen to this because you know what's going to happen. So, it's kind of a balance we have to hit. And sometimes we get too emotional and too absorbed. And you don't, you're not with it enough to sort of see other possibilities. That can be a problem. But on the other hand, sometimes you're too rigid and controlled and you don't let your emotions guide you to what you need to do to protect yourself or protect others. So, I would say in general that people with OCD are in the less, on the less hypnotizable side of the spectrum. They're less likely to allow themselves to engage in any, and you know, the typical example is the checking with OCD, for example. They don't remember, you know, whether they, you know, lock the door or turn off the gas and they open and they keep going back and they keep checking. So, they're the evaluative component of the brain kind of overrides the experiential one. And sometimes people can get some benefit, but they're not a group that I would select for being the most likely to respond to self-hypnotic approaches. Are superstitions similar? Superstitions, I think that's more. There are people who are very hypnotizable, who keep getting caught up in things like superstitions. And they're the imagination supplants the reality. And we've seen a lot of that happening recently. And so, I think they're, it's possible that they could be helped by learning to sort of see it, but put it in context, you know, see it from a, from a different point of view. I developed a pretty vicious superstition when I was in college, and it was hard to break, actually. I always feel that when I talk to clinicians, I have to reveal certain things about my own pathology. And so, you'll get my bill later. Thank you. Yes. It's part of the reason I ran this month. I'm just kidding. But yeah, I did. I had a habit of knocking on wood for things. And I noticed it started to, I would, I would, I would sneak knocking on wood every once in a while, because I didn't want people to think I was doing too often. And then I started to realize that I, it was becoming a little bit of a reflex. And then I saw this incredible video from Benzatolevsky's lab at Harvard. He studies motor patterns. He has these rats that press different sequences of, of levers and turned dials in order to get a pellet of food. But that as they do that, they'll start to introduce these behaviors that have nothing to do with the actual lever pressing, like they'll start scratching their, and their hindquarters and things like that and their hat and their head, excuse me, don't wear hats and flipping their ears. And this is just like a picture before throwing a baseball that we do this. We, we start to incorporate motor behaviors that are unrelated to the outcome. But we are mind somehow starts to think that they're necessary for the outcome. And so then you incorporate it. So I decided to break it by simply forcing myself to not do it for about a week. And then it just seemed like a ridiculous thing to do. Yeah. Well, we call that response prevention. And it works because you set what you do is you set up a new context in your brain where you get the outcome you want, devoid of the, the extraneous behavior. And I knew it was, it was nuts, right? I knew it was illogical. Right. But somehow the, these things take on meaning. Right. So we talked about stress reduction, the utility of hypnosis for stress reduction, phobia's pain, possibly we don't know. But for things like ADHD and OCD, it just will depend on hypnotizability. Right. You talked about this beautiful study on the amazement, breast cancer, outcome or patients. Hypnotizability is clearly a key variable. Yeah. So could you please tell us what hypnotizability is, how it's evaluated, and what the Spiegel-Irol test is? Okay. Sure. So, um, hypnotizability is just a capacity to have hypnotic experiences. And we have a test called the hypnotic induction profile. We were give a highly structured hypnotic experience. And you know, the, the old tradition in clinical hypnosis was that you try a bunch of different things, talking, walking upstairs and downstairs and other images and time, what you say to the breathing of this subject and all that. And the more you change what you do as a clinician, the less you can make a variation in outcome. So, and it could take a long time, you know, 20 minutes, 30 minutes. And I just view that as a kind of complex, not very effective way of assessing the person's hypnotic capacity. We know that the peak period of, of hypnotizability in the human life is the latency years in childhood. So every eight-year-old is in a trance all the time. You know, you call them in for dinner. They don't hear you. They're doing their thing. And that's why childhood is such a wonderful experience. Work and play are all the same thing, you know. And we try to make them into little adults, which I think is a terrible mistake. They and everything is fun for them. They enjoy learning. They enjoy everything. So, what age are are they in this? This is like six to ten, six to eleven. They're playful. They enjoy everything. Everything is sort of a game and fun. And we try to make it miserable for them. But they've got it. And then when what Piaget called, you know, a more adult cognitive framework where we learn abstract concepts, we learn that even if one bottle looks bigger than the other, they can have equal volume. And so we start imposing logic. We're growing our DLPFC at that point. And imposing cognitive structure on experience. Some people start to lose that hypnotic ability. By the time you're in your early 20s, your hypnotizability becomes extremely fixed. And there was a study done at Stanford, Ernest Hillgarten, the Phil Zimbardo did this looking at. They tracked down students who were in Psych 1, had their hypnotizability measured, and retested them blindly 25 years later. And the test, retest correlation was, you want to guess what it was? I'm guessing it's 0.6 something. Yeah, very close. It was 0.7 IQ would be 0.6 on the 25-year interval. So it's more stable than IQ over 25-year intervals. So once you're at that point, that's where you are. What are the factors that lead to that? Well, and so what it means is that about a third of adults are just not hypnotizable. Two thirds are about 15% are extremely hypnotizable. And we can measure that and give it a number from 0 to 10. And that's very useful. For some of my patients when I do it, I say, look, I'm sorry, you're not hypnotizable. We're going to do something else. You