THE MODEL HEALTH SHOW

EPISODE 640

The Shocking Way Your Brain Interprets Food as Information

With Guest Mark Schatzker

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SHAWN STEVENSON: Welcome to The Model Health Show. This is fitness and nutrition expert Shawn Stevenson, and I'm so grateful for you tuning in with me today. Food is not just food. It's information. And there's an ancient connection between humans and the foods that we eat. Yes, our food is actually making up our tissues, the tissues of our heart, of our brain, of our lungs, of our Gastrointestinal tract. Food has that intimate connection. But also, food is being utilized to run our immune system. To run and create all of our extracellular fluid. To run and create all of our hormones and neurotransmitters that manifest in how we feel. Again, there's a deep ancient connection between humans and the foods that we eat. Now, obviously, what we're eating today is very, very different from what we evolved on as a species, and food manufacturers have kind of hijacked this process.

But on this episode, I want to give you the very best dictation, the very best understanding of how this ancient connection actually works. Specifically, we're going to be talking about the science of flavor and also how our brains and our biology interprets food as information. And I had to put together a compilation of the very best person in this space in explaining how all of this stuff works. And he is an absolutely brilliant human being in his own right, but the information and how he packages everything together is just phenomenal.

This is information that every single person should know, so I'm very, very excited to share this. And this is at a time when we need this more than ever as a species to really be able to take control of our biology. So again, I think you're really, really going to enjoy this. Now, in this episode, you're going to be hearing about sugar in a way that you have never heard before, and I think it's going to surprise you. But obviously the highly refined sugar that's making up a huge percentage of our diet today can be detrimental to our biology. Now, one of the simple things that we can do is start to realize, okay, we've got a highly refined product over here versus something that has been utilized for tens of thousands of years by humans and this substance not only does it do the reverse which sugar has its propensity towards creating insulin resistance, but this sweetener actually has been found to improve our insulin sensitivity and reduce insulin resistance. And what I'm talking about is honey. It's impossible to classify honey as merely a sweetener.

There really is nothing like it on earth. Unlike other sweeteners, raw honey specifically has been found to improve insulin sensitivity. A recent study that was published in the peer-reviewed journal, Nutrients details how raw honey can improve fasting blood sugar levels, improve our fat metabolism, and reduce the risk of cardiovascular disease. Additionally, the scientists noted that it has a vast array of antioxidants and anti-inflammatory properties and one of those is leaning towards its impact that it has on our brain and cognition. This was published in

evidence-based complementary and alternative medicine. They found that raw honey possesses nootropic effects such as memory enhancing effects, anti-anxiety effects, and also antidepressant effects. Super powerful stuff and again thousands of years of use by our species providing all of these really interesting metabolic benefits.

I really don't think that's an accident. Now, the quality of honey matters more than ever because there is a tremendous amount of contamination in our world today as you know, and so we want to get our honey from companies that are doing third-party testing for contaminants like heavy metals, like Toxic molds and things of that nature. And the company that I know is doing that far and away better than anybody else and also providing the very best honey utilizing sustainable beekeeping is Beekeeper's Naturals. Go to beekeepersnaturals.com/model you get 25% off their incredible superfood honey. Now, once you have this honey, you're not going to settle for anything less. And also, they have some wonderful other things for our immune system like their Propolis Spray, and I'm a huge fan of their nootropic that's based on royal jelly, and it's royal jelly brain fuel. Again, pop over there. Check them out ASAP. That's beekeepersnaturals.com/model for 25% off store wide. And now let's get to the Apple podcast Review of the week.

ITUNES REVIEW: Another five-star review titled “essential listening” by Anthony Lyft. “I have been in the health and fitness industry for over 10 years, hold multiple degrees and certifications, and yet I still turn to Shawn for more info than anyone else. First and foremost, the passion he has for trying to help people is relentless. His devotion to his craft is something I strive to emulate. His willingness to speak the truth is something we should all admire. I share his work with anyone willing to listen and hope someday to be even a tenth as successful as he is much respect, sir.”

SHAWN STEVENSON: Wow, much respect to you. Thank you so much for sharing that review over on Apple podcast that hit my heart. Thank you. Thank you. Thank you Thank you. And if you get to do so, please pop over to Apple podcast leave a review for the model health show and on that note, let's get to this powerful compilation. On today's episode, you're going to be hearing a compilation from conversations that I had with award-winning science journalist and author of the best-selling books The Dorito Effect and The End of Craving, Mark Schatzker. Now, again of everybody that I know in this space of health and nutrition and science, he's the person who's really brought forward into public consciousness how the science of flavor and food actually work and how it affects our biology. And I think again, this is really going to blow you away and add some very powerful tools to your superhero utility belt. So, let's dive into this first segment from the incredible Mark Schatzker.

I want to know what sparked your interests. You're a journalist. You're somebody who's a writer. What sparked your interest into studying food?

MARK SCHATZLER: I Like eating food, and this all really started as I was like a travel food writer. It really started... Right after I graduated from University, I went to Chile to visit my brother who was working there. We went out to the beach one weekend, and we brought some steak, and it was mind-blowing steak. It was steak from Argentina, and it was the kind of steak you put a morsel in your mouth and you're just like, "Oh, my god, what just happened? That was the best steak I've ever had." So, I asked what I thought was a simple question, which was why did that steak taste so good? And it took me like ten years to answer. It's a really complex question. It turns out. It resulted in my first book which was called, Steak: One Man's Search for the World's Tastiest Piece of Beef. And that was really just a search for delicious steak. But then you start to ask these deeper questions like what is deliciousness? And why does food taste good? What why do humans eat meat? Are we supposed to eat meat? Aren't we supposed to eat meat? If we're not supposed to, why does it taste so good?

But then it even started... I started to get interested in cattle themselves 'cause I spent a lot of time with farmers and ranchers, and they would say things like I'd go and visit a ranch and the rancher would say, "Well, you know those cows over there are mama cows, and they're over in the field with lots of legumes, clover, and alfalfa. And they're eating that stuff 'cause they're pregnant, and they need the protein. But over in that field those are steers, and they're lying on fat. So, they're not so much interested in protein as carbs and that's what they're going for. And you sort of scratch your head and you think, how do they know? They don't know what carbs are. They don't read men's health. And yet somehow, they're eating the food that they you know should be eating. And that led me into this very interesting domain of science where they talk about things like flavor feedback and how animals are guided by an intuitive sense of what they need. But basically, those cows were eating what they were eating 'cause that's what tasted good to them at the time. So, of course, this brings up another question, which is, are we like that? Because we don't think we're like that. We tend to think that deliciousness is out to get us, and we have to kind of resist. That that food is fuel and that we can outsmart, you know, all this kind of machinery bodily machinery brain machinery. And the possibility is we're getting it all radically wrong.

SHAWN STEVENSON: Yeah, man. This is super interesting stuff and you kind of highlight in the name of the book, The Dorito Effect is fascinating in of its of itself. But this big shift took place around the time that the Dorito was invented. So, can you talk a little bit about that story that kind of history of the Dorito?

MARK SCHATZKER: So, have you seen the show Mad Men, do you know that show?

SHAWN STEVENSON: Yeah. Draper.

MARK SCHATZKER: Advertisers on Madison and Don Draper exactly where there was a guy named Arch West who could have walked off the set of that show. He was a Madison Avenue ad guy. In the 1950s, he worked on like Jell-O Puddings Account, Campbell Soups. And he was invited to be the VP of sales and marketing for the Frito company. So, he moved his family to Dallas, and shortly after he got there the Frito company merged with the Lay's chip company, became Frito-Lay company. A company we've all heard of. So shortly after that Arch West takes his family on a trip out to California. Really interesting little side story. He goes out for his favorite lunch one day, which is prime rib. And on his way out of the restaurant, he meets the guy who started McDonald's. And they have this conversation. What was the McDonald's guy's name for some reason I'm...

SHAWN STEVENSON: Kroc.

MARK SCHATZKER: Ray Kroc, exactly. He meets Ray Kroc. Ray Kroc compliments his daughter's beautiful golden hair, asks him, "Have you ever eaten at my restaurant?" Turns out Arch West hasn't even heard of it 'cause McDonald's hasn't gone to Dallas yet. So, these two titans of the food industry have this interaction and basically talk about hair and then go their separate ways, Never talk again. But the real important moment on that trip came a little while later. Arch West was driving south to San Diego, and he passed what he called a little Mexican shack. And he was the kind of guy who just had to stop, so he pulls in there and he tastes for the first time a tortilla chip. And he's really taken by it, and he has this vision. He says, he thinks to himself, "Tortilla chips are going to be the next big thing for Frito-Lay." So, he goes back to Dallas. He springs this idea on the corporate brass. And they just sort of look at him funny, and they say, "Why would we sell tortilla chips when we already sell Fritos?" Which are kind of the same thing just more like a different shape happening.

But Arch West is so convinced about the future of tortilla chips that he actually funnels discretionary funds to an off-site facility, where he figures out how to make them. He comes up with a name, which in a very bastardized pidgin Spanish means little pieces of gold. And he re-pitches it, and he says, "Gentlemen, I give you Doritos." And he gets the green light. And I know what you're thinking, "This is the moment everything changed. America started gorging on junk food, and we started getting bigger." But that's not when things changed because what happened next is really interesting. The original Doritos bombed. Nobody got them. In the southwest, where there was like a Hispanic kind of Mexican cultural influence, people knew, "Yeah, tortilla chips. Great. You can dip them in bean dip, dip them in salsa." But everyone else said, "This snack sounds Mexican, but it doesn't taste Mexican." So Arch West has to go back in front of the people he had essentially lied to, the people who greenlit this snack that was failing, and they say, "What are you going to do about Doritos?"

