

EPISODE 159

[0:00:00.3] AV: Welcome Paleo Nation. I'm Ashleigh VanHouten and you're listening to Paleo Magazine Radio, the official podcast of the original Paleo Lifestyle Publication.

[INTRODUCTION]

[0:00:18.3] AV: *The Hungry Brain* is a new book from Stephan Guyenet, an obesity and neuroscience researcher, all about the complicated processes of the brain and body that lead us to behave the way we do with regards to eating and food and how this can be problematic when taken into context with our modern world and our modern diet, which is a situation that's very different from the world our ancestors lived in and the world in which our brains developed.

This book really resonates, I think, because so many of us feel out of control with our eating and don't understand why we make the food choices we do or why we act the way we do or look the way we do when we so desperately want things to be different. This book is so important because it helps explain in very specific and scientific yet clear terms, why our brain does what it does and the ways we can work to combat the very intelligent biological processes that in today's world can make us fat, and make us sick, and keep us caught in a negative cycle with our eating.

I'm really excited about my talk today with Stephan and I think it will make us all feel more informed and more empowered and more able to tackle what, on the surface, seems like a very simple task, eat well and be healthy but is actually so much more complicated than we think. I really hope you get as much out of this podcast as I did.

[SPONSOR MESSAGE]

[0:01:37.3] AV: Today's show sponsor is Desert Farms, a company offering camel products like milk, meat and fat, and even kefir chocolate and soap made from their pasture raised grass fed camels that live on family farms around the US. Camel milk has lots of calcium and vitamin B1, it's a good source of protein, potassium, and fats and it's generally easier for most people to digest than cow's milk.

And it's tasty but you don't have to take my word for it, if you want to find out more about their products and why camel milk is so awesome, check out Paleo Magazine Radio episode 158 where we interview Walid from Desert Farms and you'll learn everything you need to know. You can also check them out and order some camel milk products of your own at desertfarms.com and you'll get 25% off with the coupon code "paleomag".

[INTERVIEW]

[0:02:52.3] AV: Hey Stephan, welcome to the podcast.

[0:02:55.0] SG: Good to be here Ashleigh.

[0:02:56.5] AV: All right, thanks for being here. We're here to talk about your new book, *The Hungry Brain*, which is all about the neuro regulation of appetite and all the ways our brain guides or dictates our behavior when it comes to food right?

I'm sure, I don't have to tell you that this is striking a cord in our world right now because I posted a picture of your book on my Instagram and I had all these comments like, "Oh this is me, I have to learn more about this, this is totally my problem." I mean, it's pretty obvious that you're addressing a very timely issue with this book.

But before we get into my drill down questions, can you just tell us what your main goal was and what you're hoping we learn by reading this book?

[0:03:35.1] SG: Yeah, so I'm really glad you said that because one of my main goals of this book is that people will read it and gain insight into their own behaviors. I think that their own behaviors and their own motivations and where theirs are coming from because there are a lot of brain functions that we are not aware of and not in control of or only minimally aware of or only minimally in control of.

I think this is really clear if you think about all the ways that the brain regulates physiology like your heart rate and your breathing rate while you're sleeping and all kinds of aspects of your

blood physiology and things like that. There's a lot of things the brain's doing that is not unconscious and those things have a strong influence on our behavior.

A lot of times we don't really understand those things because we don't have direct conscious access to them, right? Where does the craving come from? Where does hunger come from? We don't really know. We kind of — we don't really have direct access to that. We just kind of know that those things arise, our feelings that arise and those are things that guide our behavior.

But science is gradually chipping away at those unknowns and telling us where those things come from. I think that those insights are really important for people to be able to understand themselves and understand their own behaviors, which can help them regulate their own behavior but also help them understand it and be kind to themselves and know that these are just kind of ways in which the human brain is wired. It's not really a defect that you have to feel ashamed of, it's just kind of how your brain is wired and it actually makes a lot of sense if you think about why your brain is that way.

So I guess the main point of the book is to give people insight into themselves and have people read the book and say, "Oh, that's why I do that, or that's why I feel that way around this food or that food or in this particular situation, or that's why weight loss is so hard, or that's why my friend is super skinny and can eat anything and for me, every junk food I eat goes right to my belly. Also, I would like the book to target, in addition to the general public who I wrote the book to be accessible to a general audience, I'd also like to target doctors and researchers and public policy experts to try to help them understand these things to guide their thinking on these issues of eating behavior and obesity as well.

[0:06:15.0] AV: Right. It's funny because this is leading into my first question. You know, you talk about so many of us kind of, we go through life with this behaviors or this cravings and we don't know where they come from and I think not knowing often is what makes people feel out of control, and you talk about in the book these reinforcement processes that happen when we eat certain foods and, you know, this addiction-like behavior that can occur with the idea that being addicted to food is kind of a controversial topic and I think many people often feel like they're

addicted to food. Do you think that that term is kind of an inappropriate way to frame the issue, or not?

[0:06:53.4] SG: Yeah. First of all, I'll just start off by expanding a little bit on what you said and just acknowledging that there is controversy in the research community about whether food addiction is a real and useful concept. But what I will say is that there is, in my view, a very strong evidence that certain people show addiction-like behaviors towards certain foods. So they will use those foods in ways that are harmful to themselves, they will say that they feel out of control around those foods.