know, medication, systematic desensitization, mindfulness, other things. Or if they're very hypnotizable, I just go for it. You know, I don't do a lot of explaining. People who are low to moderate hypnotizable, like explanations about what you're doing, but then they can still get the benefit. So it helps me guide the nature of my treatment with these people. Now, the the IRL is my father used to use an eye fixation induction. He used to say, look up at the ceiling and now close your eyes while you're looking at him. Oh, you're very, yes, you're great. Yeah, as I, he noticed, he had two patients back to back. And one was a woman who I'd seen him work with who had hysterical seizures. She would just suddenly start shaking and if real epileptic seizures, no, pseudo epileptic. I see. So hysteria hysteria. And although some people have both, that is the for some people, real epilepsy becomes a framework that gets elaborated on for when you're stressed. You have seizures. She just had pseudo epilepsy, no EEG abnormalities. And she was really something to watch. Her husband had to move his work bench near the door so that if she started to have a seizure, he could run home and try and help her with it. It was that bad. And he noticed that when she, when she did, she did what you did when she looked up when she would have one of her seizure events, all you see is sclero. You don't see iris anymore. And she would start to see. So he, he did a great thing with her. He taught her to have seizures. Everybody else was telling her to stop. He made her have one. So he hypnotized her. Let's go back to the last time you had one. I'm sure enough she'd start to shake. And gradually, he'd make them smaller and smaller. So she was learning, she could control, she'd have access. It's like with PTSD, you know, you confront, you don't avoid it, you don't suppress it. You confront it and figure out how to deal with it. The next patient he had was a rigid, obsessional businessman who wanted to stop, you know, being so controlling and all this. So remind me there was a New Yorker cartoon of a driver who comes to a yield sign and he yells, never, you know, it's always been here. You're in New York. I'm a New Yorker. And so this guy, when he tried to look up, he couldn't keep his eyes up while he closed them. And so my father started testing people. And it seemed that there is a rough correlation between the capacity to keep your eyes up while you close them and measure hypnotizability. So that people who are listening, what might end up and watching on video. So this big eye roll test involves looking up at the ceiling. So it's tilting the head back. I'm tilting my chin back and looking up at the ceiling now. But I'm also directing my eyes upward and my eyes are open. And then the the eye roll test involves then closing the eyelids while the eyes are open. And whether or not the eyes roll back. And as you said, then you see scleror, the white part. That means you're very hypnotizable or moderately hypnotizable. Whereas if the eyes move down and you see iris, the colored part of the eye as the eyes close, less hypnotize. Right. Right. So you can look this up online there. You just put spiegel, eye roll test and you'll find it. And we are also going to do an actual example of hypnosis on video later. Right. So it's it you're asking the brain to do something difficult to to keep the eyes up while closing the eye. Lyos. And so that's contradictory signals for the third, fourth, and sixth cranial nerve nuclei that control eye movement. You said the third, fourth, and sixth. cranial nerve nuclei. And so they're they're you're suspending one activity while asking them to do another. And eye movements have a lot to do with levels of consciousness. You know, the periacryductal gray surrounds these cranial nerve nuclei. And when we, you know, we close our eyes when we sleep, we have rapid eye movement when we dream. Most drugs at effect level of consciousness can affect eyes and eye movements, either the dilation or contraction of the pupils, depending on whether it's stimulant or an opioid stimulants make the pupils big. Right. Yeah, this like cocaine and fetamine. Right. Exactly. And opioids, you get constricted pupils. This is what parent, you know, parents looking at their kids coming in the door late at night. They're looking for substance abuse. That's right. So so there's something about the eyes that has a lot to do with level of consciousness. I mean, obviously you close your eyes when you go to sleep, you have rapid eye movement when you're dreaming. So it's not surprising. And there's there's an old zen practice called looking at the third eye. And I think part of the reason that this happens is where you're looking up in inside. It's like there's a third eye between the other two and your forehead. And I think it's because we're visual creatures. You know, we're we're pretty pathetic from a physical point of view. You know, many animals can outrun us, you know. And or outsmell us or see you, you know, eagles can read could read newsprint at a hundred yards and we can't, you know, it's so our major defensive sensory input is vision. And that's why, you know, animals predator animals have eyes in the front of their head so that they have very good detailed division of prey, whereas prey animals like deer have eyes on the side of their head. So they don't see things that well, but they have a much bigger range of potential to see threat. And we mainly use, in fact, it's interesting. There have been social anthropologists to say, why do we gather where we do, you know, on coastlines and, you know, at the edge of a forest or something? It's because you've got protection in the back. Something can attack you from one side and you have a big vision of what might threaten you. And we tend to like be attracted to those kinds of physical situations. So we love this. We love this. This is a very calming. They take us into that panoramic vision. That's right. I didn't know this, but it turns out that most of the scenic spots at any location in national parks and where people naturally aggregated. It wasn't, which makes sense. But those signs and locations were built up around people's tendency and animals' tendencies to aggregate there. Yeah, there's an interesting book on the history of the national parks that says that they didn't give a research study to support it, but there was no Google Maps, obviously. That's very interesting. Yeah, panorama and visual boundaries are really interesting. I