I'M CALLING BS!

PART 2

(The Sleep Episode)

The Dr. JOHN BERARDI SHOW

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I'm Calling BS! – Part 1 (The Science Police) Transcript

Dr. Jennifer Martin:

When I think about debates like this in general, I think what is each person trying to accomplish? I think that, Matt Walker is passionate about sleep. I don't know what Dr. Guzey's criticism was trying to accomplish. I think that there are some things in Matt's book that are debatable, and some things that are not debatable. Sometimes scientists get stuck in needing to find the perfect answer when the good answer would have a big public health impact.

Dr. John Berardi:

This is the Dr. John Berardi Show, a podcast that seeks important lessons in a seemingly unlikely place amid competing points of view. In each episode, I look at fascinating, sometimes even controversial topics through the minds of divergent thinkers, and together we tease out unifying threads from ideas that may feel irreconcilable. Today's topic, I'm calling BS part two.

Dr. John Berardi:

In part one of this series, we learned about a fringe area of science that you probably hadn't heard of before. One in which the goal is to call BS on poorly done published research in the interest of having it corrected or removed. Here in part two, we'll move from published science to popular science, talking about Dr. Matthew Walker's best-selling book, Why We Sleep, Alexey Guzey's criticism of it, and how a leading sleep researcher Dr. Jennifer Martin thinks about both. Let's get started.

Dr. John Berardi:

In 2017, Dr. Matthew Walker, neuroscientist, sleep researcher and director of the Center for Human Sleep Science at UC Berkeley, released his book, Why We Sleep. The book had two big things going for it. First, the Centers for Disease Control had recently described sleep loss as a "public health epidemic" linked to a wide range of medical issues, including hypertension, diabetes, depression, obesity and cancer. Coupled with data suggesting that more than a third of adults were getting less than the recommended seven to nine hours of sleep each night, a grim picture emerged about how the demands of modern life have been negatively affecting our sleep and health.

Dr. John Berardi:

Second, the book had Walker with his signature wit and charm his gift for compelling prose and his knack for explaining complex subjects with easy to understand analogies, he became sleeps most famous advocate, his book rocketed up the charts. Today, about four years later, it's become an international bestseller, translated into 40 languages, sold close to a million copies and generated more than 12,000 Amazon reviews. But Dr. Walker's influence extends beyond the book, he's appeared on 60 minutes on the Joe Rogan show, and in nearly every major media outlet, television, radio, print, podcasting, you name it, he's a PR machine. One example, his wildly popular TED talk has over 13 million views.

Dr. John Berardi:

Since 2017, Dr. Walker really has been the face and the voice of sleep science, evangelizing the importance of sleep, trying to wake us up to the myriad problems with sleeping too little. But in 2019, Dr. Walker started to get a different kind of attention. A handful of sleep scientists for years had been frustrated by some of his claims and data presentation strategies. For example, often when presenting bar graphs, he'd eliminate error bars, which to scientists gives a clear indication of how "clean or messy" the data are. With small error bars, the data have what we could call high fidelity, with larger error bars, the data have a lot of uncertainty. So when no error bars are presented, it suggests the data he's sharing are clean and definitive, when they might not be.

Dr. John Berardi:

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In addition, Dr. Walker often made bold definitive sometimes unsupported claims, like the one kicking off his famous TED talk, where he tells the audience he's going to begin with testicles, and then claims that men who sleep five hours a night have significantly smaller testicles than those who sleep seven hours or more. The thing is, while there is one study investigating this question, it doesn't clearly support Dr. Walker's extraordinary claim. As Carl Sagan, perhaps best known for writing and hosting the award winning 1980, PBS series Cosmos, famously said, "Extraordinary claims require extraordinary evidence." When it comes to the popular science work that Dr. Walker does, Dr. James Heathers who we talked to for part one of this series, had this to say.