They will report a relationship with that food that's very similar to what we see with drugs of abuse and I think really, the main reason that makes this controversial is that food is an essential substance. It's not like cocaine or cigarettes where if you leave it out of your life, it's not going to cause any problems for you. You're not going to die of cocaine deficiency if you don't have cocaine, you know? I think that's kind of where the controversy comes from.

But I don't think that's a really very difficult thing to resolve because I think the way to resolve it is to acknowledge that these addiction like behaviors are not occurring in response to celery and lentils and, you know, chicken thighs. These are things that are occurring in response to calorie dense, highly refined, palatable foods. You know, things like pizza, and chocolate, and chips and all that stuff and we can get into why that is in a moment if you'd like.

But I think that the essential thing to understand is that addiction is really an arbitrary term. There's not really any objective line that we can draw between the behaviors or the biology of a non-addicted person and an addicted person. Basically what we call addiction is when our motivational drive to do a certain thing exceeds a certain threshold that we arbitrarily define as pathological.

So most people like chocolate, right? Most people would eat chocolate in situations where they probably shouldn't eat it, like if they don't need the calories. Maybe they've already had a meal and you know the desert menu comes around and there's, let's say, like a molten chocolate cake for desert and they decide that they want to eat that. I mean, that's really — that's not a situation that for most people is going to be supportive of leanness and good health.

But most people are not literally addicted to that molten chocolate cake or the chocolate but it's the same — what I'm trying to say is that, what we call addiction and just regular reward, a regular seductiveness of food is a continuum and so that same drive that causes addiction like behavior in some people, it's the very same drive that causes over eating and heightened responsiveness to food queues and heightened motivation to eat in the rest of us that would not consider ourselves to be addicted.

It's really just a continuum and these foods — chips, pizza, soda, candy, all that stuff — they have those same effects on most if not all people but only some of us cross the threshold where it is considered to be pathological enough that we label it as addiction.

[0:10:35.5] AV: Okay. So I'd like to talk about that more and the difference between those people who do react to it differently and the difference between, like you said, eating celery versus eating pizza and cookies. On that note, you talk about in the book variety and eating and the idea that's sort of the more variety, the more you can eat.

As you said, we all know we've all had experiences where we've eaten a huge meal and we're full and then the desert come, of course you find room. So I mean, would you then recommend for folks who are trying to lose weight or be healthier to have less variety, you know, both at their meals or in the cupboards in general?

[0:11:12.1] SG: Yeah, I do think that's one thing that can be helpful. This comes back to a really basic property of the nervous system called habituation. This goes all the way back to jelly fish, our last common ancestors with jelly fish hundreds of millions of years ago and it's basically the idea that when we first encounter stimulus, we'll respond to it maximally and then the more we see it, the less we care about it. That's called habituation.

So if you see a billboard with some new add on that you've never seen for the first time you might pay attention to it but after you've seen it 10 times on your drive to work, you may stop noticing it. This expresses itself when we sit down for a meal and the way it expresses itself is that we habituate to individual foods or individual flavor profiles on our plate and so, when it

happens with food, it's a phenomenon called sensory specific satiety and basically what that means is that we can become satiated of specific foods.

So you could become satiated of the meat on your plate and the sweet potato on your plate and the salad on your plate but you're not — that satiation doesn't really carry over to a novel, a new stimulus such as dessert. You can be totally satisfied on your savory meal, but once that new opportunity for that tempting flavor profile of something sweet and calorie dense comes up, that kind of bypasses the satiety that you're experiencing. If you hadn't had that option, you would have ended your meal, you would have felt totally satisfied. But once that dessert comes out, you grow a so called "second stomach".

Well I can tell you that there is no second stomach in the human body. The second stomach is in the brain and so it has a lot to do with this effect of variety and sensory specific satiety. As well also as just the kind of seductiveness of the food, such as a chocolate cake or whatever but yeah, as you said, we see this effect at buffets. I think most people have had the experience of overeating tremendously at a buffet and a lot of that has to do with the variety.

So yeah, to get back around to your initial question, I do think that reducing the variety at a meal so making it so that instead of having a bunch of different options on your table and on your plate and in your kitchen, you only have a few options. I do think that that is a rational way to try to regulate your calorie intake. And there are actually studies both in animal models and randomized controlled trials in humans suggesting that this strategy actually does work for not only controlling calorie intake but also longer term changes in body fatness.

[0:14:11.3] AV: Okay, so does this relate to, because I have this sort of a next question and why for example my friend can order a piece of cake for dessert and eat a piece and push away and I eat my entire piece and then I eat hers. But there's a study in the book that I think it was people who, they had to answer a question correctly and then they were rewarded with like a piece of candy or something and that each time you had to answer more questions to get the same piece of candy so it was like, how hard people were willing to work right? It basically showed that some people worked a lot harder than others. Why is that?

[0:14:45.7] SG: Yeah, that's absolutely right. This is the research of Lenard Epstein at the University of Buffalo and it's really fascinating stuff. He uses these, it's called a progressive ratio test and basically what it is, it's a test of your motivational drive. You can use this to test people's motivations for anything for video games or magazines or social interactions or money or food.