And this is when everything really did change because he said, "Let's make them taste like taco." And one of his fellow executives started ribbing him and said, "Our Yankee friend from the north doesn't know the difference between a thing and a flavor." And it was a really good comment because right up until about that time, different things had different flavors. Like if you wanted to experience the flavor of fried chicken, you had to eat fried chicken. And if you want to experience the flavor of cherry or the authentic flavor of strawberry, you had to eat those things. We had some fake flavors back then like really fake tasting strawberry chewing gum or really fake tasting strawberry ice cream. But flavors were really in the domain of nature up until that point. But Arch West knew that there was new technology, which let you impose flavor on anything you wanted. For the first time in the history of our species, we could make a triangular piece of fried cornmeal, have the zingy tang of a taco, the same savory depth, doesn't taste exactly like a taco, but it tastes kind of like a taco. And you put one in your mouth, and you want to keep eating. And just think about that for a moment because we're talking about something that on the surface, we're all a little bit frightened of, right? Carbs, fat, salt.

The original Doritos had all that stuff. Nobody wanted them. Then they dust on the sprinkling of flavor chemicals, and a snack that no one wants becomes a snack that people literally cannot stop eating. So that really tightly illustrates the power of flavor technology to make us eat stuff.

SHAWN STEVENSON: Man, that is so fascinating. What did they use? What was this technology that allowed scientists to start to extract and understand these different flavors.

MARK SCHATZKER: A very important device called a Gas Chromatograph. And a gas chromatograph is really good at analyzing substances that exist in minute amounts. So, before the gas chromatograph science knew an awful lot about food.

We knew about vitamins. We knew about minerals. We knew about carbs. We knew about the omega-3s and the omega-6s. But we didn't know about flavor because flavor exists in food in tiny, tiny quantities like we're talking parts per million parts per billion, even parts per trillion. Then in the mid 1950s, a device called the Gas Chromatograph is suddenly available. And what that does is it volatilizes the chemicals in food, and it puts them through a coil. And in the coil, they kind of arrange into all their constituent parts. So, they just start marching at the other end one by one. So, you can split them all up, and you can capture them. And then you can go analyze them using technology called Mass Spectronomy. And then you know what the flavor chemical is. And it's really easy to go, "Hey, why don't we just make these ourselves?" And that's what happened.

SHAWN STEVENSON: Right. Man. When reading your book, I started to realize all of the different flavors of... Because this is so fascinating if people get this. There's a difference

between a thing and a flavor. You know and that just really struck me because we've become a culture that's just immersed in things that aren't actually supposed to taste like it does tasting like something else. So, what I mean by that is...

MARK SCHATZKER: We've never questioned it, right?

SHAWN STEVENSON: Yeah.

MARK SCHATZKER: We've never thought orange Fanta tastes like an orange. Is it supposed to be that way? We grew up with it. So, it seems normal, but it's actually really recent.

SHAWN STEVENSON: Yes, so fascinating. I'm thinking about like all these different things, these "fruit" snacks fruit punch.

MARK SCHATZKER: Yep.

SHAWN STEVENSON: Zero percent fruit in it. And even the name itself like what is a fruit punch. It's like a punch in the face. Like it's a punch in your mouth that you just can't even Process. It's so fascinating that this was like something that somebody came up with, and it started around this time of this Dorito.

MARK SCHATZKER: Yeah, exactly.

SHAWN STEVENSON: Well, simultaneously you also mentioned that because we're looking at this paradigm with food now. We have this increase in flavor with these things that are things that aren't necessarily supposed to have this particular flavor, but then we have natural foods that start to have a reduction in flavor. So, let's talk about that. Why is that happening?

MARK SCHATZKER: Exactly. This is the other side of the flavor coin, and in some ways even more alarming. This is actually the question I originally start to ask 'cause one of the things I noticed when I was doing my steak book is that you know the steak you go and buy at the supermarket, it doesn't have a lot of flavor. And then you go to Argentina, and you taste one of these grass-fed Argentine steaks and you're like, "Oh, my god, what was that?"

And then I started to notice everything's getting blander. The people I would talk to would say, "Well, this is high output agriculture. We keep growing more of everything." So, if you look for example at the Dorito itself. The corn that it was made from in the mid 1960s was already very different from the corn that went into the original Fritos in the 1930s because our yields of corn have just been getting bigger and bigger and bigger. We grow more, more corn on the same acre of land than... I mean, it's astounding how much more we grow. If you look at things

like tomatoes and strawberries, we grow like an order of magnitude more. We're getting ten times as much fruit from the same acre of land as we used to.

Now, on the one hand, this is a really good news story because we have more mouths to feed, and we have less farmland than we did a hundred years ago. So, if it was not for these agricultural innovations, there would be a lot of hungry and even dead people. So, it's really good that we cranked up our ability to produce food. However, the question we never ask, is has this come at a cost? And we started to get a whiff of that in the late 1990s. There was a study that came out in a British Journal of Nutrition that found that actually whole foods, which are called whole they're wholesome, are getting less wholesome. It found that there was less vitamins, less minerals than before it was alarming. But it caught the attention of a biochemist at the University of Texas. His name was Don Davis. And he thought, "You know, this doesn't sound great," but he wasn't sure they did the study, right?

So, he did an extremely rigorous study looking at like 50 garden fruits and vegetables, analyzing them for vitamin content, for mineral content 1950s varieties versus 1999 varieties. And what he found is that on average there's an across-the-board decline. That these foods are, he calls it the dilution effect. There's just not as many vitamins and minerals in them as there used to be, which is alarming. I mean on a very basic sense. These are whole foods. This is the stuff that's supposed to be good for you. It's getting less good for you. It seems intuitive, right? Because you think, "Well, of course, you know I put a strawberry in my mouth it, you know, it tastes like cardboard. I put one of those tomatoes in my mouth," we know how terrible tomatoes taste, but what the really interesting link that I was looking for and wanted to forge and which brought me to an absolutely fascinating body of science is the link between flavor and nutrition.

Because this is something we never talk about because here's the thing all those vitamins that Don Davis was studying, they don't have any flavor. This is why nutritionists have avoided flavor from the get-go because they don't taste like anything. Vitamin C is the only thing that has any flavor, and it tastes a little bit sour. Once I got into the animal science and oddly into the science of tomato flavor that the curtain was pulled back, and I realized there is this absolutely fundamental connection between the flavor of the food that we eat and the nutritional content.

SHAWN STEVENSON: Man, that's exactly what I want to talk about today, and you state in the book that, "Essentially, our food related problems are due to a large-scale flavor disorder, right?

We've got this simultaneously happening. Real natural foods, fruits and vegetables, their flavor is being reduced. So, I want to talk about that first, the actual flavor itself. You gave the

example of chicken in the book and also the same time this increase in processed food having so much more flavor that's just kind of you don't... You have no chance against it. Both of these things are happening at the same time and wonder why people aren't eating more whole natural foods. So, let's talk a little bit about the flavor itself of natural foods being reduced.

MARK SCHATZKER: Yeah. So, let's take the example of a tomato. There was a guy who has been working on this for years at the University of Florida. His name is Harry Klee. And he was initially tasked in the late '80s by Monsanto to produce a genetically modified tomato because everybody in the tomato industry, everyone knew tomatoes taste really bland, what can we do about it? They all thought it was because tomatoes are picked green and then they're kind of like stored in a warehouse and then we want to send to the supermarket they just fog them with ethylene gas, which is like a ripening hormone turns the tomatoes red, you go to the supermarket, tomato looks red, you take it home, you slice it, and it tastes totally bland. They all thought if we can just slow down the ripening process, we can get the tomatoes to ripen halfway on the vine, then we stick them in a box, send them to the supermarket, and then they kind of ripen along the way, and they'll be ready to go and awesome. So that's what Harry Klee did. He developed one of the first GMO tomatoes, which was essentially programmed to ripen slowly.

It worked. The tomato took like three weeks to ripen instead of a week, and it didn't taste any better. And at this point Harry Klee decided he'd have had enough of industry. He got a job with the University of Florida and literally dedicated the rest of his life to trying to unravel the mystery of tomato flavor 'cause it's the mystery we all know most tomatoes taste terrible, but then like in July or August you get an heirloom tomato, and you put a slice in your mouth, and it's just like this flavor symphonies raging in your head. So, what Harry Klee found is that tomatoes have essentially forgotten how to be flavorful?

They don't have the genetic ability to be flavorful because we've been breeding them for what we call agronomic traits. We want our tomatoes. We want a lot of them. We want them to have a good shelf life. And we want the plants to be disease resistant. So, these are the traits that we keep selecting for. And what's happened is kind of a reverse evolution. When you don't select a trait, you lose. It's the same reason we lost our tail. It's reverse evolutionary pressure. And over the decades, after all this aggressive tomato breeding of not choosing flavor, we've lost flavor. You can take a modern tomato doesn't matter how you grow it can be in your backyard, organic, you can sing it lullabies, it will not be flavorful. So, this is the story of so much of the food we grow because all we care about is quantity and price. We want more of it. We want it to be cheaper. Nobody ever sits down and tastes it and goes, "hmm. Is this a better tomato? Is this a better carrot? Is this a better cucumber?" And yet we all know it because so much of this food is just underwhelming.