Dr. James Heathers:

We have a little saying; popular science means never having to say you're wrong. It's a trope within serious scientists that most things that are within popular science are thought of as publicity campaigns, you organize a series of ideas, you marshal some facts around an idea that you want to present to the world, and then tour and speak about, and publish on, and become that lady or that guy for a while, and then in general, you either modify that and keep going, or you come up with something else. Now, at its best, it's very, very valuable. I'm a big fan of science communication, I grew up reading books like that. But at its worst, it's somewhere between not worth the time and actively misleading.

Dr. John Berardi:

But as we discussed in the first part of this series, when scientists see things like errors, misleading information, downright fraud, either in published science or popular science, they usually don't do anything about it, mostly because, A, there's not much you can do about it except write to people, publishers, journal editors, university administrators, people who aren't likely interested in you making their life more difficult.

Dr. John Berardi:

B, it's a lot of work to prove that you're not just a disgruntled hack with an axe to grind. See, you've got your own work to do and finding errors and others work isn't professionally rewarded. It's a distraction. However, one young man with time on his hands and perhaps emboldened by the work of folks like Dr. Heather's decided to actually do something about it.

Alexey Guzey:

I'm an independent researcher, originally from Moscow, Russia, and I've always been interested in science.

Dr. John Berardi:

This is Alexey Guzey. In terms of training, Alexey's got a bachelor's degree in mathematics and economics. But he's also interested in the biological sciences, taking graduate level classes in psychology, neuroscience and biology. He stumbled upon Dr. Walker's book on a recommendation from a friend.

Alexey Guzey:

I have a good friend of mine who is super smart, and she has been talking to him about sleep a bunch, and he kept recommending this book to me. At some point, I decided to check it out, and hoped that it would enlighten me about sleep essentially, because it is such an acclaimed book by such a famous expert on sleep. What happened was that I started reading it. In the very first paragraph, a saw some things that I thought were very highly implausible, and I started checking out whether they're true or not, and a bunch of them turned out to just not be true.

Alexey Guzey:

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I kept reading the book, the pace of those untrue or highly exaggerated claims about sleep just kept increasing. I was very, very disappointed in the book, and I was a bit disappointed in my friend for I haven't liked the book so much. So, what I ended up doing is, I basically decided to write about what I think about the book.

Dr. John Berardi:

As he started writing.

Alexey Guzey:

I realized that I cannot write about that book, I cannot examine it in full, because there is just so much wrong with it, and what I ended up doing is just picking out a few of the worst, most exaggerated statements from the first chapter, and just looking into them really closely, and examining them and pointing out that this is not how actually sleep works, and now you should probably not trust the book when you're trying to figure out what to do with sleep.

Dr. John Berardi:

Alexey gives this example from one of the first paragraphs of the book.

Alexey Guzey:

Walker writes that sleeping less than six or seven hours a night, doubles one's risk of cancer. This claim specifically jumped out to me because I immediately started to think about how one would learn this, essentially, and I said that, "Well, the way you could figure this out is by designing a randomized controlled trial and observing a lot of people over, say, 10 or 20 years, and making one group of people sleep five hours, the other group sleep, say, eight hours, and then look at their incidence of cancer." And you'll realize that this seems like it's very implausible that such a study existed.

Alexey Guzey:

What probably happened was that workers simply looked at some, just a correlational study, some people were asked about how much they sleep, and the researchers looked up their medical records, looked at the incidence of cancer, and so that, for example, the group of people who sleep five hours a night have twice the incidence of cancer of people who sleep eight hours a night. So I thought that, "Well, maybe this is what happened." Although we cannot use such data to determine whether lack of sleep per se influences cancer rates, because for example, people who are depressed sleep a lot.

Alexey Guzey:

So in this case, illness actually causes disturbance of sleep. Or, for example, people who had stroke usually have trouble getting enough sleep. It seems that in a bunch of cases, in fact, the illness causes either lack of sleep, or too much sleep. So we can't really disentangle what causes what.