In this case, Dr. Epstein uses it to test food as well as non-food items and basically, what they're doing, they're playing a slot machine. They're playing a computerized slot machine and they're playing the slot machine and every time it randomly comes up on some combination, they get a point and once you get a certain number of points, then you can buy a little piece of a tempting food, like a candy bar or a slice of pizza or something like that.

What happens is that the more you play this game, the harder it gets. So the more points you need to get this food reward and eventually, it gets so hard that people say, "It's not really worth it anymore, I'm going to stop this." They're told that they can stop any time. At some point they just say, "I don't want to do this anymore, it's not worth it so they'll stop." But it turns out that that intrinsic drive to obtain this foods and particularly this calorie dense, highly palatable food, varies dramatically between individuals.

This is a stable personality trait that follows you for apparently throughout life. They can measure this in young children and even to some degree in infants and it predicts future bodyweight gain and eating behaviors. So this is a fairly stable personality trait. What he can do as well as he can use the same gambling task to test people's motivation for a non-food item, like a magazine or a little video game or something like that.

If you compare those two things, someone's motivational drive for food compared to their motivational drive for a non-food item, you get this thing called the relative reinforcing value of food. That's the kind of technical scientific term, but basically the idea is, that is your willingness to work for food relative to a non-food item.

So if you're just living your daily life and you have the option to eat food or to do something besides eat food, how motivated are you going to be to eat that food? Which choice are you more likely to make? It's a stable personality trait that predicts behavior and it predicts weight and fat gain over time and it's actually pretty darn good predictor.

It turns out that I want to waive this in because I said it's a stable personality trait and I think a lot of this has got to be genetic and I'm not certain that relative reinforcing value of food, the genetics of that specifically have been studied, but there has been a tremendous amount of research on the genetics of food intake behavior and obesity in general and what we know is that both eating behaviors and body fatness have a very strong genetic basis.

As one would suspect, a lot of the genetic variation that determines differences in food intake behavior and body fatness relates to genes that determine the genetic blueprint of your brain. So I think probably what's happening to a large extent is that people have different intrinsic motivational drives to eat these calorie dense highly palatable foods and that a lot of that, not all of it but a lot of that is genetically determined and stable throughout the lifespan.

[0:18:50.1] AV: Okay, I think I already know where I fall on that, but okay.

[0:18:54.1] SG: Well that's good to know.

[0:18:55.1] AV: That's it, that's kind of one of the whole points of the book, right? Is knowing these things and arming yourself with the tools so that you don't feel at the mercy necessarily of your genetics or the world that we're living in, right?

[0:19:08.8] SG: Yeah, that's right. And understanding that you're not built the same as your friend and you can't really expect yourself to react the same as your friend to those situations, your brain is built a little different.

[0:19:20.4] AV: Right, another idea that was really interesting to me was that adiposity set point right? We're talking about sort of bland food versus hyper palatable food. But there were studies, I think it was people as well as animal studies that they were given like really highly palatable foods, they ate way more, their set point went up.

But when they were given bland foods, they ate less. Set point went down but their body like it didn't go into starvation mode, they were kind of cool, it was just like they didn't need to eat as much because the food just wasn't as interesting. I think that probably tells us a lot about why

our current world is kind of stacked against us being lean and healthy, right? Can you get into that a bit?

[0:19:57.4] SG: Yeah, I totally agree and I think that there are some things that require a little bit of unpacking here and one of the things that I want to unpack first is that the body fatness is regulated by the brain. So this is one of those things that's non-consciously regulated by the brain just like your body temperature is and your blood pressure and your concentration of ions and your heart rate and all that.

It's regulated by a part of the brain called the hypothalamus and we've known think since at least the late 1800's when there were a bunch of reports coming out suggesting that people with damage to the hypothalamus were developing extreme obesity and now we understand a lot about why that happens and it continues to happen today. This is a phenomenon called hypothalamic obesity that's very well characterized.

But basically, the hypothalamus is the seat of regulation of body fatness and the way it works is kind of like your home thermostat where you have it set around let's say 65 and when the temperature dips below 65, you get a response from your furnace that brings it back up to 65. It's called a negative feedback system or a homeostatic system and it's common in engineering, it's also common in biology and it's designed to maintain the stability of a system.

Basically, your brain, your hypothalamus fights against changes in body fatness. I could get into quite a bit of detail on that system, but I don't think I will unless you want to. That's just the basic overview of how it works and it's a lot better — in most people that's better at preventing weight loss than it is at preventing weight gain as many people can attest to. That's presumably because in the times of our distant ancestors, weight loss was a much greater threat to reproductive success than weight gain was. Whereas today, in a country like the United States, that's not true anymore.

So essentially we have this system that regulates body fatness but obviously, the set point around which it regulates and defends can obviously change because, for a lot of people, when they're young, their comfortable weight, the weight that their brain is defending is lean and then

as they get older, that comfortable weight goes higher and higher. If they try to get back down to their former lean selves, they're going to have a hard time doing it.