So, you make a salad, and you're dumping ranch dressing over it, you're putting croutons and bacon bits. You're doing anything to just make it taste good 'cause it's so insanely bland. And yet we also know, in the back of our heads, it doesn't really have to be this way 'cause some of us have been lucky enough. You might travel to Greece or Italy, where they grow some really wonderful produce, and you have a very simple salad with just a little bit of olive oil, a squeeze of lemon, and some sea salt. And it's like a revelation. You're just like, "This is the best salad I've ever had." And they haven't done anything to it. That salad recipe wouldn't work here because our greens especially like supermarket.

January greens are so bland. Maybe you can pull that off at a farmers' market. So much of the whole foods that we grow, it's true of meat as well chicken is the best example, the chicken we grown... So, chicken in the 1940s, chicken that our grandparents our great-grandparents would have eaten, would have been around 16 weeks old when it was at the supermarket. A chicken we eat today is six weeks old. So, it's essentially a giant baby. Chickens are ultra-fast growing. They're incredibly cheap, and they're incredibly bland. It is so difficult to make chicken flavorful. We brine it. We put dry rubs on it. We make sauces. We do anything we can to make it just taste like something.

SHAWN STEVENSON: So, so fascinating, you know, one of the things that also jumped out in the book is this concept, and you share the story of Debbie in the book, of incentive salience. And we're looking at this paradigm, where we've got all these artificial flavors, and actually looking at brain imaging scans and seeing what's going on in the brain. Because the reason I want to talk about this before we get into some of the other things is a little bit to do with food addiction because I thought you talked about this so elegantly and even kind of funny in the book and just kind of bringing this right to the forefront of what's going on for us when we're experiencing this thing. So, can you talk a little bit about that story?

MARK SCHATZKER: Yeah, absolutely. I got very interested in this idea because one of the things I resist, as I told you, like my interest in all this sprang 'cause I really love to eat. I travel Different parts of the world. Sometimes you go to fancy restaurants. Sometimes you just eat by the side of the road. But I really became interested in this idea of flavor and deliciousness. And what lot of people say is, is that the problem with our food culture is that we're surrounded by too much delicious food. And I'm sort of going like, "I don't really buy it. I mean if you're eating donuts, and drinking cola, and eating potato chips." It's like a pop song. It gets you in the moment, but nobody would ever say this is really great right? It's not like Beethoven's fifth, something truly memorable.

So, I got interested in this idea of food addiction. And Most people think, especially with you know the morbidly obese, they think that their problem is that they just like food too much and they don't have the good sense to stop when you and I have the good sense to stop. But,

of course, that doesn't really make any sense because these people want to stop and they're in the grip of something they can't control. When they take people who have a, let's say, a problematic relationship with food, they have difficulty controlling what they eat. And they put them in a brain scanner. What they find is that if they show them, let's say, a picture of a milkshake, they experience this burst of desire for it.

That's just like off the charts. They'll see that picture of a milkshake, and they'll want it a lot more than you or I will want it. But then they'll actually taste it and their enjoyment of it will be equal to what you or I might like or even below. So, they're in this crazy relationship where their problem is that they want food a lot, but they don't actually like it anymore. They might even like it less and I think that tells us something really interesting, is that something that we've done with our food has really?

Distorted our relationship with food. We're making food more craveable, but we're not actually making it taste any better. And I think we all know this to some degree. When it comes to things like Doritos or potato chips, we've all been there. You go to a Super Bowl party and there's the big bowl and you're like, "No, I'm not going to have any." And you're like, "Yeah, maybe I'll have one." And you have one, and would you say that was the most delicious thing you ever ate in your life? Not a chance, but what you experience more than anything is just like your hands going back to the bowl. It's like you're you're trying to pull it back. There's this compulsive element and that's this experience we've created is that we've made food in a way more compulsive, but not really that delicious.

I think if you asked a lot of people what their most delicious food experiences would be. It wouldn't be that stuff. It would be like a pie that their grandmother made them or like a chicken that their mom roasted or an incredible steak like the one I had in Argentina.

SHAWN STEVENSON: Yeah.

MARK SCHATZKER: Or an amazing tomato or peach. Think of how good peaches are in the summer. You know you bite into that thing and the juice is running down your chin. I mean, that's a food moment.

SHAWN STEVENSON: Yeah, man, and that's what life is too. You know, it's kind of like this is you know like music is a soundtrack to our lives food is as well in a way. You know and it speaks this language and again, you just kind of detail in the book and also specifically sweet foods speak a very strong language to, not just humans, but a lot of other animals as well, but specifically for human physiology. So, I want to talk about our hardwiring to desire sweet. I did an episode. And I will put that in the show notes the history of sugar. And we went back and literally looked at when it was extracted from sugarcane and how it kind of found its way into

Europe and the whole story behind it. But then we got into present day because now we can test things, and we can see. We can give rats in a lab the opportunity to choose cocaine or artificial sweetener. And you see them get addicted to the artificial sweetener rather than the cocaine. You know, it's so crazy to see this. What is it about sugar that makes us so kind of we're hardwired to eat it. Let's let's talk about that.

MARK SCHATZKER: Yeah. Well, it's you know, as soon as we come out, as soon as we're born, sugar makes us smile, sugar's something we want. It's a source of energy. And obviously sugar has come under a lot of scrutiny in the last several years. Everybody's talking about it. I'm not in full agreement with 'cause here's what I would add. It's actually not sugar that we want. It's sweet foods that have a sweet taste, but also Something else. And this is why I think the flavor industry is so interesting. 'Cause if you look at all the sugary sodas in the supermarket you think you just imagine them in your in your brain all the sugary sodas next to one another. They are all nutritionally speaking the same thing sugar and water. There might be like a little caffeine there's caramel color, but they're basically sugar water with some carbonation. It's the flavor that makes them delicious. It's the flavor that makes Dr. Pepper taste different from ginger taste different from Coca-Cola taste different from Fanta, right? It's the flavoring. Would any of us drink those if not for the flavoring. I don't think anybody would. I've given my kids sugar water and they're like, "No, thanks, it doesn't taste very good."

It's the flavoring. It plays such a big role. So, the sugar, you know, that's the macronutrient that's implicated in things like insulin resistance and obesity. I don't dispute that once that sugar gets into your stomach it's doing stuff. But what we have to ask is why is it getting there? And we are hyper incentivizing it by making it taste more delicious than it deserves to be.

SHAWN STEVENSON: Very interesting. So, this is a good place to kind of segue into we're looking for something else. It's not just the sugar but that sugar can indicate that there is some other potential value in the food. You know, for example eating properly grown peach like you talked about. We're going to get some other things packaged into that. So, let's shift gears and talk about, how flavors can actually indicate potentially? Nutrition.

MARK SCHATZKER: Yes. So, let's just think for a moment about flavor and how does flavor work? We rarely pause to think. We're all in search of deliciousness. We all want our dinner to be as delicious as possible. Even when you're in a diet, you run out and buy like the diet book that has you know 55 can't miss recipes. We all want food to be delicious. Well, what is this experience of deliciousness? It's two things. It's the taste that you experience on your tongue with your taste buds sweet, salty, bitter, sour, umami. A lot of us kind of know that. We feel like the tongue is doing all the work. But there's this other thing happening called retro nasal olfaction big word. But what it really means is back of the nose smelling. So, what happens when you eat, you know, Let's say, as you're bringing that pizza close to your mouth, you first

sniff it with your nose smells like pizza. But then when you start to bite it those pizza vapors go into the back of your throat and then up that tube that connects to your nose and stimulates your smell receptors. So, what nobody realizes is that as they eat food, as they chew food, they're actually smelling it. And it's a different kind of smelling it's received by a different part of the brain and that's what gives food it's nuance.

It's rich flavor. It's character. Maybe it makes the most sense to people once they realize that when they have a cold food doesn't have any flavor, and it's because this retro nasal olfaction has gotten shut off. So, it turns out the DNA to make that equipment, it's the biggest chapter in the manual to make you. Your DNA is like this instruction manual. The biggest chapter is on how to make your nose. So, obviously, it's there for a really important reason. What's it doing there? Why do we have this? It's a Gas Chromatograph, only it's way more sensitive and way faster than the ones the scientists use. So why is it there? Well, I got in touch with a scientist at Utah State University named Fred Provenza, who has the most fascinating body of research that he's done on sheep and goats, and he asked the same question, what is flavor there for? And he would do these crazy experiments where he'd take two groups of sheep and he would make them deficient in something important. So, phosphorus is an example phosphorus is a mineral if you don't get enough phosphorus.

You're going to die. It's essential. He would make these sheep deficient in phosphorus. They start doing crazy things. They start eating dirt. They start trying to drink the urine of sheep in the other pen that aren't deficient in phosphorus. They are like totally, totally desperate. And then one day, he takes one of these groups of sheep and He puts a what he calls a ruminal infusion. So, he sticks a tube down as their throat and he blasts in some phosphorus and at the same time they eat this feed that tastes like coconut.

And then the next day he puts some water in their stomach and he gives them feed that tastes like maple. There's this association going on. The phosphorus itself doesn't taste like coconut, but it's associated with the flavor of coconut. And then after a bunch of days of doing this, these sheep... He makes them deficient again. And what do they do? They go, "I want to eat the coconut feed." It's like they've realized this is where the phosphorus is. Now, what a lot of people say is, "Oh, but how do we know that sheep just don't like the flavor of coconut?"