Dr. John Berardi:

So essentially, in the first few paragraphs of the book, Alexey is getting that itchy, uncomfortable feeling that Dr. Heathers described in part one of this series, when trying to conceive of a study that could demonstrate that getting less sleep would cause cancer, which is what Dr. Walker was implying, he couldn't. Such a study would be too difficult to do, and even if you thought you could pull it off, no research ethics group would ever let you try it, which means Dr. Walker's claim had to be based on something else, correlational data.

Dr. John Berardi:

In our series called The Problem With Weight Loss, I discussed the limitations of correlational research using the ice cream and murders example, turns out that when ice cream sales are high murder rates go up. But we know that it's not

the ice cream that's causing the murdering, it's the fact that ice cream sales and murders both go up when the weather is nice. Understanding all this, Alexey figured that there must be some correlation between sleep and cancer, but that Dr. Walker was just being loose with his language, implying causation when there really was just some correlation.

Alexey Guzey:

Then it turns out that the reality wasn't even worse, there's essentially no correlation. If you look at each of dozens of cancer, I think sometimes some correlations show up, but if you look at all cancer, then there is essentially no difference in cancer incidence between people who say they sleep a lot, and people who say that they sleep a little. So, the book is filled with things like this, where the facts are either grossly exaggerated or just did not exist. Or in one case, Walker literally cuts off a part of the graph that contradicts his arguments, which is really, really bad.

Dr. John Berardi:

And Alexey is right, loose language is one thing, but deliberately manipulating data is unethical and borders on research misconduct. In a compelling article co-written with Dr. Andrew Gelman, professor of statistics and political science at Columbia University, they show how in Dr. Walker's book, he shared a graph from someone else's research, and then simply eliminated a column of data that didn't support his point. The point he was trying to make was that in young athletes, less sleep means more injuries. In the graph he shares in the book, this argument holds up.

Dr. John Berardi:

The bar graph is really low, indicating a low likelihood of injury in the nine hours of sleep group. It goes up a bit in the eight hours of sleep group, which indicates a higher likelihood of injury versus nine, it goes up more in the seven hours group and it peaks with six hours. Meaning that in this group of 112 young athletes, per every hour of sleep they lost, their injury likelihood went up. It all makes intuitive sense. The problem is that Dr. Walker excluded a bar from the original graph, just totally chopped it off, and that bar represented five hours of sleep.

Dr. John Berardi:

What did it show? Well, it showed that the chance of injury was actually lower with five hours of sleep versus six and seven. In other words, Dr. Walker wanted you to see this compelling graph showing that more sleep leads to lower injury linearly from six down to seven, down to eight, down to nine hours. So he just left out the five our data, presumably because it screwed with his point. Now these are just a few examples of the dozens of problems Alexey found and reported in his article called, Matthew Walker's, Why We Sleep, is Riddled with Scientific and Factual Errors. Here's the thing, his 12,000 word fully referenced article, only reviewed the first chapter of Why We Sleep.

Alexey Guzey:

I think I got the rough outline of the past, probably in 30 hours or so because it took a while to just figure out the right structure because it was such a non-trivial thing to decide that, "Yes, it actually makes sense to just focus on the introduction." There's so much in there that it's essentially enough.

Dr. John Berardi:

Again, what Alexey is saying here is that, all those errors he found are just in chapter one, the introduction.

Alexey Guzey:

Then it took me in total around 100, maybe 120 hours to get to the publication. Since then, I probably spent another 100 hours over the last year and a half, just dealing with what happened.

Dr. John Berardi:

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The reason he didn't keep going, he estimates it would have taken him over 3000 hours to review the entire book, which is untenable even for someone paid to do it, which of course, Alexey was not. This time commitment hints at why very little policing of science and popular science actually happens, which is a shame.