Obviously that can change and so the question is, "What changes is?" I think there are a lot of things that change it but one of the things that you mentioned that I think is really important is the reward value or seductiveness of food. Reward is a concept that encapsulates the motivational value of food and its palliative ability and the learning effects that it has on the brain so it makes you learn to want and crave and enjoy it over repeated exposures. Basically, the brain is hard wired to prefer certain food properties to really look for certain food properties and be motivated by those.

That's related to the properties that cause dopamine to spike in the eventual striatum, which is the main part of the brain that helps — or I should say, a key part of the brain that drives motivational states. Basically, what you see is that when people are eating diets that are high in very rewarding, seductive, calorie dense foods, especially if they're easily accessible and present in a wide variety, they will tend to gain weight. They'll tend to overeat substantially and gain weight.

This is something that seems to be pretty universal to omnivores, it's not just humans, I mean, you see this in rodents too. The most effective way to make a normal rat or mouse obese is to go to the supermarket and buy a variety of palatable human foods and put them into that cage and they will overeat tremendously and become fat very rapidly. There is no other diet that is better at fattening rodents than palatable human foods. I think that probably...

[0:24:27.1] AV: If that's not the lesson we need to learn right there, I think in the book you call it the cafeteria diet?

[0:24:34.6] SG: Yeah, that's right.

[0:24:35.9] AV: The food were are all eating is the food that just makes every animal the fattest the quickest.

[0:24:42.3] SG: Yeah, that's right. I think that's exactly, it's the same situation for humans. The best way to fatten a human is to give them a variety of palatable human foods and the reason is that, we have explicitly designed those foods to suit our brain's in a food preferences. Those foods are specifically designed to please those circuits in our brains that determine our food intake. The goal isn't to fatten ourselves; the goal is to have food that we like but a side effect is that it fattens us.

The flip side of that is very simple, bland foods. So if you give people who are overweight or obese, if you restrict them to very simple, bland diet such as a liquid formula diet, you can say, "Eat as much as you want," but — you just say, "Eat as much as you need to feel full to feel comfortable," but what you observe is that they tend to eat a lot fewer calories than the need to maintain weight and they will lose weight comfortably without hunger, which suggest that their set point is actually going down.

And I think this is something that we see with a lot of different diets including the paleo diet, I think, where when people transition on to simple foods that are more similar to what our ancestors would have eaten, things that are less calorie dense, less refined, less hyper palatable where you don't have all these concentrated sugars and starches and salts and added fats and flavorings and all the trappings of modern processed food.

I think when you go back to those more simple basic foods that were more consistent with what our ancestors ate, it actually seems to lower that set point and allow more comfortable weight loss and maintenance of that loss. I think that that squares pretty well with the experience of people who have been on various diets, including the paleo diet, and have found that it becomes easier to lose weight without having to count calories or struggle with fighting your own appetite all the time.

[0:26:58.0] AV: Yeah. This is a very common sense lesson, I think, and you know, when we're saying bland food too, we don't necessarily mean like unflavored mush or whatever. We're talking about food that isn't hyper palatable like ice cream, and cookies, and pizza and stuff like that. As you said, when you're talking about paleo, whole food, unprocessed fruits and meat and fat and stuff. It's not like it's unpleasant food, it's just not very hyper palatable.

But this is still a lesson that's hard for people? Because I think we're also very spoiled and want everything to be just so delicious all the time. It's hard for people who are going from that very processed diet to be told, "Well maybe you should have less variety in your meals and maybe you should be eating some more sort of on the blander side." How do you make that transition?

[0:27:50.7] SG: Yeah, I think this is a tremendously important and difficult question because the human brain wants everything all the time. It doesn't want to go back to things that it doesn't like as much once it's had a taste, especially once it's been regularly eating food that really stimulates those circuits that those hardware circuits that are looking for certain food properties. It doesn't want to go back to eating simple foods. So I think this is actually a tremendously difficult problem for people because highly rewarding, seductive foods are by definition more motivating to people.

So to stop eating those foods that are so fattening, there's this psychological energy barrier that has to be overcome and you have to say — there's a certain amount of deprivation, at least in the beginning to say to yourself, "No, I'm not going to eat these foods that I want to eat." There are ways to make that a lot easier to make that transition easier and I think for most people, it gets easier over time the more they avoid those foods but I do think that it is definitely a challenge. I mean, it's like taking away anything in your life that you really like.

I think, this is why there's probably never going to be a Stephan Guyenet cook book is because I think that the seductiveness of food is what is one of the things that contributes to our overeating it and are eating the wrong kinds of foods and becoming overweight. But because those food properties that make us over eat are intrinsically motivating, those are the things that make cookbooks sell and fly off the shelves.

So, you know, every cookbook including diet cookbooks that the claim is for diet cookbooks, almost invariably, "You're going to lose weight while eating the most delicious food you've ever eaten," right? This is like the universal claim is that "there's no sacrifice, this is going to be amazing, you're going to love it and you're going to lose weight". I mean, there are different way to lose weight and I'm not saying that you can't lose weight on a diet that you enjoy. I'm not saying that that's impossible but I think that all else being equal, if you're eating food that is

highly palatable to you, it's going to be harder for you to control your calorie intake and it's going to be harder to control your bodyweight in the downward direction.