think so that the eyes, as we both know, are two pieces of the central nervous system of the brain. Right. Outside the brain. I used to say that the eyes are outside the skull and a neural ophthalmologist said they're wrote to me and vehemently pointed out that they are outside the cranial vault. So, you know, they're outside the cranial vault, but they are two pieces of brain. They're out there. And so you mentioned cranial nerves three, four, and six. This isn't a neural anatomy course, but maybe we could go a little deeper there. So you said there's contradictory activity. Looking up is controlled by the one set of cranial nerves and then the closing of the eyelids is controlled by another cranial nerve. No, it's the same one. I think it's six that you close, when you close your eyes, you activate. No, it's the facial. I guess it's the facial nerve. It's the seven, seven. But you're looking up, you're activating the muscles that force your eyes to look up and the closing your eyelids normally relaxes those, relaxes that upper movement because your eyes are closed and you don't need to do it. So you're breaking a usual customary pattern. It's like the rubbery, the, the, hey, I can't even do it. See, it's like the, that's a, um, rubbing your tummy and patting your head. It's a, it's a bit, there's a bit of a conflict there. Right. But clinically, it's been a good probe for you and, and, and, and, and, and, and, and how your father. So was it speagle senior or speagle, that's speagle senior that developed a speagle high-well test. And, um, but the key issue is this that normally when we close our eyes also, we're going to sleep, you know, you're, you're not worried about what's going on in the world anymore. Here, you're maintaining resting alertness. So you're, you're focusing, but you're turning inward. That's an unusual state. Normally, we don't, we close our eyes periodically. We have to, but, um, when you close your eyes for some period of time, it's normally to go to sleep and you're not worried about, you know, detecting risk or threat. Uh, so it's, it's an interesting state because you're turning inward, basically. You're looking up, you're shutting your eyes and you're allowing whatever happens outside you to happen and focusing on what's going on inward. So it's a, I think it's a signal to your brain to turn inward. Very interesting. Um, and meditation, of course, could be done with eyes open, but almost always is done with eyes closed. Yes. Um, that's right. Very interesting. So you can very quickly determine whether or not someone is highly hypnotizable, right? Not at all hypnotized. We said about two thirds of people can be hypnotized. Right. Um, obviously a third cannot. And, but within the two thirds that can, there's a range and you said 15% of people fall into this highly hypnotizable category that I seem to be a, uh, member of. Um, and does repeated use of self hypnosis or clinical hypnosis increase or change hypnotizability for those that can access it in the first place? I would say in general, it may increase a little bit, but not a hell of a lot. And it's not worth the effort to increase your hypnotizability at that point. It's worth trying to deal with the problem you're dealing with. So you can get better at using it at the level that you have. There was a study done in which they tried to train people to be more hypnotizable. And, you know, obviously, there are subjective and behavioral components to the test. You can learn to do a little better on them. But what we found was when we re-analyzed this data that we could account for three times the final score based on the initial hypnotizability measurement, rather than whether or not they had been trained to do better. So you can improve it a little, but it's not worth the trouble. Got it. Along the lines of eyes and eye movements, a lot of interest out there about EMDR, eye movement, desensitization, reprocessing. Shapiro herself was working, not she wasn't at Stanford directly, but was the local to Stanford, I think in Palo Alto. So what are your thoughts on EMDR? Where is it useful? Where do you think it's less useful? Are there things that EMDR could be combined with to make it more useful? You know, we get, you know, the listeners of this podcast come to, I think, come to the podcast with a range of backgrounds and interests. To me, it makes sense why EMDR lateralized eye movements might work, given the newer data that it can suppress migral activity and some animals and animal models in humans as well. But it really hasn't been explored much, nor early. I've heard things like it coordinates the two sides of the brain, which to me is just a throw away. I don't think there's any evidence that coordinating the two sides of the brain is better than not coordinating. I wouldn't be speaking right now if the two sides of my brain were well correlated because language is lateralized. So I've heard that it mimics rapid eye movements during sleep, but actually it doesn't. But I have heard people talk about their positive experiences with EMDR. What are your thoughts about EMDR? Yeah, you had a good comment on that in one of your recent podcasts. And I'll tell you, one way I sort of think about it from a bemused point of view is the old, you mentioned it earlier, the oldest idea of a hypnotic induction was a dangling watch. And you watch. And in fact, there was enough concern about it that when automobiles were invented, there was a movement to prevent installing windshield wipers because people were afraid that they would be hypnotized if they watched the windshield wipers go back and forth on a car. Now it turns out, fortunately, that you tend not to look at the windshield wipers. You keep looking through the windshield. And so we have windshield wipers today. But that movement is what exactly used to be a hypnotic induction. I think there is a lot of hypnosis in EMDR. And I think it's a combination of that with exposure-based treatments where you're using EMDR to think about it. You tend not to process the experience as much and just do the physical part of it, which I personally think is a drawback. And every study I've seen that was a dismantling study. There's no question that people who go through EMDR, many of them get better with trauma-related problems. And the VA has a big program using it and so on. But every program that has dismantled going through the treatment with having the lateral eye movement has shown that the lateral eye movement doesn't add anything to it. And toward