Alexey Guzey:

The way I view such critics is like policing, there definitely exists some optimal non-zero level of policing. We definitely need police to solve murders. But there is just literally no professional police in science, and sometimes the scientists are just not honest. Sometimes the scientists fabricate data, or they lie about their methods, or they, in the case of Walker, they make up data and they publish books with made up data, and then they end up citing the books that they publish in their scientific papers, and create the impression that their books are scientifically accurate.

Dr. John Berardi:

Here he's referencing the fact that Dr. Walker at least three times in published research papers, has cited his very own pop science book as a source, which is a circular process and definitely not a normal way of doing scientific referencing. Imagine someone makes a claim, you ask where they got their info, they tell you not from a study, but from a book. You ask who wrote the book, and they say I did. It's essentially a parent telling you because I said so.

Dr. John Berardi:

The other reason, Alexey stopped at chapter one, he argues that it was enough that if the multitude of errors and omissions and generally bad behavior he found in Dr. Walker's first chapter weren't enough to convince you, then maybe he didn't apply the level of care and rigor that one might expect of a respected scientist, would anything convince you? Alexey Guzey's criticism which has now been read by a few 100,000 people seem to galvanize those who had previously been uncomfortable with some of Dr. Walker's work, it gave them an outlet, a place to share their grievances. It was like a scientific me-too moment.

Alexey Guzey:

Very well-respected sleep scientist wrote to me that, "Yeah, I thought the book was really bad. But I just didn't know where to start, essentially. I was thinking about writing something about it, but there were so many issues with it that I just gave up. I'm very happy that you came up with this way of just focusing the first chapter." Sometimes I get emails from like post-docs that says that, "I really enjoyed your essay, and I am in fact studying the area that Walker's studying. He is not rigorous in his research either, and he's pushing some theories that were really against the data that we see, but I can't say anything about this because he is such a powerful figure in the field, that it will really damage my career."

Dr. John Berardi:

Alexey coming forward, emboldened researchers who were uncomfortable with Dr. Walker style, his unequivocal language, his lack of acknowledgement of the subtleties of research, his bad use of statistics and more.

Alexey Guzey:

As scientist, should know that you cannot make such confident statements on correlational data. Maybe if you really want to interpret this data, you can say that this looks interesting, but it's just very, very wrong to interpret correlational data as if it strongly implies that there is a causal relationship. In other parts of the post I mentioned the percentages, it appears that in at least three cases in the book, Walker claims that something decreased by more than 100%, something that cannot be negative. A decrease of 100% brings something to zero. So a decrease of 200% brings something to be negative.

Alexey Guzey:

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For example, he claims that the doctors make 400% less errors. So they make the negative number of errors or that the brain activity of newborns when there, I think, under slept decreases to 100%. On the one hand, I think one defense could be well, he's just been metaphorical or something, or he meant that the decreases like 2x or 4x. This is probably what actually happened, but if he's a scientist, and he published his papers in neuroscience that employ numbers, then there is a question of how rigorous can he be if he consistently claims that percentages, for example, don't work in the ways that he would expect them to work. So I think this bleeds out in all of the other claims where confusion of correlation and causation or claims of cancer or immune system.

Dr. John Berardi:

Alexey's criticism also led to other investigations. For example, Dr. Walker recently had one of his published papers retracted in the journal, Neuron, for republishing large amounts of text that he had previously published in another journal, The Lancet. This tactic often called self-plagiarism, or scientific recycling, is frowned upon for a host of reasons, but the validity of those reasons aside, it's considered bad form, it's not permitted by journals, and yet he did it anyway.

Dr. John Berardi:

Dr. Markus Locher, professor of mathematics and statistics at Berlin School of Economics and Law, also published a criticism of Dr. Walker's 2019 TED talk, highlighting the unsupported exaggerated or flat out incorrect claims he made. From the outside looking in, it seems like the momentum that Alexey's article built up, and the attraction it drew to Dr. Walker's work was the catalyst for all this. As Dr. Heathers talked about in the last episode, there's too much science out there to review it all. So, instead of looking at individual papers, he looked for patterns. When you find a pattern of bad behavior, that's where you dig in.