[0:30:18.9] AV: So time to be a little bit nosy, just because I think people will be interested. What's a day in your life like food wise? What do you like to eat?

[0:30:27.0] SG: Yeah, sure. My diet I would say is somewhere on the spectrum between a paleo diet and a non-industrial agricultural diet. What I mean by that is the kind of diet that my distant agricultural ancestors might have eaten. So it's kind of like a broadly ancestral inspired diet I should say.

In the morning, I get up and I'll either have oatmeal with some berries and homemade yogurt or sometimes I will have a potato and an egg. I eat a lot of potatoes, and then for lunch, it will usually be an egg and maybe a potato or these kind of grain pancakes that I make and then...

[0:31:17.1] AV: That could be a recipe, you could put that somewhere, I'm sure. That sounds good.

[0:31:20.1] SG: The grain pancake?

[0:31:21.2] AV: Yeah, that sounds good.

[0:31:22.1] SG: Yeah, actually, I have written about it in the past, it actually is really good and I should update it because I've kind of changed how I do it lately and so I should update it.

[0:31:32.1] AV: We'll put it in the show notes so people can try it.

[0:31:34.9] SG: Okay cool, sounds good yeah. It's very satisfying and so I guess to kind of give a high level overview, I eat, it's a pretty starchy diet. I eat a lot of tubers, I eat a fair amount of whole grains. I eat a lot of beans, I eat a lot of fruit, I eat moderate amount of meat. I eat probably about half as much meat as the average American, a fair amount of sea food, mostly poultry and seafood is my meat. A lot of vegetables and I actually grow a lot of my own food,

which is something that I really enjoy. Probably 75% of the vegetables I eat yearly is vegetables that I grow myself.

I grow a lot of fruit and we harvested 500 pounds of potatoes last year. I think 400 pounds of winter squash, I eat a lot of squash and some grain corn too, we harvested some flower corn. Not the type that you would eat on the cob but the type that you would use to make tortillas and tamales and that sort of thing. I use that in my grain pancakes. It's something that I enjoy and something that helps me to be involved in my food and to have the healthiest possible food that I can.

[0:32:54.9] AV: I mean, your book, it's not a how to diet book. You know, I don't think you necessarily are touting any specific kind of diet but I would guess that sort of the first step for anybody is to just try to move away from some of this hyper palatable, highly processed foods, right?

You wouldn't say, I suppose because as you've said, everyone kind of reacts to food differently that there isn't necessarily one diet. Paleo, everyone's doing Keto now or higher carb, lower carb, there isn't really one answer, right? It's move away from the foods that are really damaging to pretty much everybody and then the next step is kind of figure out what works for you. You think that's accurate?

[0:33:35.8] SG: Yeah. I mean, I think that that's one aspect of the — so as you said, the book, it's not really focused on the prescriptive aspects, it's more on the descriptive aspect so understanding rather than fixing but I do in the last chapter as you know, offer some thoughts on that and it's not, like you said, it's not the DNA diet, it's just some thoughts that are based in the neurobiology and the behavior on how to take this information and leverage it.

Some of it really is common sense. Like you said, avoiding this highly processed palatable foods. I mean, that's really a no brainer but I think it raises this other question of "how do we do that?" Because I mean, honestly, it's easier said than done. It's very important but it's easier said than done and this kind of gets back around to the core thesis of my book, which is that much of our eating behavior is guided by this non-conscious, instinctive, impulsive circuits in our brain that we can't really control but they have a big impact on our behavior.

I should say, we can't control them directly. There are ways to influence them indirectly. That's a lot of what my ideas are based on in the last chapter of the book. I mean, the question is, how do we stop eating those foods? I mean, the kind of like hardcore answer would be just stop eating them. But I think that kind of ignores the reality of the fact that we have these drives in our brains that are pushing us toward those foods that makes it difficult.

So I think there are some ways that we can make that easier and I think one of the most important ways is to control our food environment. The brain, over repeated exposures with these foods forms motivational drives and forms habits that make us crave these foods and push us toward these foods. Those cravings, those motivations are triggered by the cues, the sensory cues that are associated with those foods.

So like the smell of baking bread, or pizza, or French fries, or brownies, or the sight of the box of pizza, or the box of ice cream, or the thing of chocolate, or whatever it is. Those sensory cues trigger those motivational circuits in our brains and basically it's our brain saying, "Oh, hey, I recognize this situation. This is the situation where I got tons of awesome sugar and fat and salt and calories last time. I'm going to ramp up your motivation and you're going to have a craving right now and if you don't want to eat that thing, you better be ready for a fight."

What I'm getting around to is to say that controlling your food environment and not exposing yourself to those cues is a very powerful way to control our impulses and control our cravings in a way that allows our conscious rational decision making parts of our brain to prevail and to help guide our behavior in the direction that we want to support us in the long term in terms of our weight and health.

[0:36:54.8] AV: What do you think about the whole abstainer versus moderator debate, you know? I guess most people — many people like think they can be moderator and by that I mean, I can have like a cookie every now and then or I'll have just to treat sometimes. But most people actually are not very good at moderating that stuff and most of us are probably better off just completely avoiding trigger foods. What do you think about that?