the end of her career, Francine was doing now of control lateral touching or something. It wasn't eye movements anymore. It was other things. So I tend to think that EMDR is another form of exposure-based therapy for trauma. But as you've implied with the exception of this possible new data, it certainly doesn't have to do with rapid eye movement sleep. And I don't think moving the eyes is the issue. I think it's a way of sitting down and confronting trauma. And I would rather that the trauma itself be processed a bit more than often happens in EMDR. So a lot of people have gotten therapy. Some of them have been helped. Francine used to originally claim that just one session would desensitize people and do it. And that's clearly not true. I see a lot of people who said, yeah, it helped for a while, but I need more. So I think it became a kind of a overly simplistic approach to understanding brain physiology and that part is wrong. And the interesting thing, you mentioned suppressing a migdal activity, it's very interesting that my late friend, Ellen Hobson, who is a brilliant sleeper search. Well, I don't know him, but I read his book when I was in college about the chemistry of sleep. And the similarities between dream states and hallucinations. And it's one of the reasons I got into this business. Yes, well, I worked with him in a MacArthur Mind Body Network for many years. And the brilliant guy points out that we need to get into primarily a parasympathetic state to go to sleep. That we have to shut off the sympathetic nervous system. And that's why I allowed noise wakes you up when your heart rate goes up and all this. So he was brilliant at documenting what happens in the brain of sleep. He pointed out something also very interesting about dreams, which is that the stories and dreams and even the images and dreams can change all over the place in crazy ways. But usually the affect is constant. Said, usually if it's a frustration dream, whatever happens, you want to frustrated. And if it's a enjoyment dream, you enjoy whatever's going on. So there's a odd consistency and affect in dreams that you don't have in other states. And the idea of lateral eye movements suppressing a migdal activity would kind of fit with that. That you don't allow intrusions of fear and anger and upset injury. It may be there all the time, but it may not be there when you think it should be. So why is it that you can be falling off a building and somehow not that scared? You're just having this experience of flying in a dream. So I think there may be something going on about regulating affect, but there are we have a labyrinth of better ways to regulate affect. Right. So the EMDR might incorporate some elements of hypnosis by so the lateral eye movements, perhaps by way of suppressing the amygdala this fear associated center might bring people into a more parasympathetic calm state. So might be pseudo hypnosis and then exposure therapy through the discussion about the issue. Right. Okay. More research needed on EMDR out there. And obviously something that's come up a lot in this discussion and in our discussions that I'm have the great fortune of talking to you every week is and working together is this idea of getting close to the phobia, getting close to the trauma, re-experiencing it as a portal to then adjusting the response to it and rewiring something. So the troubling thing or the horrible thing is no longer as horrible to us. But the repeating theme is we can't expect to get over something without getting really close to it maybe even experiencing it somatically. Nowadays we hear a lot about triggers and trigger warnings and certainly one can understand why those exist. But it seems like there's a in the general population there's this idea that we want to move away from anything that upsets us. And yet I think it's fair to say even though having gathered the statistics that on the whole that the human beings are becoming more and more anxious and more and more stressed. Perhaps because of but certainly in parallel with the fact that we're trying to move away from troubling things, troubling things. So I've heard you say before that it's in terms of therapeutic approaches it's not just about the state you get into but whether or not you brought yourself there voluntarily. So this element of deliberate self-exposure deciding I'm going to confront the trauma. I'm going to confront the pain. I'm going to confront the insomnia. I'm going to confront the you know and fill in the blank and then readjusting one's emotional response right up next to that troubling thing. That seems to be the hallmark of this treatment and if I'm thinking about it correctly of pretty much all treatments for getting over stuff. If people don't have access to a really good clinician like yourself, how should they carry these thoughts and these ideas? I think almost everybody of any reasonable age has memories or things that upset them but we learn to suppress them. What does one do? Obviously the reveria app has approaches to dealing with some of this inside of the app but how does one start to think about actually dealing with something like this and avoiding the hazards of just kind of reactivating a lot of painful experiences because a lot of being a functional human being is also going to work each day interacting with people and not bringing one's trauma and dumping it out on the table or being able to just function is so crucial. So how do you think about this as a clinician? Well you know the image that comes to mind is the Greek myth of Pandora's Box. You know that it opened and the fury has got out and you couldn't put them back in and we have this kind of fantasy that once you get into these memories they'll take you over and you'll never get them back in the box and I think that's wrong. You know we people who use hypnosis say that there are ways to present things to people that will be helpful in ways that won't and one real mistake is to tell someone don't think about purple elephants you know what are you thinking about you know it doesn't work. So you want to find a way to feel in control of the access and to define what happened on your own terms and so I'm not a big fan of trigger warnings. I think we're going crazy over you know this could be upsetting that could be upsetting. Yeah there are lots of things are upsetting you know the average kid has watched 20,000 murders and by the time he's 20 years old watching television and movies these days. So you know we see terrible