Dr. John Berardi:

The other reason to look for patterns, people's reputations and livelihoods are on the line. Calling someone out without being really, really sure that something is problematic is bad behavior too. Which is why Alexey was very intentional about vetting his work.

Alexey Guzey:

The most important thing that I do is, I try to get a lot of people to read my draft before I make them public, and I try to get specialists on the topics. So for example, before I published the Why We Sleep, I asked a couple of professional sleep researchers who I trusted to look over my draft and tell me if there's anything wrong with it, and asked a lot of my friends, I think maybe around 30 people, maybe more, ended up reading my article before I published it. So, by the point that I made it public, it was both vetted by smart generalists and by specialists.

Dr. John Berardi:

Another reason for not doing this alone beyond accuracy is this.

Alexey Guzey:

So, in general, when I write my drafts, I get a little bit angry at people. But also having a lot of draft readers is helpful for is that they know that Alexey, you're being too angry here or you should probably not have ad hominems in text, and you should stick to the arguments that I publish, and fairly neutral to avoid directly accusing authors of things unless there is really, really, really strong evidence that the author did something intentionally.

Dr. John Berardi:

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Leaving intention aside, we're back to patterns. And with Dr. Walker, certain patterns kept coming up. Not just in the scientific community, many sleep psychologists and coaches were appalled by what some saw as harm inducing fear mongering.

Alexey Guzey:

I think that the main claim of the book ends up being that sleep is really, really, really important, and you should sleep at least seven hours, but very likely eight hours. And that if you think that you can sleep less than that you're deluding yourself, and you're probably going to get some terrible disease.

Dr. John Berardi:

And much of the book is exactly that, wave after wave of argument for how unequivocally good eight hours of sleep per night is, and how terribly bad anything else is. This is often infuriating to sleep coaches, and traumatic for individuals struggling with sleep.

Alexey Guzey:

One type of an email that I get regularly is with someone saying that I naturally sleep six or seven hours a night. Then they read the book and became really anxious about sleep, and they tried to stay eight hours a night, and they couldn't sleep for eight hours a night, so they became even more anxious, and they developed insomnia and everything became even worse.

Dr. John Berardi:

I'll share one such story after the break. Okay, we're going to take a quick break so I can tell you about a fantastic free science-based nutrition tool from our sponsor Precision Nutrition. It's called the PN Nutrition Calculator. Whether you want to improve your health, change your body, or just get your eating on track, it can help you get where you want to go. Within just seconds of entering some basic information, it'll give you a nutrition plan that's 100% personalized for your body, your eating preferences, and your goals. Like I said, your customized report is completely free. You can access it right now at www.precisionnutrition.com/calculator.

Dr. John Berardi:

By the way, when I say it's science based, I'm not kidding. The PN Nutrition Calculator uses a cutting-edge adaptive algorithm validated by Dr. Kevin Hall and his team at the National Institute of Diabetes and Digestive and Kidney Disease. Full disclosure, when PN was developing this calculator, I acted as an advisor. So I know it's a tool you can trust from a company you can trust, and it's totally free. So whether it's for yourself or if you coach clients, it's for them, definitely check it out. Again, you can find it at www.precisionnutrition.com/calculator.

Dr. John Berardi:

All right, back to the show. A few months back when I was putting together ideas for this series I posted about Dr. Walker's book and shared Alexey's criticism. In response to that post, my good friend, Jennifer Broxterman, posted an interesting story about her experience with Why We Sleep on my Facebook page. Here's Jen.

Jennifer Broxterman:

I am a Canadian registered dietitian and sports nutritionist. I've been in the field about 10 plus years now. I've also taught at the university level in foods and nutrition.

Dr. John Berardi:

She also owns her own clinic called NutritionRx.