Well, he took that other group of sheep, and he reversed it and he paired the phosphorus with maple. And those sheep would go, "Hey, I want to eat maple when I'm phosphorus deficient. I don't want to eat coconut." So that's what I was talking about earlier about flavor feedback. This is why we have this elaborate, amazing chemical sensing apparatus right in the middle of our face that is taking chemical readings of the food that we're eating all the time. Because the flavor of food is a guide to the nutrition that's in it. Now, for the big question, right? Maybe sheep do that maybe like who knows nature is a different place. Can humans do that? Well, it

turns out the history books are pretty revealing. I started to look at the history of British sailors, who would get scurvy. Because I wondered you know When British sailors got scurvy would they sit around craving oranges makes sense, right? You'd think that would be a good thing to do.

Well, I talked to a plant scientist, and he said, "No, of course not. And I said, "Well, how do we know?" And he said, "Well, if they did do that, we'd know about it." And I thought, "Man, he's probably right. But I better check anyway." It turns out they did. Scurvy is the most... I mean it was a devastating disease. Their gums would swell up, their hair would fall out, wounds that had been healed for 50 years would open up and start bleeding again. It was awful, but it was characterized by something they called scorbutic nostalgia, so it just wasn't a physical ailment. It was a mental one. And one of the symptoms of scorbutic nostalgia Was just an overpowering craving for fruits and vegetables. They would look into the ocean as they sailed over a coral reef, and they'd see all the coral reef heads and in their minds, those would transform into cabbages because they were craving foods that had vitamin C.

There's a chaplain who recorded a ship. It was you know out adrift in the Pacific for weeks like they were thrown 20 dead bodies overboard a day. So many people were dying of scurvy. They finally hobble into this island called Juan Fernandez the middle of Pacific and what do they do? You think they go and like trap a deer or something or eat some groundhogs? They start eating moss. They start ripping wild turnips out of the ground and they wrote about how delicious they tasted. So, for them there really looks like there was this intuitive Knowledge of, "I want to eat the food that I need." Even more interestingly is that tomato scientist I told you about earlier Harry Klee. One of the things he did was map out, he figured out what the flavors are in tomatoes that we like turns out there's about 26 of these flavor compounds that really drive our liking of tomatoes. So, Harry has this idea that, "Hey, if I can figure out how the tomato makes flavor, then I can start to target those genes and breed for a more flavorful tomato." Well, when he traces back the metabolic pathway that a tomato uses to make flavor, what does he find all 26 of those flavor compounds are synthesized from an essential nutrient?

Carotenoids, omega-3s, vitamins. So, it's like the flavor of a tomato is a big chemical sign saying there's good stuff inside here.

SHAWN STEVENSON: I hope that you're enjoying this episode now a big part of taking back control of our palate from processed food companies resides in the intelligence of real foods. A study published in 2014 in the peer-reviewed journal, Appetite found that Chlorophyll, that's naturally found in green foods dense green foods, can aid in weight loss, and reduce the urge to eat hyper palatable processed foods. That's pretty remarkable again. There's this intelligence that is found in foods. Now, to take this a step further there are time-honored beverages that are also highly concentrated in chlorophyll and this high concentration of

chlorophyll in this liquid form is one of the fastest ways to help to really reset our palate and activate the inner intelligence for us to choose higher quality foods. And I'm talking about green tea specifically matcha green tea. Now, matcha green tea is the richest green tea in chlorophyll and you can see it.

Now, green tea, in addition to this, also contains a unique amino acid called L-theanine that's able to cross the blood-brain barrier and to stimulate the neurotransmitter GABA. Now, this helps us to be more in control of our bodies, of our thoughts, helps to reduce anxiety, and just makes us feel more centered and relaxed, again, this is leaning towards making better decisions with our food choices. Research published in the journal, Brain Topography found that L-theanine intake increases the frequency of alpha brainwaves indicating reduced stress, enhanced focus, and even increased creativity.

The only matcha green tea that I drink is sun goddess matcha green tea from pique life. It's shaded 35% longer for extra L-theanine and it's also crafted by a Japanese tea master, there are less than 15 in the world, as the first matcha that's quadruple toxin screen for purity. There's no nefarious things added, no preservatives, no artificial sweeteners, or sugar anything like that just the highest quality matcha green tea that you're going to find. Go to piquelife.com/model you get 10% off of their incredible sun goddess matcha green tea and also their other award-winning tea flavors. Go to piquelife.com/model that's P-I-Q-U-EL-I-F-E.com/model for 10% off. And now in this next segment with Mark Schatzker again Award-winning science journalist best-selling author he's going to be sharing with you the science of what actually drives our food cravings and how our brains interpret food as information plus a whole lot more. Check out this next segment from the amazing Mark Schatzker.

MARK SCHATZKER: We all feel that consuming excess calories causes weight gain and I think that is true. And we also think then well then, we just need to control that so if we post the numbers next to menu items this has 200 calories.

This has 500 calories. Maybe this will help us make better choices. But what we find in studies what you know when people have access to that information does it change their choices? Yes, it does, but in the short term. So, people when they see that information, they might decide to have maybe just one slice of pizza instead of two or maybe to have a salad. But what we find is that later on they will they will have a larger dinner. They might snack in front of the television and unconsciously they will they will gain that back and what this is telling us is very important is that so much of how we've regarded diet and weight gain has been based on a myth, which is that we have conscious control over what we eat and how much we eat. And so much of this is in fact controlled by a deeper part of the brain that we don't really have access to. It's kind of like your heart rate or the rate at which you breathe or how you unconsciously

blink. These aren't things that you can you know make a decision about they happen often despite your strongest efforts to change them.

SHAWN STEVENSON: You start the book off by basically pointing out these fallacies that we tend to have and you highlight this incredible city in Italy that is well noted for its plethora of delicious food 'cause another argument is well, it's because of the amount of food we're consuming here in the United States versus there and eating "bad foods" what we would consider on the surface to be bad foods. Can you talk about this city? And that connection?

MARK SCHATZKER: Well, and even more we're I think we're afraid. We've been guarded against the pleasures of eating. There's that famous saying, if it tastes good spit, it out that we think the pleasure of eating is going to take us to a bad Place that we're somehow inclined towards overeating. So, then I visited a city called Bologna. This is in northern Italy. They do not eat a Mediterranean diet in northern Italy. You're familiar with the lunch meat bologna sometimes called Bologna. It comes from Bologna. There they call it Mortadella. It's a it's a deli meat that they take enormous pride in. They have rules about how it's made, and you can see that it's flecked with cubes of white fat. They are not afraid of fat at all in Bologna. They have another, I wouldn't even call it a meat, a It's called lardo. It's very thinly sliced pig fat and they drape it over crusty bread. This is carbs and fat in its purity, and they revered as a wonderful delicacy. They revere pasta in the Chamber of Commerce.

They have a golden noodle. Their favorite noodles called Tagliatelle. It's kind of a wider than spaghetti. It's made with eggs. Once again, a blending of these two nutritional villains carbs and fat. They have the Platonic perfect golden noodle the scientific achievement that all noodles should aspire to be. They have a repository of recipes in Bologna, which is to say rules as to say these recipes and we're talking about things like lasagna, or their famous meat sauce must be made a certain way. The food in Bologna is incomparable. It is one of the world's great dining destinations. Millions of people from all over the world fly to northern Italy just so they can eat what the locals are eating. So, if it were true that that eating this delicious food is going to make us gain weight, you would expect these northern Italians would be the plumpest in the world and their rate of obesity is astonishing. It's less than 8%. Here in the United States, it's 42%. I mean, just try and reckon that 8% versus 42%.

SHAWN STEVENSON: This is nuts. I mean to put it lightly and just looking at here we have a population of folks who are consuming, as you mentioned with the you know throughout the book, delicacies and in terms of pastries, and pastas, and Bologna that but again, this is just a little foreshadowing the bologna that I was eating from my corner store was not the same bologna that these folks are eating.

MARK SCHATZKER: It's not the same, no. And that's an important difference.

SHAWN STEVENSON: And so, I would go there we get it sliced. My mom would have us go get that the bologna sliced up and you know oftentimes of course we fry it, and you know, we do our hood sandwich basically and but it has a root and also even the most popular really pasta dish coming from this particular place, but what people tend to think of when they think of Italy we think of you know these various blue zones. We think they're just eating fish, and vegetables, and olive oil and that's the end of story. But it is so much more colorful and so much more variety than that.

MARK SCHATZKER: Yes, and in fact that you know classic Mediterranean diet you tend to find further south in Italy and oddly enough there's actually more obesity in southern Italy. Now, I'm not going to say that's due to the Mediterranean diet, but it's just to say this is really so much more complex and fascinating and I also think exciting. I mean think about it. There's this population Italy that's eating this wonderful rich food and they're trim. I mean, this gives us hope.

SHAWN STEVENSON: Right, and that's what it's really all about. And so, building upon this you also talk about this really strange epidemic that gripped Europe and also it made its way here to the United States. Let's talk about that.

MARK SCHATZKER: Yeah, because you know, I want to think well, what's different about them? And I start to look at the history and the truth is that northern Italy was at one time quite similar. This is going back a little over a hundred years ago. They had an epidemic, a pandemic. And they didn't know the cause it was called pellagra, which in an Italian dialect literally means rough skin and that's how it would start. It would start with like a skin scale a farmer or farmer's wife and it might come back the next year and it'll start to spread and eventually they would be covered in these hideous skin scales. They would lose their appetite. They would get horrible diarrhea. They would get dementia. They would behave in odd ways. They might attack children and eventually they would die. And this was...

SHAWN STEVENSON: You mentioned also, I got to point this out, you mentioned one guy cut his penis off and threw it out a window.