things and it's not a matter of are you exposed to something that's upsetting but how do you handle it? What do you make of it? And are you feeling in control? It's not like you know what what Putin is doing to his rival in Russia you know forcing him to watch propaganda movies 10 hours a day while he's imprisoned. It's a matter of thinking about a problem in a way that leaves you feeling you understand it better you're in more control you can turn it off when you when you want you can turn it on when you want and so we have to in life deal with stressful things there are studies Karen Parker at Stanford has done some wonderful studies with primates about stress and occupation that if you separate a baby monkey from his mother for two hours a day and then reunite them and then you stress that baby monkey later they actually handle stress better there's less cortisol arousal in the face of the stress stress and occupation it's been called so mere exposure to trauma or stress it's a part of living anyway we can't avoid it even if we'd like to and um it's not pleasant it's not great but it's sometimes things you need to learn about life and if you can find an algorithm for facing it putting it to perspective dealing with it you become a stronger person not a weaker person so this idea that college students are such fragile flowers that if you talk about a sexual assault or something you know you're doing something terrible to them it's just wrong and and I think we need to build our ability to recognize and manage stress and you can't do that without doing it you can't learn or you can't ride a bicycle without taking the risk of falling off it you know and so I think that's the way I think of dealing with stress yeah I really appreciate you saying that I was you and I were both at a gathering let's say where um this issue was being discussed and around an issue of a of a publicized sexual trauma and um you made an excellent case for why this stuff can't be pushed under the rug um and that actually in my observation led to a lot of healing for the people that and the families of people that suffered from this and the um I do think uh people are resilient they uh but we don't really teach how how to think about feelings you know we don't you know we're told that we need to feel our feelings but then again uh we are also told that feelings don't hold all the information and so I think that as you mentioned there's no operating or users manual for this nervous system thing um brings me to another issue which is the mind body connection something that we're very interested in and uh you've done extensive work on you know we all like to think that getting more in touch with our body would be a great thing learning to intercept paying attention to our internal landscape would be a great thing but as we often discuss um when we're feeling lousy then being really in touch with that lousy feeling may or may not be a good thing right um so how should we think about mind body it i can see examples in hypnosis from your descriptions of hypnosis where uh you want to unify the mind body connection feel what you're thinking think think what you're feeling etc but i could also um point to elements within the hypnotic process in which you are actively untrying to uncouple those so it sounds to me like this whole mind body thing is a bit more like a car you can't say that um 40 miles per hour is the optimal speed it kind of depends on the road you're on and the turn you may or may not be taking um how should we think about mind body in terms of uh you know navigating daily life what do you think is the adaptive way to to conceptualize the mind body it's a big question it is it's it's it's a very interesting one um i i guess i think um that it's a matter not of you know absolute control but more control that that um we need to think of our brain as a tool and and our body signals as tools as well to help us understand um what's going on in the world what we need what matters what's important what isn't uh but also something that can be managed not simply you know absorbed and so hypnosis i think is a kind of limiting case where you can push it about as far as we can push it in terms of regulating pain pain is it you know is a good example of that you know obviously you need to pay attention if you just broke your ankle you better pay attention to it and get help where you're having crushing sub-sternal chest pain you better do something about it but our brain is sort of programmed to treat all pain signals as if they were novel pain signals if it's a sudden new problem that needs to be attended to i teach people to to think of the pain and categorize it see it is it does it does the pain mean that if you put weight on this you're going to re-injure your ankle for example or does it simply mean that your body is healing and the pain is assigned that gradually things are getting back to normal and and so you can modify the way you process pain based on what your brain tells you the pain means and that's true for emotional pain as well and particularly where i think a strategy that really helps is if you think of an interpersonal problem or a threat of something coming as as an opportunity to do something to ameliorate the situation so it's not just it's happening to you but something that you can influence and do something about so it's blending the receptive with the active response that i think can make a difference so you try and process it in a way that gives you a deeper understanding of what's happening you face it but you also say this is an opportunity for me to do something about it and the minute you realistically enhance and this doesn't mean imagine a way a heart attack it means figure out how to rehabilitate from a heart attack or a broken leg or something like that in a way that you get as much control into the situation as you can. I love it. Grief. Grief is one of those states that is very hard to remove oneself from you know and a lot of people ask me how do I deal with grief and i'm not a clinician so i'm deferring to you on the one hand actually someone at Stanford recently came to me and said you know my mother passed away and i had a sibling that passed away and they were the only people that i had and i'm also living alone and i'm challenged with a number of things and they look like they were holding it together very well in fact given what they were describing and on the one hand well i certainly point out that i'm not a clinician but i said on the one hand