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Jennifer Broxterman:

I see a wide variety of clients from everyday folks looking to eat better, take better care of their bodies and have a healthier relationship with food to very serious and sick eating disorders to super high level Olympic Canadian top tier professional athletes. So looking at not only food, but the greater context of self-care, sleep mindset recovery comes into what I end up discussing with my clients.

Dr. John Berardi:

What Jen shared was eye opening for me. When I read Dr. Walker's book, although I did feel like it was a little too self-assured and a little alarmist, I never really suspected that it was doing harm.

Jennifer Broxterman:

So, the other piece of context I guess I didn't provide is that I am also a double ovarian cancer survivor. So I was given a really terrible diagnosis a couple of years ago, less than a 9% chance of living to five years. As a very, very healthy high-level athlete who has basically spent her life eating well and exercising, obviously, my cancer diagnosis came out of left field, and to add a little bit more context to that, as much as I do everything I can in my power to take great care of my health, the one piece of my health that's always evaded me is a great night sleep. When I picked up Why We Sleep I was in a really bad patch of insomnia.

Jennifer Broxterman:

The thing that really jumped out as I read through the pages was just the language about catastrophic, toxic, negative overarching, the way the book was written is that it seemed to connect poor sleep to every and any health ailment, as like the root cause. And it was really scary, loud, powerful language. I mean, it wasn't. This could be connected, this is a complex issue, this is nuanced, which is, as a nutrition researcher, I'm used to interpreting foods and nutrition literature with a lot of nuance, because we know, it would be like me reading about big sugar saying, "Sugar is the root of all evil, and every health ailment is connected to your level of sugar intake."

Jennifer Broxterman:

Yes, we know that too much sugar is problematic, but health problems are multifaceted and complicated and nuanced. Because this isn't my area of expertise, and I was also reading the book quite sleep deprived, I think I took a lot of mental shortcuts.

Dr. John Berardi:

Which is easy to do. After all, Dr. Walker has an impressive list of credentials.

Jennifer Broxterman:

He checks out, he's got his PhD, he is a doctor in neuroscience. He's the director of UC Berkeley, a very world-renowned research center, especially for psychology and sleep. So I think I just took the mental shortcut of, "Wow, this is someone who really, really is a world leading expert in this topic." So as I was reading through each chapter of how scary and serious sleep deprivation really is, or can be connected to the problems in your life, my takeaway as a cancer survivor was a place of blame. Like "Oh my gosh, I gave myself cancer, I gave myself one of the worst cancers in the world, because I've never mastered insomnia."

Dr. John Berardi:

This idea came up often in my research, many of the poor Amazon reviews mentioned it. One reviewer posted this. "The main tool used in the book is the scare tactic. Here's what happens if sleep quality is compromised. It works, and it might even be the right approach in many cases. For example, schools starting before 9:00 AM is simply barbaric. The problem

is, for someone going through sleep troubles, this can dramatically make things worse. It took me six months to recover from this book."

Dr. John Berardi:

Sleep coach Martin Reed had this to say, "As someone who works with individuals with insomnia on a daily basis, I know from firsthand experience the harm that Dr. Walker's book is causing. I have many stories of people who slept well on less than eight hours of sleep, read Walker's book, tried to get more sleep, and this led to more time awake, frustration, worry, sleep related anxiety and insomnia."

Jennifer Broxterman:

The irony, I'll point out, and I'm proud to talk about working hard on mental health, is I remember bringing up this book in a psychiatrist appointment talking about how mental health and sleep and anxiety related to cancer were definitely impacting me in a very negative way. He was open to the book, but also hinted like, "Don't give the book as much weight as you are." But that was the one sleep book compared to other sleep books that I read, where there was this very heavy sense of guilt, and this very heavy sense of, "Oh my gosh, I think I gave myself this very serious chronic health condition."