MARK SCHATZKER: Yes. Yes. I did. Yes, exactly one guy.

SHAWN STEVENSON: My team is looking at me like where did that come from?

MARK SCHATZKER: Yeah, no it happened. He did do that, which is I mean is a testament to what a powerful grip this disease had over people's minds. It literally changed the way they thought. Well, in just shortly after the turn of the last century Pellagra suddenly appears in Georgia. And

again, it's a pandemic. It spreads throughout the south and just like our modern pandemic of obesity nobody knew the cause, there was all sorts of experts that claimed they knew the cause. They would pound their fists on the table. Some said it was caused by mosquitoes. Some said it was caused by germs. Some thought it was a parasite. Some thought it had to do with whether you lived close to a river or not. They really had no idea and pellagra actually played a major role in our understanding of nutrition.

It was eventually deduced by an epidemiologist named Joseph Goldberger that it wasn't a disease, not an infectious disease, it was a nutritional disease because he could... He cured people by getting them to eat different food. He would go to a sanitarium, for example, and he would make people eat... Have people eat milk or meat cheese, beans and the pellagra would disappear. And what we learned from that was that you know, the conception of food changed. Food wasn't just food. They understood that there was elements within food that were necessary for the continuation of life. And we eventually identified what the missing element in the diet of people with pellagra was and it's what we call niacin or vitamin B3. And this this was a game changer. This led to the eradication of pellagra, but what is so different is how these two cultures dealt with it. Because I think that is what would define the present moment, we're in.

SHAWN STEVENSON: And so how did we deal with it? Let's talk about enrichment.

MARK SCHATZKER: Yeah. Well, we did what you'd think you should do. If we're not getting a vitamin if there's people out there literally you know Kind of starving to death because they're not getting this essential nutrient. Let's just put this nutrient in the food system. It makes so much sense and that's exactly what we did. In the early 1940s, the American government passed a law encouraging, essentially making law, what they call enrichment. Also called fortification. We began to add B vitamins niacin, thiamine, riboflavin. Also, the mineral iron. First to white bread, but then to all sorts of processed carbs. It made its way into pasta, into flour, into cornmeal, into rice, and it had just a magnificent effect. Pellagra just disappeared almost overnight. It was such an amazing example of if you marry nutritional science with public policy, amazing things can be achieved. We eradicated a disease that caused incredible suffering and killed thousands of people.

SHAWN STEVENSON: Wow. Wow. So, and I don't want everybody to miss this point was that folks were eating and we actually in the United States it was the pellagra belt.

MARK SCHATZKER: Yes.

SHAWN STEVENSON: Right. And so, we're talking about the southern countries and folks were obviously eating, they're eating regularly eating food, but the food that they were eating was

lacking in these key nutrients needed to not just sustain health but to prevent rampant issues like this. Got it. Got it. And so, moving forward into this. We're building on a case here. The next portion of this that you highlight in the book is bringing forward this very powerful concept, that's really well highlighted in the television show The Biggest Loser, for example, when folks are brought forward, they're doing the conventional protocol, exercise in their face off dieting You know, they're doing the normal metrics and they lose tremendous amounts of weight. But something really interesting or also can be framed as Heartbreaking happens after the show that most folks don't see. Let's talk about that.

MARK SCHATZKER: Yes, well in the case The Biggest Loser there was just a lot of weight gain, which is what the scientists would predict. It's very hard to sustain weight loss, which is one of the challenges of diets is that they seem to work in the beginning usually a diet is fun, you know works for about 6-8 months and then it stops working and because of that people blame themselves.

They say the diet was working. I failed. But what's really happening is they're running into their brain. The brain regulates body weight and that this is what nobody really wants to talk about 'cause it's kind of devastating to the diet industry because they all want you to believe that you can... You have it within your power to make a simple decision and it really isn't like that. You're going up against something very powerful, which is to... Which is your brain your brain's control over your body's physiology. And this is an important point 'cause everybody thinks they're kind of you know they emerge from the womb on a lifelong mission to get fat and they say, you know like it's like the stomach is this un-fillable pit, but that's not true.

When we start to lose weight, the brain says, "I want you to gain the weight back." But then scientists do overfeeding studies, where they force people to eat food and it becomes awful. They had to do the early studies in prisons because it's just so unpleasant to be forced to eat more food than you need. It's difficult to get people to gain weight and then when the studies are over, they lose the weight so people bounce back to this set point. And the set point wasn't always as high as it is now. So that's what this book this really... I was really fueled by this question of what changed? And that's what got me on track with looking at Italy and the Southern US and Pellagra because if we come back to that for a second what is so interesting about the south is it really didn't work out?

Well in the end. If you look at the... You know it was called the pellagra belt, it is now called the obesity belt, or it's called the diabetes belt because the south graduated from one nutritional disaster to another. And you get the sense from looking at nutrition in the south that you kind of you're screwed no matter what you do. You're either going to starve or you're going to eat yourself to death, but there's no happy medium. But maybe there is because let's go and look at Italy. Like we said they eat a fantastic diet, a rich diet, a wonderful, amazing Like an

unimaginably good diet in northern Italy and the rate of obesity is so low. So, what did they do differently? And this is where things get really interesting because they didn't... They could have said, let's just put vitamins in the polenta in the pasta. And they didn't do that, and you look at that you think like why not that just seems so obvious and what they did do seems Kind of medieval. They said poor people should raise rabbits. They set up communal bread ovens. One of the things they said is that people should drink wine, which you're like. "Wine like are you nuts?

These people are dying of a nutritional deficiency and you're saying drink wine." But there was actually kind of maybe an accidental wisdom to that because the wines back then were not as well filtered as they are now. They had a lot of yeast in them, and yeast actually has a ton of niacin in it. So, telling someone with pellagra to have some vino is actually good advice. And here's what's interesting about Italy. They ate their way out of a nutritional deficiency. It took longer, but it worked. But what's so interesting is you look at where they are 100 years later, and they have such a positive relationship with food. So, let's go back and say what's the difference? Like you just said our brain is smart. We have this hypothalamus that there's this idea of a set point. That the brain knows how much it wants you to weigh and that it doesn't... It isn't inclined to weigh that much what changed. Well, let's look at how these two cultures looked at food.

We looked at food and we said there's something wrong with food. Sometimes it doesn't have the vitamins we need and there's something wrong with us 'cause we don't know what we need to eat because people will eat food that doesn't have the right diet. The Italians said, "No, no food isn't the problem. Food is the cure." To Italians it was obvious that pellagra was caused by poverty. People couldn't afford to eat good food. All they could afford to eat was cornmeal, and pork fat. Well, of course, they got sick. So, we saw food as a problem and we saw ourselves as the scientific saviors who could step in and fix it. Italians saw food as the cure, and they saw food as having essential and worthy qualities that the experience of eating food should be embraced and that we should not be afraid of food. And it seems odd because their approach is not nearly as technical. It's not steeped in science. But I believe it's the correct approach 'cause all we need to do is look at northern Italy and say They have the relationship with food that we want.

SHAWN STEVENSON: Absolutely. This is something, you know, we haven't talked often, and I love when I get a chance to talk with you. One of the things that I've been working to impress upon culture, you know, I've been in this field for almost 20 years now is just this like it's like a switch gets flipped in your mind to understand just how powerful food really is. It's literally making the tissues that you see right here through this camera and I'm seeing on your screen as well. It's literally making our brain cells. It's making our immune cells. These are the foundational pieces that make us people and so it has a remarkable impact that is just often

overlooked because we just see it as just stuff. In our culture today, we've lost this resonance and a connection with food and it's more just a pleasure game and you talk about this in one of your chapters The Quest for Pleasure. So, let's talk about some of the information in that chapter.

MARK SCHATZKER: So, this starts with a French scientist named Michel Cabanac and he was interested... This started with investigations into temperature and why things felt hot or cold. So, this is in the early 1960s and if back then if you look in a textbook, he said, "Why does water feel hot or cold?"

He would say, "Well, it all has to do with your skin temperature. And if the water is like way above your skin temperature or a little way above, it'll feel hot. If it's a bit kind of below it'll feel cold." That's what's how it worked seems to make sense, right? So, he did an experiment on himself where he you know, he's doing something and he made his... He made himself get really hot He... And he had another subject showing up to the lab and he had to get the bathtub cleaned up 'cause he's going to do an experiment on this guy and he's like hot he's sweaty. He's scrubbing down the bathtub. And then he's got to rinse it and he turns on the cold-water tap, and this just bracingly cold water just pours over his Hand and he thinks to himself like, "Oh, that just feels incredible." And he has this insight, he goes like, "Hold on a second. That's not supposed to feel incredible 'cause this water is really cold and really cold water is supposed to feel unpleasant and yet it felt pleasant. So, what's going on?" So, he starts to do this experiment. The guy comes in and he puts him in this hot bathtub and the guy gets really hot He measures an internal temperature, and his internal temperature gets higher than it's supposed to be. And then he gives this guy a bucket of cold water just says, "It's ice water." Says, "Stick your hand in this ice water." And the guy says, "Oh, God feels wonderful." That's not how it's supposed to work, right?