you could imagine that it would be necessary and useful to go into the grief state if you want to transition through it. On the other hand there i've heard before that the cathartic model of just really diving into an emotion can also be potentially hazardous if you don't have any anchors to grab onto. What is the view of psychiatry or your view of grief and how to deal with grief? Because i think grief is one of those all-encompassing emotions for many people. Yeah it is and it's a very important natural necessary stage of life and the reason we have all these grief rituals you know from burials and memorials and headstones and sitting Shiva and other things that people do it's a way of making it real that an incomprehensible loss has to be comprehended you know you have to realize that you're now going to have to live life without your loved one your parent you're sibling whoever and we've all gone through this at one time or another i certainly have and it's very hard to just come to terms with but one principle is to sort of say it's not it's never all are known it's more or less so yes it's all are known that you've lost a loved one but i asked people as part of their grieving to say to themselves and i do this in hypnosis sometimes too um you've lost them but what have they left you with what what have they bequeathed to you even though they're gone and i'll sometimes ask them to say if your mother could be here right now what would she say to you how would she feel about your life now what would she advise you to do so in our support groups for women with advanced breast cancer we we lost people and i and i got to tell you that we were warned by oncologists that we demoralized people that i mean they were a wonderful oncologist but there is some that were very afraid that that we would harm them in some way because they you know the mortality rate is fairly high with metastatic breast cancer they're going to watch people die of the same disease and you'll demoralize them and i so we actually measured their emotion and the content of speech every five minutes throughout a bunch of groups to make sure that wasn't happening what we found was that they talked about more serious issues but the mood didn't actually get worse and we found in general that expressing negative emotion on the long run helps people be less anxious and depressed over time and we've shown this in randomized clinical trials so it's not just my clinical impression and and um what we what we try to get them to do is to face a loss live with the emotion that comes with it but also see that the reason it hurts so much is how much that person gave you so we would do itself hypnosis exercise at the end of the group say i want you to get your body floating safe and comfortable now picture Mary and and um sit with the feeling of sadness that she's no longer with us and we do that for a few minutes and then we'd say on the other side picture one thing she left with you that you still have that you carry on in your heart her tradition of what she gave to you and so just seeing it not as a complete loss but as a real loss a painful loss but one that helps you to reflect on what you gained from her and knowing her um i think can be very helpful in the grieving process it's very helpful the way to conceptualize it um a couple quick questions can children be safely hypnotized or do self hypnosis they it it's sometimes harder for them to do self hypnosis they need more structure to do it you've got to share your dorsal adore prefrontal cortex with them a little bit but yes absolutely children can be very hypnotizable and um i i know pediatricians who use it wonderfully all the time they get them to focus on something else so they're going to have to give them a shot or draw blood or something and they'll say i'm going to press your happy button and presses their belly button and they start to get go the way kids do and meanwhile the nurse is drawing the blood and they don't even notice it um dentist good dentist can use it to help kids with fear and pain so yes it can be very effective for children we did a randomized trial i have a publication in pediatrics my late sister who was a pediatrician uh who and who always used to joke that uh she was the only one in our family who was a real doctor you know um i said i got you i got a paper in pediatrics and and the paper was children having to undergo avoiding cysto urethrogram so they're the anatomy of the kidney if you will forgive me it's sort of interesting and in that the the urethra that goes into the bladder normally goes into the bladder at an angle and so that means that when the bladder contracts to expel urine it automatically closes off the urethra because it sideways to the bladder some kids are born with it perpendicular and then you'll get reflux into the kidney and some children outgrow at some need pretty complicated surgery to fix that and so you you image them every year or so to see whether they're getting kidney damage or not and it's a pretty miserable experience you're a nine-year-old girl you have to go online on a hard-called table have strangers pull your legs apart and stick a catheter into your urethra and hold in the bladder and then expel urine and so you get into these struggling fights and of course the more they struggle the more they constrict and it makes it harder to do it so um i was asked if we could test it so we did a randomized trial at children's hospital uh they either got training in self hypnosis i would have meet with them on the mother the week before we find out from the kids where they like to be and i'd say you're gonna play a trick on your doctors your body's there you're somewhere else go visit your friend go to Disneyland do something else and the mother would work on this with me at the head of the table and we found that these children were much easier to image one got so relaxed that so you guy with he's a normally it takes us 10 minutes to get them to pee after they're doing this she was so relaxed she started peeing before i could even get the bed pan under her and i had to clean up the table you know and they also 17 minutes shorter procedures and that's a long 17 minutes for for a little kid so it can be very effective with children they're less anxious they have less pain and uh get through these difficult procedures very well that's great has hypnosis ever been done in uh for couples like couples therapy i'm thinking of pretty much every clinical setting here both people have to be