[0:37:19.0] SG: Yeah, that's a really good, really interesting question. You know, I'm not really an expert in this area in like a scientific sense, but I do have some general thoughts. I'm very much a moderator. I can have pizza every now and then, I can have ice cream every now and then, as long as it's not in my personal food environment and it's not in my face, I'm cool. But if it is in my face, I'm probably going to eat it and I'm going to have a hard time controlling that behavior.

A lot of people aren't like that. Like you said, they have a hard time saying, "Well, I'm just going to eat this every now and then." You know what? I think it's a lot harder to say I'm just going to have one mouth full of this than it is to say, "I'm only going to eat this every now and then," because when it's actually in front of you and that queue is so salient and you're tasting it and you're smelling it, you're going to have some very powerful motivational triggers happening, at least from my personal experience. That's the kind of scenario where I have a hard time controlling myself.

But if I just say like, "Okay, you know what? Once every month or two, I'm just going to let myself eat a bunch of pizza and not worry about it." That to me is a scenario that I personally at least have good control over but I don't know if that's true for everyone. I think some people really do benefit from hard and fast rules. You know, I attended one time, this meeting, it was with this guy named John McDougall who is low fat advocate of very low fat vegan starch based diets.

Basically, his perspective is, in his experience with the people that he has been trying to get to adhere to this dietary pattern is that you have to tell people that this is it, this is the way you have to be very rigid because otherwise, people just won't do it. People will not do moderation. I don't know. I think it probably depends on the individual. I think it probably depends quite a bit on the individual and I guess I would hope that most people would have enough insight into their own personalities and their own responses that they could decide which type of person they are.

I think another question that arises here is, you know, is it unhealthy psychologically to have those hard and fast rules? A lot of people have suggested that this can contribute to eating disorders and just kind of an unhealthy relationship with food.

[0:39:56.1] AV: Interesting though that people put more of a focus on saying that you can't eat sugar can lead to eating disorders but the fact that we're all crazy overeating and becoming obese is not as alarming. That's an eating disorder in itself too. So maybe, I mean, in many areas of our life, having rules and having some discipline is you know, allotted and it's a good thing but then when we say, "You know what? I'm just not going to eat junk food anymore," it's like this red flags and people kind of get all worried about it.

[0:40:24.1] SG: I completely agree with that. I mean, exerting control over your behavior is something that we do in many areas of our lives. You don't punch your boss when you're angry, you don't do stuff like that and that's totally accepted that we would have very strict controls over our behaviors in some areas of life that benefit us greatly. That's just kind of a part of being an adult.

I think that the same applies to food and I want to recognize that that may not be true for everyone, there are people who have eating disorders that may not benefit from that kind of scenario. But I think to just say, no, we shouldn't stop eating all these processed foods that are doing us very serious harm, that we shouldn't stop eating those because that's an unhealthy psychological pattern that restricting something like that is not good. I don't think that really makes any sense for most people.

I think that, I mean, unless you're doing it to the point where you are creating a scenario where you cannot eat a nutritionally adequate diet or you are not eating a nutritionally adequate diet then I think you're getting into pathological territory. I mean, just saying, "I'm not going to eat this food that's hurting me and I'm only going to limit my options to these things that are not hurting me and are supporting my long term constructive, positive goals of being lean and healthy." I mean, there couldn't be anything healthier in my view than doing that, psychologically. I mean, that to me is a very positive thing to do.

[0:42:06.6] AV: Yeah, it sounds very reasonable. We're not always in a reasonable world but it sounds reasonable to me. One of the other topics I wanted you to talk about a bit, we all know obviously that sleep is very important to our overall health, but you go into the idea in the book of circadian rhythm disruption affecting food metabolism.

There was this study that on the rats that fattening foods, eaten when you should be sleeping has like a much worse effect than those same foods eaten during the day. Is that right? I mean, that's crazy. What are the implications for us, you know, with something like that?

[0:42:42.0] SG: Yeah, I think it's really interesting and I think in terms of the obesity and body fatness angle, there's still some questions, still some open questions that haven't been completely resolved. But we do have some very intriguing signs from the animal research literature suggesting, as you said, that the timing of food ingestion has a lot to do with its effects on body fatness.

Dan Arble and Fred Turek were I think the first people to publish on this and showing that. So to normally, a rodent, a rat will eat about two thirds of its food intake during the dark cycle when they're awake. So their light dark activity cycles are reversed relative to ours and then they'll eat about a third of it in the light cycle when they would normally be mostly sleeping.

If you restrict them so they can only eat during the active time, the dark cycle, then you can give them a super fattening diet and they won't become obese. It's pretty striking actually, it's amazing because, I mean, I've worked with these diets and I've worked in rodents with this diets and I never had any idea that the fact that they are allowed to eat at all times of days contributing to how fattening these diets are.

That's a pretty interesting observation and I think it's been mostly supported by further research to my knowledge and one interesting thing that came out of this is that they actually were — the ones that were allowed to eat at any time of day were getting fatter but they weren't actually eating more calories. So something about this scenario reduced their calorie expenditure rather than increasing their calorie intake.