Jennifer Broxterman:

Now that I've worked with a social worker on this in the cancer center, she's like, "You need to just let that piece go, because it's not serving your recovery from cancer, and it's not conclusive, and it hasn't been proven to the level that the language in the book might have suggested it's been proven, what the connection is, I think there may be a length, I don't think it's wrong to say that sleep may be connected, but I don't think it's as scientifically proven and validated as maybe the book might have led us to believe."

Dr. John Berardi:

To this last point, Dr. Jennifer Martin, a clinical psychologist, professor of medicine and sleep researcher at UCLA, confirmed this idea.

Dr. Jennifer Martin:

My scientific opinion is that we have less convincing evidence, again, about the link between sleep duration and cancer than we do about sleep duration and cardiovascular and metabolic diseases.

Dr. John Berardi:

This isn't something we should breeze right over. As Alexey says, the role of the scientist is to be more cautious in their interpretations of research, especially when the research is far from conclusive.

Alexey Guzey:

We really just don't know that much about sleep; the brain is a really mysterious thing. What happens is that, for areas where we don't know what's really happening, the people who are most confident, it almost necessarily follows that they must not be such a great expert for topics where we don't have a super rigorous scientific knowledge, because if they were, then they would qualify their statements and they wouldn't be such confident.

Dr. John Berardi:

Now, Jen wanted to make sure she communicated the fact that the book wasn't all negative for her.

Jennifer Broxterman:

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I definitely can say that there were some positives that came out. With any book on healthcare, I think it's always a good reminder about the importance of prioritizing different elements of self-care. So it was just a reminder to go through the checklist of like, "Well, am I doing everything to the best of my ability to get a good night sleep? Have I let technology creep back into the bedroom? Am I getting too much blue light exposure before bed? Am I creating a consistent wind-down routine?" So I've programmed my body help it fall asleep in a timely way.

Dr. John Berardi:

At the same time.

Jennifer Broxterman:

I think from both a healthcare provider view and as a cancer survivor view, the book needs maybe an element more of hope, and what can you do, and also this like, "Let go of perfectionism." When I think about humans, we are all flawed, we're all busy, we all have competing priorities. We can't just be full time self-care professionals, because we have jobs and kids and other things we have to get out and do. So I know when I work with my all nutrition clients, we work on the good enough answer. What is good enough in the context of your real messy life today that gets you most of the way there or as well on your way towards your goal, without self-sacrificing everything else that's important to you?

Jennifer Broxterman:

I think the takeaway when I read this book was like, your whole life has to be about sleep, or inflammatory remark, inflammatory remark, inflammatory remark, like your life's going to go down in flames with Alzheimer's, cancer, heart disease. Someone who has anxiety and insomnia, telling them all the ways they're going to die because they're not sleeping, maybe not so good for someone's mental health. So, my feedback to Dr. Walker would be, think about the human impact, not just the health impact from physiologically what you think might happen to the body.

Jennifer Broxterman:

If Dr. Matthew Walker is ever listening to this part of the interview, please know that I respect the work that you're doing and trying to help millions of people around the world sleep better, but I think like we covered just the fact that think about the human consequence of the way that information is shared.

Dr. John Berardi:

I wanted to know if Jen had found any books that did help her.

Jennifer Broxterman:

Yeah, the one that I always come back to that had the most positive impact was actually by two PhD sleep researchers as well, and it was called Quiet Your Mind and Get to Sleep. It basically just walked through cognitive behavioral therapy for insomnia. If I can pull up my favorite bullet points from the book, it just talked about sleep drive, as you become more and more sleep deprived, your sleep drive increases. So trust that even if you've had a couple nights in a row of not great sleep, your body will start to pull you back to sleep, don't worry, it has reset mechanisms in place.