hypnotizable of course but the reason i ask about this is next i'm gonna ask about psychedelics and there's a lot of interest in coordinating states through the use of of drugs of different kinds um we actually do this when we treat depression right you have a depressed person with a family members who are not depressed and you say well let's make them all uh not depressed right i mean but but in all and i'm only half kidding there because that is kind of the underlying logic in some sense but um are you aware of any um of any coordinated hypnosis that's interesting i i mean i've done plenty of it in groups not not with couples you can hypnotize large groups oh yeah yeah are we hypnotized right now yeah you are and i hope you've been enjoying it but the the the metastatic breast cancer there was a group of like 10 women who would meet once a week and we would all go into hypnosis together i didn't realize you were hypnotizing them collectively yes yes right fascinating and and that you know if anything i think it brings out the best in people's abilities because it's a shared social experience and and they would talk about it afterwards and so yes that's absolutely doable yeah and i don't want to focus on psychedelics specifically maybe that's a topic for a future episode but is there any basis for combining hypnosis with drug therapies inside of the hypnotic episode so i realize that some patients of years might be prescribed uh antidepressant or medication for for some purpose maybe same or different than the hypnosis is being directed toward but is there any evidence that if people are relaxed through the use of a um propanol or somewhat you know one of these many things in the psychiatrist kit that hypnosis can be more effective well interestingly one study that i haven't mentioned as we did uh spectroscopy on people who were hypnotized and we found that there was a correlation between hypnotizability and GABA activity in the anterior single cortex which fits with turning down activity so to the extent that we can self-medicate and GABA receptors basically are doing what benzodiazepines do to the brain that can happen when people are hypnotized so you're saying inside of the hypnosis you you have neural evidence that there's a kind of a um sedative effect of hypnosis at the chemical level yeah right right the people who are more hypnotizable have more of those GABA receptors and it's related to the degree of their hypnotizability that's in terms of there have been studies where they try to give people medications as well and the interesting thing with benzodiazepines which activate inhibitory activity in the brain if you're very anxious it might improve your hypnotic response a bit if you're just so anxious and you can't do it if you're not very anxious it actually inhibits hypnotic activity because you get sort of sedated and just out of it and you can't focus your attention as well so by and large we don't use drugs as an adjuvant to hypnotic experience most of the time you don't need to and sometimes it can make it worse rather than better some there's some evidence that mild stimulants might enhance hypnotic responsiveness a little reliably but too much well again scatter attention and you'll have less control over it so they they might be adjuvants but I frankly think hypnosis is more of a replacement than a need of supplementation your laboratory my laboratory have well sort of snuck into your lab and trying to emerge the to it's been a lot of fun and learning a lot about the power of respiration of breathing to shift brain states not just during breathing protocols but at all times and we will do an entire episode about those protocols I think we after those are published and and and so on but breathing itself is you've described is the bridge between conscious and unconscious states right and so I have to ask how how important is the patient's breathing pattern how closely are you monitoring their breathing pattern how closely do you monitor your own breathing pattern as you're inducing hypnosis put simply what is the role of respiration in shifting the brain's state during a hypnotic protocol yeah that's very interesting you had a great show with Jack yeah Jack Feldman and he he is and and the the issue I watch it I try the work that we're enjoying doing together shows that there are breathing patterns that may increase sympathetic arousal or may decrease it may help in you know cyclic sighing seems to actually where you have more time spent exhaling than inhaling seen and there's reason to believe that it induces parasympathetic activity because you're increasing pressure in the chest and therefore allowing the heart to slow down because blood is being returned to the atrium more easily I do use it I ask people to take a deep breath as part of the induction and then slowly exhale and partly as a result of our research together I'm emphasizing the slow exhale more as part of an some to enhance the idea in the induction that this is a period of relaxation because I think they are inducing that and perhaps perceiving it as well so there's no you're absolutely right that breathing is very interesting because it's right at the edge of conscious and Jack talked about that too of conscious and unconscious control that it will go on automatically but we can control it and so it's a kind of way for us to demonstrate to ourselves it greater ways of manipulating our internal state so you can either do it thinking about it the way we do with pain control and hypnosis or you can do it to some extent by taking charge of your breathing and doing things that will produce a change that you want to see happen in your body so I like it because it's right at that margin where you can enhance for me I like that as a way of augmenting hypnosis more than medication I think this is a powerful way of doing that great I'm really excited to see where all of this goes breathing vision bodily states clearly the and directed mental focus seem to be the key elements of hypnosis am I missing any other ingredients yeah it's I think that's right breathing vision how you change your vision and you don't you know typically you're in a physically relaxed state but frankly there are people at the peak of performance including physical athletic performance or musical performance when they're in hypnotic states too you know I've talked to classical pianists who say I'm not thinking if I start thinking about what my fingers are doing now I screw up you know I'm floating above the piano