This is the type of scenario where I start to be a little bit concerned that it might not apply to humans very directly because rodents, their calorie expenditure side of the energy balance equation is a lot more flexible than ours, and so because they're small mammals, they have a high surface area to volume ratio, they can change their energy expenditure dramatically to maintain body temperature because they lose heat because of that surface area to volume ratio.

They lose heat a lot faster than we do so they can ramp up their calorie expenditure and because of that, they have a lot more kind of flexibility and the energy outside of the equation.

One thing that's really interesting, My point in saying that is we don't know whether the mechanism is exactly the same in rodents and humans but it is a very interesting finding and we are having more and more evidence, which is still preliminary but we're getting more and more in humans suggesting that it may affect appetite regulation and body fatness in us. So maybe the mechanism isn't exactly the same, but maybe the outcome of body fatness is the same.

And we see in people who have so called night eating syndrome who tend to eat a lot of calories at night and then people with rotating shift work who have disrupted circadian rhythms. We see that they tend to be somewhat heavier than the general population and they tend particularly to have negative metabolic risk factors and higher — I don't know specifically for night eating syndrome, but for people with shift work, they tend to have a higher risk of certain disorders like diabetes, cardiovascular disease, and cancer. It's possible, I think, very plausible at this point that it could be a very important factor.

[0:46:20.6] AV: Okay, I'm asking you all this stuff that took out to me while I was reading so I suppose I'm being kind of bias but during all of your work on this book and all the research you were doing, was there anything, and this can be at a high level, that was really surprising or unexpected that you discovered that you know, was going to be helpful to our listeners and your readers. I mean, not...

[0:46:44.4] SG: Something practical you mean?

[0:46:46.3] AV: Yeah.

[0:46:47.7] SG: Okay.

[0:46:47.7] AV: I mean, it don't have to be practical I suppose. Just anything that maybe you kind of weren't expecting that outcome and yeah.

[0:46:55.4] SG: Okay. I guess, one thing that I was kind of surprised by and challenged by is the idea, and at this point it makes a lot of sense to me and I've accepted it but when I first came to this, I found it challenging, was the idea that the human brain is intrinsically motivated by the calorie content of food.

I guess I didn't really realize just how good the human brain is at ferreting out this abstract concept of calories in the food that you're eating by detecting the different types of chemicals like fat and carbohydrate and protein and sugar coming in and this modeling that anthropologist and biologist have done that's called optimal foraging theory that suggest that the human brain really in the way that it interacts with food is fundamentally very motivated by calories. The proxy for that is our attraction to these properties like starch and sugar and fat and stuff. So that idea that calories themselves were kind of this value quantity to the brain was interesting to me and challenging.

Another thing that I would mention that has perhaps more practical value is the importance of uncontrollable stress. So stress is one of the things I talk about in my book as influencing food intake in part by influencing levels of cortisol. There seems to be a very big difference between, in terms of the physiological response and the eating behavior response and the potential health harms that result, there seems to be a very big difference between stress that we think we can control and stress that we don't think we can control.

This is very much a matter of perspective, but if a person doesn't think he can control a stressful situation, he's going to have a much more powerful physiological and neurobiological threat response and that's going to result in potentially much more powerful effects on food intake and the other things that stress impacts. So the kind of practical fallout from that is that anything you can do to give yourself control over a stressful situation or even increase the perception of control, because perception is really what matters here with psychological stress. Anything you can do to create the perception or actual control over this stressful situation will likely greatly mitigate its impacts on your physiology and on your behavior.

[0:49:50.4] AV: Whatever kind of stress management practices that work for you, right?

Whether I guess meditation or yoga or reading, or somethings that can give you kind of tools to have ways of dealing with it I suppose but mitigate.

[0:50:03.4] SG: I think those things are all important but what I am saying here is a little bit different and just to make it more concrete, if you're stressed out because of financial problems can you make a plan to get control of your finances like sit down and make an actual concrete plan and write it out and maybe that will help you with your finances but even if it doesn't it will give you a feeling of being in control of your situation and it will mitigate the negative effects of that stress on your physiology and on your eating behavior.

So it's like the difference between someone who's at work and they are given a really tough project with the tight deadline but they know they can do it so that's a positive stress versus caring for an elderly family member that has a disease with no cure and it's hard to see any way out of the situation and that would be the negative uncontrollable stress. If you can change your perception or even your level of control itself over the situation then to a large degree you can mitigate its negative effects.

[0:51:15.9] AV: Right and that food is the thing that's stressing you then coming up with these tangible action plans as we've mentioned before is a great way to deal with it too, right?

[0:51:24.8] SG: Yeah, absolutely.

[0:51:26.3] AV: Okay, so we've got to wind down soon here but the last question I have, I mean we have talked about this throughout the course of our chat here all the ways that we can — because one of the good things about this book is not only are you explaining the complex processes and chemical reactions and why we have this hungry brain, but you also give us tangible ways to outsmart it, right? So we talked about less variety and having less palatable foods and managing stress, and things like that.

You also started to get into maybe you can talk a little bit more about tricking your brain, how to feel fuller on less calories. Even though, as you said, our brain seems to be very smart at picking out these things that are either fatty or lots of sugar or whatever. But there are ways that you can trick it, right? Depending on fat content, fiber content, calorie density, things like that, what are some other high level ways that we can trick our brain?