So, then he dumps all this ice water into the bath and over you know slowly the guy's temperature falls. He starts to get hypothermic. He's cold. He's frigid. Then he gives him a bucket of hot water and he says, "Stick your hand in that." The guy says, "Oh, my god. The hot water feels amazing." So here we see this thing in just like a matter of an hour cold water feels great. Then it feels terrible. Hot water feels terrible. Then it feels great. What's going on? It all has to do with the internal milieu, what's going on inside your body. When you feel hot, coldness feels good. When you feel cold, warmth feels good. Now, this is important because we can be very suspicious of pleasure. We're all puritans and we think we're smarter than that. We have to break the shackles of pleasure. But when it comes to temperature, what you want and what feels good is in line with what your body needs. Your brain's trying to help you. It says open the window and cool off 'cause you're overheating. It says drink you know drink some hot chocolate when it's January here in Toronto because it's cold so... And what's interesting too is that this is a kind of instantaneous calculation.

This is not the rational brain going I feel cold. Therefore, I should wear a sweater. These are just urges. This bubbles up from deep inside us. So, then he had this question. He's like, "Well, if it works that way with temperature, shouldn't work that way with food? And it didn't work that way for him. He'd grown up all his life. He ate the delicacies of France rich, you know, the French love all that good stuff cheese and wine and all that. And he kind of weighed like he was not a tall guy weighed about 150 pounds, but clearly there was people where it just didn't seem to be in sync, where they seemed to consume more food than was physiologically necessary. And that really is the perplexing question of obesity. Why do we eat more than is necessary? We don't drink too much water. We don't you know put on sweaters on a hot summer day and then get heat stroke and go like, "Gee," like, "I wanted to put on the sweater what's wrong with my body?" so often these natural seems to be systems seem to work. So, the book at that point really became a quest to understand what it is that could turn this brilliant brain into... To become so disordered that it would start to consume way more food than it needs. Like way more food than it actually needs.

SHAWN STEVENSON: Yeah. This is powerful and just even setting it up to look at that piece what is the driving force there? And you begin to deconstruct this bliss point as well. So, what does that mean? What is this bliss point? And how can we actually measure what that is. There's some studies looking at like drinking sweet water. For example, you mentioned.

MARK SCHATZKER: Yeah. So, it's interesting, you know the bliss point that term has become popular because I think because of our suspicion of pleasure because we're so afraid of it and we talk about the way, you know food has been engineered to be too delicious and I'm somewhat suspicious of that. And it's really interesting if you look at the science of pleasure because I think it's something we've gotten wrong and continue to get wrong. So, if you look around 50 years ago psychology was dominated... There was two schools of thoughts. There was the Freudian, Sigmund Freud the whole Oedipus complex and all that but then there were the behaviorists. And they were strict scientists and they said, "We can only... Scientists can only measure what is measurable." So, they didn't believe in pleasure. They thought it was like the easter bunny. It's just sort of a myth. People were confused. They didn't know what they were talking about. They wanted to measure things. So, you could measure something like thirst. You could make a rodent. You could deprive it of water, and you could measure all the things a rodent would do. It might climb a whole bunch of blocks it might endure electrical shocks to get what it needed.

So, they started to think of what we call pleasure as drive reduction, which is to say we get these urges these unpleasant urges to drink water to eat food to cool off because we're trying to make a painful urge go away. Why do we eat to make the pain of hunger go away? Why do we have sex to make the kind of this urge that has this grip on us go away and it's kind of a

really dismal view of life when you think about it 'cause there's nothing good in life just various shades of bad. Well, eventually one day at McGill University here in Canada where I live somebody stuck a probe like a sharpened wire inside the brain of a rat and started sending zaps and found that the rat enjoyed it. And what this suggested is in fact that pleasure does exist.

So, our conception of pleasure really started to change and we thought it all had to do with a neurotransmitter called dopamine, which everybody's heard of. You hear about it a lot. It's involved with drugs addictive drugs especially tend to be involved with dopamine. And for the longest time we thought dopamine equaled pleasure that it was like literally chemical pleasure that you just sprinkle out in the brain and happiness ensues. And what we found; this goes back a couple decades now, really exploded our conception of pleasure. There was a scientist named Kent Berridge and he really believed that dopamine equaled pleasure and he was trying to do more experiments. This is what scientists do to support a hypothesis. And what he did is he gave some rats a drug that would kind of suppress dopamine. And then he just fired a little blast of sugar water in their mouth rats love sugar water. And he said he hypothesized well with dopamine knocked out.

They're just not going to enjoy the sugar water, so he knocks out the dopamine, fires the sugar water in their mouth and they make these cute little rat gestures. They lick their paws. They stick their tongue out and that's the rat saying oh that was delicious. And he's like, "What the heck's going on? I got rid of dopamine, and they still enjoyed it. What is going on here?" So, he actually next step he does a lesion in the rat's brain. He just gets rid, kills the dopamine cells in the brain. So, there's no dopamine and these rats are like catatonic. They're like zombies. Their life has been absolutely drained of pleasure. There's no question in his mind when he fires that sugar water in their mouth. There's just going to be like. No dopamine. No pleasure fires in the sugar water. They love it. They lick their paws. They stick their tongue out. He's like, "What the heck is going on?" So, he says, "Okay, I'm going to switch tactics." He sticks wires in their brains and cranks up the dopamine. Now, he lets them eat and oh my god, they are just gorging themselves. So, this starts to make it look like dopamine's pleasure, right?

Not so fast because while they're gorging themselves, they're making these gestures as to say like, "This is gross. I can't stand this food and I can't stop eating it." And we started to get data from humans that said the same things. Parkinson's disease is caused by a lack of dopamine production because dopamine is also involved in movement. So, they would give people with Parkinson's disease drugs that cranked up dopamine and they would do strange things. They would go and visit prostitutes. They would binge watch pornography. They would pester their wives for sex. They would get into scratch cards. They might dismantle their refrigerator. And yet they would report that they didn't enjoy doing any of these things. It's like something compelled them to do it. So eventually Kent Berridge cracked the puzzle what was going on

and he realized that what we call pleasure is in fact two different things. There's two different brain networks involved. One is in fact run on dopamine and this is what we call motivation or desire or at its purest craving. This is how we get stuff. When you're thirsty after you go for a run on a summer's day, and you crave that glass of water. That is dopamine.

That's your body saying this is what I want. But then when that water hits your mouth and you swallow it and it's just refreshing and delicious, that's a different neural network that runs on different neurotransmitters, the opioids. And that is what Kent Berridge calls liking. That is the pleasure impact moment. And this is important because so often we think that overeating and obesity is characterized by indulgence. We are so afraid of pleasure. It's a stigma. We say they lose themselves in the pleasure of food that they just don't have the good sense to say, "I've had enough." And when we look at the brain science, that's not what we see. Obesity is not about too much pleasure. If anything, they experience a blunted pleasure response. Obesity is a disease of craving. That's where the difference is. It's not when they taste the pizza, it's when they see a picture of it, or they hit the aroma of it. They have this spike of dopamine craving and it's actually a miserable condition because they are doomed to crave food and that food never delivers the pleasure that their brain expects. So that is a radical You know new understanding of how our brains are just not responding properly to food.

SHAWN STEVENSON: This is mind-blowing stuff right here, you know, and it's starting to articulate a underlying solution when again, there's so much infighting about these minor details with macronutrients, for example, but we're talking about a far more sort of primitive idea of things here that is just simply not getting fleshed out. I want to ask you about in the same context you mentioned a study with Indian students and laborers. And it involves not sweet water necessarily not just sweet water, but sour water.

MARK SCHATZKER: So, let's get back to this idea 'cause this is really important. This idea that we're so afraid of our urges and pleasures and we see that in people with obesity that their urges are out of sync with what they need. But this is in fact a new thing, and this is part of what's gone wrong because our urges are not supposed to work that way and when we look historically our urges are in line with our needs.

I mentioned temperature. Well, that's how it works with food too. If we look, for example remember, in history class you'd read about those British sailors, and they would get scurvy. And they always tell you that in history books that their gums would swell. Well, that really did happen. Their gums did swell. All sorts of weird things happened like old wounds would open up. But what they don't tell you about was the first symptom of scurvy and that was a craving for fruits and vegetables. Well, scurvy is caused by deficiency of vitamin C. What do fruits and vegetables have? They have vitamin C.

So, we see here that the urges are in line with what people need, but there's an even more interesting example I found which has to do with... It's a study that was done in southern India. A scientist by the name of Howard Moskowitz, which people may have heard of Malcolm Gladwell wrote about how Howard Moskowitz. He's the guy who realized people like chunky tomato sauce and Malcolm Gladwell has this great essay in his book about how there was no chunky tomato sauce in the market Howard Moskowitz did this study and realized there's chunky tomato people out there and Prego brought a chunky tomato sauce and made like $11 billion or something crazy like that. Well, Howard will tell you the most interesting study he ever did took place in India. In the late '70s. And it's because he heard there's these people who really like sour food. That's not supposed to make sense because back then kind of like the rules about temperature the scientist said, "well Here's how it works.

We like sweet. We don't like sour." So, he did a bunch of experiments. He did them on Indian medical students. But also, these illiterate laborers very poor people who were you know, they couldn't read or write. But they had this reputation for liking sour food. So, when he looked at the Indian medical students who came from wealthy families their taste looked a lot like North American taste, which is to say they like sugar you know the more sugar it kind of reached this bliss point and then and then it just became too sweet. But sour wasn't like that. They could tolerate a little bit of sour, but then sour just became awful. Don't want any sour. No sour. Get it away from me. Then he did the same experiment on the illiterate laborers, and this was stunningly interesting because they liked sweet just the way everybody else does but they also liked sour a little bit of sour was okay. A little more sour, well, that's better. A little more sour, well, that's even better until sour reached this bliss point and their liking curve for sour looked just like their liking curve for sweet. So that's where the experiment ended, but I scratched my head and said, "Well, that's weird.