thinking about the native the tone that I want to feel exuding from the instrument so that's a hypnotic like state too and many athletes in who are in peak performance are just flowing with it they're they're not they're not thinking step by step what am I doing and that's when you're doing your best or you know when when we're working or giving a talk and doing it well we're in a hypnotic like state so it doesn't it it usually requires but doesn't necessarily require physical comfort or quietness it can sometimes be intense activity incredible well this has been an amazing discussion I've learned so much that I always do from you where can people learn more about how they can get hypnotized we mentioned Revery we'll put a link to it's r-e-v-e-r-i.com is the way to access that or it's the Revery app from the app store is the other way Revery.com is the website you can get to it through that or download the Revery app from the app store. Great so currently on Apple hopefully soon also on Android but in the meantime what if people are interested in exploring clinical hypnosis working with you or or somebody similar is there a centralized resource that people can go do to find really well trained hypnotists there are two good professional organizations that will help you with that one is the society for clinical and experimental hypnosis and I think that's sc-e-h.us is there we will we'll look it up and provide a link and the American Society for Clinical Hypnosis and they both provide referral services for professionals you can look it up I would just say in general look for someone who is licensed and trained in their primary professional discipline psychiatry psychology medicine dentistry and who has training and interest in using hypnosis is a way to do it. Great and then one more question and then a comment the question is will you be my psychiatrist? I'm honored. It's a tall task. I might be the most stubborn patient. I think the hardest work's already been done and we're done. Thank you. Thank you. You're fine. I appreciate that. Well and the final thing is a comment. First of all thank you so much for being here today for sharing your knowledge. I hope we can do it again and again. I hope so. I love working with your laboratory and with you. Likewise. Because when you speak I learn and I know others do as well. We will put resources to get to you but I also just want to say thank you for doing the work that you do. It's an incredible thing that in this world where we are discovering so much about how the body works. The mind is still rather mysterious and people are struggling with a lot of things but also I think people are really excited about applying tools like hypnosis to perform better feel better mentally and physically and so you've pointed us to a tremendous amount of resources and how these tools work and where they've already been demonstrated to work. So just thank you. I know this is your life's professional commitment in life and we all benefit. Well thank you but it's been a real joy for me to be collaborating with you and for you to be using your precision and knowledge about neuroanatomy neurobiology to address problems that often people who are that disciplined in the primary neurological end aren't as interested in as you are and so it's really been a pleasure to try and you know bring together what we both know from these different perspectives to build something that neither of us could do alone and so it's been a real joy for me to do it. Thank you. I'm honored. Thank you. Thank you very much David. You're welcome. Thank you for joining me today for my discussion with Dr. David Spiegel. I hope you found it as fascinating as I did and if you'd like to see the video of Dr. Spiegel hypnotizing me in what constitutes a abbreviated clinical hypnosis session you can go to the Huberman Lab Clips channel on YouTube. Also if you'd like to check out the Revery app for self hypnosis designed by Dr. Spiegel and colleagues you can go to Revery that's r-e-v-e-r-i.com to see the Revery app there's also other information there about the scientific studies that support the Revery app. If you're enjoying and or learning from this podcast please subscribe to our YouTube channel that's a terrific zero-cost way to support us. In addition please subscribe to the podcast on Apple and or Spotify and on Apple you have the opportunity to leave us up to a five-star review. Please also leave us comments and feedback as well as suggestions for guests that you'd like us to host on the Huberman Lab podcast in the comment section on our YouTube channel. Please also check out the sponsors mentioned at the beginning of today's episode. That's the best way to support this podcast. We also have a Patreon that's patreon.com slash Andrew Huberman and there you can support the podcast at any level that you like. On many previous episodes of the Huberman Lab podcast we discussed supplements. While supplements aren't necessary for everybody many people drive tremendous benefit from them for things like enhancing sleep and focus and various other aspects of brain and body health and performance. One issue with supplements however is that many of the supplements out there simply do not contain what's listed on the bottle and or the quality of the ingredients is not very high. That's why we partnered with Thorn Supplements. Thorn Supplements are used by all the major sports teams and they partnered with the Mayo Clinic. The reason they have so many high-level partners is that Thorn Supplements are of the very highest quality ingredients. They also are extremely precise in terms of what's listed on the bottle is always what's in the bottle. If you'd like to see the Thorn Supplements that I take you can go to Thorn. That's THORne.com slash the letter U slash Huberman and there you can see the Thorn Supplements that I take and get 20% off any of those supplements. Also if you navigate deeper into the Thorn site through that portal THORne.com slash the letter U slash Huberman you can also get 20% off any of the other supplements that Thorn makes. If you're not already following us on Instagram and Twitter please do so it's Huberman Lab on both Instagram and Twitter and at those channels I cover science and science-related tools some of which overlap with the content of this podcast other of which does not and is unique content. So once again thank you for joining me for my discussion with Dr. David Spiegel and last but certainly not least thank you for your interest in science.