[0:52:19.9] SG: Yeah, sure. So I think this is actually one of the most powerful ways, what you are talking about is one of the most powerful ways that we can exploit the neurobiology of eating behavior to gain control over it and regulate our weight better. Earlier I was saying the brain is very focused on calories. What I was talking about was the motivational systems of the brain that drive our cravings and things but the system in the brain stem that creates satiety or fullness during the course of a meal, actually isn't really that closely tied to the calorie content of what you are eating and that creates some really important areas that we can exploit.

So what I mean by that is when you eat food, the food travels down into your stomach and your stomach detects the volume of that food and then it starts to go down into your small intestine, which starts to detect the chemical composition of it in terms of the carbohydrate and the fat and the protein content, all that stuff goes back to the brain, the brain stem in particular, via this nerve, the vagus nerve. And the brainstem integrates all of that information into a signal that is your perception of fullness.

So there is all this complicated information going in, but what you feel is just one thing, which is whether or not you're still hungry and so as your meal progresses, that sensation builds and builds until finally you have lost your motivation to eat further food and you stop eating. The amount of fullness that you feel, the amount of satiety that's generated by the system depends not only on the calorie value of your food but also on other food properties like the calorie density of your food.

So the more calorie dense a food is, in other words the more calories per volume or per weight, the less full it's going to make you feel per calorie because it is not expanding your stomach as much. It's not triggering those stretch receptors and then the less fiber it contains, the less filling it's going to be per calorie. Also the less protein it contains, the less filling it will be per calorie and then conversely, the more highly palatable it is, the more seductive it is, the less filling it will be per unit calorie and so what I have just described is basically junk food.

Approximately speaking, I have described foods like pizza, and brownies, and cake, and chips and many other foods like that fit that profile of high calorie density, high palatability. Most of the time but not always low protein, low fiber. Those are the foods that we have to eat a lot of

calories of those foods before they start to trigger our fullness signals. They don't have properties that tell our brain that we're full in time for us to regulate our appetite properly.

And that's really critical because when we are eating food, we use that fullness signal as a way to understand when to stop eating and so if that signal is delayed relative to the calories we are ingesting, we're going to overeat and we won't even realize it because we don't feel any more full than we would than we otherwise would.

And so the converse of that if we flip that around to foods that have a high satiety value per calories, such as a lower calorie density, higher protein, higher fiber and more moderate palatability, what we see is that the things that correspond to that are unrefined, natural ancestral foods like fruit and meats, fresh meats, unprocessed meats, vegetables, eggs, whole grain porridges like oatmeal type stuff and things like that.

Those are the things that are filling per unit calorie, and so if we can stick to diet that focuses around those types of foods then we're going to be experiencing the same level of fullness and the same level of satisfaction in that sense at a meal, but we'll be consuming significantly fewer calories.

[0:56:51.0] AV: Got it. Okay we could go on probably for hours more and barely scratch the surface of what's in this book but we've got to let you get on with your day. But for people who want to know more about the book and know more about you, where can they go online?

[0:57:04.3] SG: Yeah, so I have a website at stephanguyenet.com. Or if it's easier, which it probably is, wholehealthsource.org will take you to the same place. That's where I have my blog, I have the page for my book, I have the page for The Ideal Weight Program, which is my weight loss program and I also am quite active on Twitter and my handle is @whsource.

[0:57:36.3] AV: Awesome. Well thank you so much for your time. I really enjoyed this book. I think it's awesome that it gives us tools using real life as well as the reason behind it. Because I think, as we said in the beginning, I think it can be empowering for people and it can also take away some of the guilt and the helplessness, which so many people have in their interactions

with food. So I think that's really important and I think it's going to help a lot of people. So thank you for that and thank you for taking the time to talk to us today.

[0:58:04.0] SG: Thanks Ashleigh, I appreciate it.

[0:58:05.9] AV: All right, take care.

[0:58:07.0] SG: You too.

[0:58:07.7] AV: Bye.

[END OF INTERVIEW]

[0:58:08.4] AV: Thanks so much for listening to my chat with Stephan Guyenet and if you are feeling inspired like I am, you should go pick up his book, *The Hungry Brain* and if you do, make sure you tag me on Instagram @themusclemaven and @paleomagazine and tell me what you think. We might even repost you.

Next week, we talk to the CEO of Vital Proteins, which is one of my favorite companies ever. They offer super high quality grass fed collagen products that I love and I'll tell you, when I dedicated myself to using their collagen every day for a month, I couldn't believe how much better my skin nails looked at how much better I felt. My nails grew like crazy, I was like Wolverine, but in a good way.

Anyway, I love their products. They are always coming out with fun and tasty new stuff and every time I had dealt with these guys, they are just super enthusiastic and genuine. So that's my endorsement but you can learn all about this company and all about the health benefits of collagen in next week's episode.

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[OUTRO]

[0:59:37.8] AV: Paleo Magazine Radio is brought to you by the Paleo Media Group and is produced by We Edit Podcasts. Our show music features the song *Light It Up*, by Morgan Heritage and Jo Mersa Marley, and on behalf of everyone at Paleo Magazine, thank you for listening.

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