Why would that be?" So, I started to look into the history of this amazing place Karnataka. It's in southern India. And it turns out they would have a pellagra problem, too. They ate they eat roti, which we've all heard of. It's this kind of a flat bread and they would make it from a relative of corn called jowar and like corn like the grits and the polenta that gave Southern Americans and Indians pellagra or sorry Italians this jowar if that's all you eat you can get pellagra. It doesn't have niacin. So, pellagra would sweep in to this plateau where they lived. Well, it's interesting because one of those sour foods that they really love to eat is called tamarind. It's this kind of fruit that grows on trees and it's super, super, super, super sour. Like you can get sweet tamarind in Thailand and many people here probably tasted it. But the tamarind that grows in India is very sour and the sourest tamarind is the cheapest of all, which is what these poor people would have been buying. These people had very little money. Well, you start to look at tamarind and something really interesting pops out.

It's loaded with niacin. There is a ton of niacin in tamarind. So here you see these people who have this diet that is by its very nature deficient in niacin. And here they have this love for this ultra-mouth-puckering fruit which is loaded with niacin. But it starts to get even more interesting because it turns out that pellagra is just like the least of their problems. Their big problem when it comes to nutrition is fluoride. We think of fluoride as that element in toothpaste that makes your teeth hard, right? Resists tooth decay and it does do that. It has this mineral interaction. But if you consume too much fluoride you get something called fluorosis. You can have like these pitted dark stains on your teeth, but it can get really bad, people have malformed joints and limb.

They can get something called bamboo spine when you look at the photos. It's absolutely hideous And here's something really interesting. I started to delve into the literature the scientific literature in India and it turns out that tamarind can actually be used to treat Fluorosis. They would do experiments and they would they would give dogs... They would add fluoride to dogs' food and they'd give half the dogs tamarind half them, they wouldn't and they would find that the dogs that were getting tamarind would excrete fluoride in their urine. They did the same thing in a hostel where orphans would live, and they found the same thing. They went into villages, and they found that the families that ate the most tamarind had the least fluorosis effects.

So here you see Our urge is working. You see this nutritional wisdom. You see that our diet is not only intelligent. It's adaptable. So, this makes this this mystery so much more interesting. Our brains know what is good. What is it that could be coaxing this incredibly intelligent brain into wanting too much food? When you see it this way it becomes an absolutely like stupefying mystery.

SHAWN STEVENSON: Yes, and this leads right into the nutritive mismatch that you talk about in the book and leading off with some research from Dana Small.

MARK SCHATZKER: That's right. So 'cause here's the interesting thing something changed. We're not wired this way something changed like in the last 50 years to make our brains go, "I want to eat more food. I want to eat way more food." Well, carbs haven't changed. I mean, carbs have been carbs for eons same with fat. Fat is the same as it was 10 years ago as it was 20 years ago, 30 years ago. We might eat more of it, but the nature of fat has not changed. So, what has changed? Well, I argue it's the way food tastes. That is the big change and I want to talk about that experiment you mentioned at Yale. This was done by a scientist named Dana Small and she was asking what she thought was a fairly simple question an important question which is to say? Is it possible to engineer drinks that deliver the same reward? They taste just as good but with fewer calories. It's an important question because if there's some way to

provide ourselves with deliciousness, which is dangerous but reduce the calories that's a win, right? So, she created... The question is how do you do that in humans?

How do you how do you test this. And she came up with something really ingenious. She created five drinks and they all tasted like they were exactly the same level of sweetness. She used an artificial sweeter called sucralose to make sure all these drinks were exactly as sweet as the each of them precisely equal sweetness. But then she gave them a different amount of energy by adding a tasteless carbohydrate called maltodextrin, which turns into sugar as soon as it hits your stomach? One of the drinks had no calories, one of the drinks had I think was 35, one had about 75, one had 120 one had 148. So here are five drinks, all tastes like they have 75 calories worth of sugar, but all have a different nutritional payload. She gives these to her subjects. They drink them for a period of time. Their brain learns becomes accustomed to these drinks and then she puts on the brain scanner, and this is what Dana Small predicts. She predicts that the drink with the most calories is going to generate the biggest brain response 'cause we like calories, right? I mean calories are important. You can't live without them, and the brain is going to learn what's in those drinks. Well, she does the study she puts them in the brain scanner and it's really weird. The 140-calorie drink Just like doesn't get much of a response. Nor that does the zero-calorie drink nor.

SHAWN STEVENSON: Does the 37-calorie drink. The drink that gets the big response, the 75-calorie drink. She's like, "That makes no sense. Why would it be the middle drink not the most it just... " She was so confused by it. She did it again and the same thing happened. Then she put subjects in what's called an indirect calorimeter, and this is a device that measures the thermic effect of food which is to say when you consume calories you start to burn them. And when you do that, you generate heat kind of like your car generates heat when you know, you're putting gas through the engine. And she did the same thing. She had a subject came in one day drank the 75-calorie drink, went into the indirect calorimeter. There's this nice little plume of heat exactly what you'd expect. A few days later that subject comes in eats the... Drinks the 140-calorie drink goes into the indirect calorimeter. Nothing happens. This is like what's going on? Textbooks say more calories more heat. There's no heat. It was just like a flat line. Dana Small can't figure out what's going on and then it hits her the number 75. The drink that got the biggest metabolic response, that generated a metabolic response, that generated the brain response was the drink where the calories were in line with the sweetness?

MARK SCHATZKER: It tasted like it had 75 calories and it had 75 calories. The other drinks tasted like they had 75 calories and they either had too much or not enough. And it turns out that's a big deal. So, we all carry on as though sweetness's is like frivolous and bad. It makes us over consume calories and it turns out no, no, no, no, no. Sweetness is information. It's telling your brain something very important about the calories that are heading its way. And when that signal becomes out of alignment, when it thinks it's getting something and gets something

else, it's like the brain throws up its hands and goes, "I don't know what's going on." And those calories don't get metabolized properly. And she did more experiments she found that, the more people are subject to this it brings on a condition like metabolic disease. She did experiments with adolescents, and this is important because adolescents are in a period of growth. We know they like to drink sugary drinks in part 'cause their brains and their bodies are growing. And she gave them these drinks and they had to stop the experiment because early on they drew blood from three subjects and two of them were already pre-diabetic and a board of ethicists said, "You got to stop this.

It would be unethical to continue." So here we see something really important that when you muck around with the taste of food, you are mucking around with an essential aspect of food. And we have to understand why that is because taste isn't frivolous taste isn't just kind of like this meaningless silliness that lights up our brain while our body does the important business of nutrition. They are absolutely inseparable. If you look at your DNA and you think of that like that's the book to make you, that's your instruction Manual. What's the thickest chapter? It's not on your eyeballs. It's not on your reproductive parts. It's not on your brain. It's on your nose and mouth and this is how we sense food. So, the information that we sense when we eat we might think of it as like flavors and deliciousness and it is all that. But it's also information. And when you start to muck around with that information, you start to change the way the brain understands food and think about this for a second because sweetness, you know it was hard and our evolutionary past when we were living in the trees and so forth might have been hard to get that sweet fruit. There might have been a panther that wanted to pounce on you, you might have had to get into a fistfight with a competitor to get that fruit. But when you got that fruit, it did not tell a lie. If that fruit was sweet, it had calories the sweeter fruit had more calories. Now, let's think of what we've done to food.

We've created things like artificial sweeteners. We put sugar alcohols in food which create the sensation of sweetness with fewer calories. Well, if you kind of run on this kind of old model that we had where our brain is this sort of you know Stone Age moron. Yeah, fool that moron. Let him think he's getting calories and he's not getting calories. But what if your brain is really smart and what if it measures the calories coming in and then measures the calories that it metabolizes? Your brain keys on to the fact that, "Hey, buddy, I'm on to you." Well, it isn't just sweetness that has changed. We put modified starches in food. I wrote a whole book about all the fake flavors we put in food that are designed to fool the brain. There's a huge family of additives called fat replacers. No one has any idea that these are in foods like ice cream. They're in yogurt. They're in plant-based milk products. They're in gravies. They're in energy drinks. These create the rich sensation of fattiness in the mouth, and they deliver very few calories. Well, once again if your brain is a Stone Age moron, what a great idea. But what if your brain is really really smart and it's meticulous and it's always measuring and it's always calculating

that's not such a good idea. So, then that brought me to what was the biggest question of the book, which was how... What is the long-term brain response?

How does the brain respond when something that used to be reliable became unreliable? This is what scientists call uncertainty or they call it reward prediction error, which is to say your brain thinks something. It's predicting a reward that reward doesn't arrive. What does that do to a brain? We see a spike in dopamine. We see a spike in motivation, in wanting, in craving. We see an activity in that part of the brain that we see then is elevated in people with obesity. So now the pieces of the puzzle are starting to fit together.

SHAWN STEVENSON: This might be one of the most remarkable parts of the book. Again, we've already talked about so many remarkable aspects here, but you are eating pig feed this information here is just mind-blowing. Let's talk about that.

MARK SCHATZKER: Well, I talked yes nutritional mismatch is one of the pillars, but I start to ask the second question was which was let's go back and look at fortification. Let's look at enrichment 'cause it was a really successful policy. It was also kind of interesting. There was just this tiny, tiny, tiny subset of the American population that had pellagra. But all of a sudden everybody starts to get niacin and thiamine and riboflavin in bread in donuts and cereal. Was there some unforeseen consequence? And I'll be the first to say on the surface this sound nuts. I'm talking about vitamins I mean aren't vitamins like the healthiest most wonderful thing in the universe. They have the word vital in them. We talk about consuming empty calories 'cause they don't have vitamins. Vitamins are good for you. Well, is it always that simple? Because the interesting thing is when you look at that southern diet that those southerners were literally starving on. It had lots of calories. They were eating grits, which is to say cornmeal, pork fat, and molasses. You got carbs, fat, and sugar and they were starving. How's that possible? It's because calories on their own are empty. What they need is the B vitamins to Metabolically enable them. So you could eat 5,000 calories a day If you don't have the B vitamins, they will go right through you.

There will be zero energy in them. That's why we talk about the wholeness of food. We're not machines. We don't just require energy. We require food in its dimensional wholeness. Well, that means that that these vitamins play a role in calorie metabolism. So now let's fast-forward the clock to the 1950s and let's talk about pig farming because pig farming is a commodity business. You get paid by the pound. So, it's in the farmers interest to get those pigs in and out as fast as possible. And what does the farmer want to do? They want to get it big and fat quickly. Well, in the early 1950s farmers knew if you want to get your pigs big and fat quickly, what do you do? You feed them corn and soy and that's like rocket fuel. They put on the pounds, but you can only feed them so much. If you feed them too much corn and soy, they get like a pig version of Pellagra. It is a nutritionally incomplete diet. So, farmers back then

knew that you had to send your pigs out to pasture to eat things like alfalfa. These were the glory days of food.

All the pork was pastured pork. Well, the discovery of B vitamins changed everything because now you could give your pigs that rocket fuel feed and instead of sending them out to pasture or bringing them cut alfalfa, you just sprinkle in this dusting of B vitamins, and they can just eat that rocket fuel all day and their growth curve took off. This changed farming forever. We talk about confinement farming and CAFOs and keeping animals in close quarters and feeding them what we feed them. This would not have been possible without the discovery of vitamins. Vitamins meant pigs didn't need to eat all that green stuff. That's good for them. They could just get the vitamins in their feed, and they got bigger and fatter faster than ever before. Well, that's pigs. We're humans and what's our problem? We get bigger and fatter faster than ever before and what did we do? We started adding B vitamins to our processed carbs. So, I asked the question maybe that wasn't a good idea.

SHAWN STEVENSON: Oh, my gosh this here again we're wondering why or how is this even possible and we look at the nature of farming today. One of the interesting things I've talked about this a couple of times you know, there was a big spill that took place on a US Road and all of these Skittles just came out across the highway and the news was reporting that these Skittles were on their way to be delivered to some cattle farmers. All right, this was going to be used for pig... For cattle feed and one of the videos that I actually attached to my show, and we'll put that for everybody here as well was demonstrating that these farmers were literally just giving this slop with candies wrapper and all.

Speaker 4: His 1,400 cattle are no longer feeding off corn the prices Watson says are too high to keep in stock. So earlier this year, he began to buy secondhand candy.

Speaker 5: It has a higher ratio of fat than actually feeding straight corn.

Speaker 4: Which is important because all of these cattle will be brought to slaughter. So Watson wants them to gain weight and by feeding them chocolate it gets the job done.

Speaker 5: It's hard to believe it will work. But I mean we've already seen the results of it now.

SHAWN STEVENSON: And a mixture of all kinds of you knows look like strands and maybe a little bit of hay, but it's also enriched as well. So, they're adding this enrichment to this feed and they're like, "Yeah, the cows love it.

They're doing great," you know, of course, there's antibiotics in there as well. And so...

MARK SCHATZKER: Yeah, and the vitamin pre-mix.

SHAWN STEVENSON: Yeah. And so, they're just adding this in and you're wondering like why went on earth with the cows go for this that there's an intelligence There as well. And so, it creates this kind of superficial draw to eat things that are not actually without them would not actually be satiating and draws to them, you know. It's kind of creating this mismatch like you like you've been kind of scripting out.

MARK SCHATZKER: One of the most interesting things in this in these old studies I dug up is they would look at... They started to experiments of course to see you know Which diet is best and one of the most interesting ones they had four groups of pigs, half of them were in confinement, and half of them were on pasture and then within those two groups some had access to a mixed ration which is to say those vitamins are blended in with the carbs and protein and some had a free choice diet which is to say they got the corn in one trough and they got the vitamins over in another through. And the most interesting thing was the pigs on pasture that had the free choice diet. Well, they ate corn no surprise there, but they also gained the slowest of all the pigs. But they didn't eat much of that that vitamin supplement. They ate alfalfa. The pigs that got their vitamins mixed in didn't. So, there's this idea that when we start to put these nutrients in food, it actually switches off that appetite that might make you say, "I want to go eat something... This thing over here," which might be a really healthy thing. So, when we murk around with these things, we think we're so smart, but we're not. We don't understand the inner brilliance of how the brain really works. And we think we're doing good and we're actually causing harm.

SHAWN STEVENSON: This is such a powerful insight. There's so many powerful insights, but just this one you just mentioned this I don't want to gloss over. We would likely have a draw towards a certain food a diversity of different foods just naturally we'd have an inclination to go and, "Let me go and grab some of this. Let me grab some of this, you know, some of these apples over here. Let me grab some of these Walnuts."

Whatever the case might be. But those signals those things that kind of Catapult us in a sense or urge us nudge us to going in and investigating and trying those who's tasting those things, those can get silenced in a sense through this enrichment process and now when left to our own devices like with these pigs, when we have the opportunity to experience a life in its natural form, there might be a tendency towards doing that. And so, this leads to my final question for you today because listen, you've packed so much into this already. I want to make sure that folks get the book Can we fix this? Is there is the intelligence in our bodies still there?

Can we fix this and actually get to a place of health and a healthy association and connection with our food again?

MARK SCHATZKER: Yeah, I think we can, and I think it's a complicated question. I think it takes a long time for us to do what... You know to got where we got so it's not something you can fix overnight. I think it's really important If you're going to try and eat healthily you got to eat real food. I'm not the first to say that. But here's the thing you got to eat like an Italian which is say you've got to love food. Look at each meal as an opportunity to explore the richness and deliciousness and awesomeness of food. Food tastes delicious for a reason and the pleasure that it gives you is a good thing. Don't be afraid of it. It's like any relationship like a relationship with your spouse. It should give. It should be wonderful It's something you should look forward to not something you're frightened of and something that leaves you in a state of anxiety. And there's science that tells us that the pleasure of food is important. And this is what I'll leave you with is this experience I had in Germany at a lab a fascinating woman named Anya Hilbert who deals with some of Germany's most troubling cases of disordered eating, and she has a lot of patients that have binge eating disorder And this is like wanting and craving at its worst.

SHAWN STEVENSON: These people will eat to the point where they're physically uncomfortable. Well, she understands eating through the language of pleasure through wanting and liking and she brought me... She brought me into this therapy that really brought to light how it feels, how these states feel, and what foods are associated with them. So, the first thing she did is she made me experience craving and she gave me two potato chips and I like Chips, I mean we all do this thing with chips where you just start to eat them and eat them. So, I'll eat chips. I would never tell you that chips are like my favorite food. I don't have any memory of eating a great bag of chips. I can tell you about great steaks. I've had great peaches, great peach cobbler, great, great bottles of wine. I can't name a single bag of chips I ever ate. But we eat chips. Well, she gave me two chips and she said, "You can't eat them. You can nibble them. You can smell them. You can rub them together." And I thought it was silly. But very quickly I was absolutely overcome by craving. I wanted to eat these chips so badly. She said, "Throw those out and do it again." And it got even worse I mean it was like pain. This was a really unpleasant state, and it made me realize that some foods just have this grip over us. Then she did something fascinating.

MARK SCHATZKER: She said, "Okay, get rid of the chips. Now take a square of dark chocolate." She gave me the square of dark chocolate surrounded with biscuit center and she said, "Just pop that in your mouth and let the heat of your body melt it." And this was such a different food experience. This chocolate took me on a journey. I closed my eyes, and I was the passenger and this tiny little chocolate just gave me so much pleasure. And I wasn't sitting there thinking I want to shove as much chocolate in my mouth as possible. I just let the chocolate do its thing. What's amazing is that Anya Hilbert uses this therapy with people who have binge eating disorder when they are overcome with these volcanic desires to eat, eat, eat. She says just pop a very fine chocolate in your mouth and these chocolates can deliver so much pleasure. It

extinguishes the craving for food. So that tells us how important it is that food give us pleasure. We did not evolve to be nutritionists to get into arguments about ketosis and protein and insulin. We evolved to eat real food and to experience the pleasure of it.

That is how our brain relates to the environment. That is how we eat what is good and that is how food should be it's how food is good for us by providing us with pleasure by nourishing our bodies.

SHAWN STEVENSON: Thank you so much for tuning into the show today, I hope you got a lot of value out of this. This is one to share out with friends and family. Get this education into more people's hands so we can take back control of our biology. And of course take a screenshot of this episode and tag me. I'm @shawnmodel on Instagram. I always love to see people that are posting the show there. I'm @shawnmodel on Twitter as well and on Facebook I'm @themodelhealthshow. And just remember sharing is caring truly, truly. And we want to do what we can to help to get our families empowered and our communities empowered at large. So, of course you can send this directly from the podcast app that you're listening on as well. Now, we've got some epic masterclasses and incredible guests coming for you very, very soon. So, make sure to stay tuned. Take care. Have an amazing day and I'll talk with you soon.

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