Jennifer Broxterman:

Then the book just emphasize to not get overly anxious, if you can't sleep, it's not the end of the world, to get up the next day at the same time. So you always anchor your rise time to the same time of day, even if you slept poorly. To trust that you'll have a great day at work, you'll be just fine to exercise, just fine to go to your job, you don't need to call in sick. They call this compensation mechanisms. Don't compensate for a bad night of sleep. So do not do your job, do not see people, do not go to the gym, just get on with your day, you'll be fine. Don't take a nap, and then just let that

natural sleep drive, pull you back into bed. Then you just get to bed at the time that you feel naturally sleepy, even if it's less than that perfect 7, 8, 9 hours a night, and know that the ebbs and flows make up for themselves.

Jennifer Broxterman:

Generally, my sleep can reset within about a week, and I can break a pattern of bad insomnia. That has been my all time, all-time favorite book. A, it worked in real life, and it was just very hopeful. Every time I reread the book, it always just leaves me with optimism that there's still something you can do about it. And also, it just takes the trauma out of insomnia, it doesn't make it seem quite so bad, and it gives you some really practical suggestions to get your body back on track.

Dr. John Berardi:

Ever the coach, Jen wanted to leave listeners with this.

Jennifer Broxterman:

It is important to communicate how self-care is connected to long term chronic and acute health issues, like chronic disease and also acute illnesses. But at the same time, understanding that there may be some limitations for an individual they might have young children, they might have insomnia, not by choice, they might have an overactive mind. So with compassion and grace, helping meet them with a solution that works for their real life, versus just a list of rules that makes them feel less than if they're not able to follow that rule book.

Dr. John Berardi:

Jen's story reminded me that how we see things isn't always governed by our rational thinking processes by arguments and logic. It often has as much to do with our lived experiences as anything else. So for otherwise healthy folks who have a good relationship with sleep, Dr. Walker's message is probably great. It's self-confirmatory, it's positive and practical. In this world of things beyond one's control, imagine how good it would feel to know that sleep is one thing you can check off your list of stuff to worry about.

Dr. John Berardi:

Now, for people without clinical sleep disorders who choose not to get enough sleep because of a busy life, for ambitious goals or great Netflix programming, Dr. Walker's message can feel like good advice from your mom. Whether you take it or not is another thing, but you at least know you could if you wanted to. However, for those with clinical sleep issues, who desperately want to get to sleep but can't, his work doesn't feel so positive or practical, feels like an indictment, a long drawn out accusation, even a death sentence. It's no accident that I read many accounts of people saying it took months and in some cases, therapy, to get over the book.

Dr. John Berardi:

This got me wondering the extent to which different sleep advice would be more or less relevant or more or less useful based on what kind of sleeper you are. I asked Dr. Martin about this.

Dr. Jennifer Martin:

Maybe I can start with a debate about, is insufficient sleep a modern phenomenon? So one of my UCLA colleagues, Jerry Siegel, has studied some indigenous tribes. It turns out that some of them actually don't sleep much more than we do now.

Dr. John Berardi:

By this, she means six and a half to six and three quarters hours of sleep a night than national average in the U.S.

I'm Calling BS! – Part 1 (The Science Police) Transcript

Dr. Jennifer Martin:

So, there has been a school of thought that means humans just don't need as much sleep as we think, and that might be true. But there's tremendous inter individual variation in how much we need to sleep. We're starting to learn that sleep duration actually has a genetic component. So it's entirely possible that the tribal communities that he studied, which are all near the equator, actually have genes for shorter sleep. If you went to a different part of the world, like Outer Mongolia and studied a group of tribal people there, that you'd see a totally different pattern. I find this fascinating, this individual variation.

Dr. Jennifer Martin:

Now, Dr. Siegel, and a lot of his colleagues also have a strong belief that we should not be medicating people out of short sleep. In the past decades, I think there's been ... a lot of pharmaceutical industry supported talk about short sleep is bad for you. So, take a sleeping pill. I feel like they're two different conversations. One is about short sleep by choice, and one is about short sleep because you have a sleep disorder, which we trade in a completely different way. But I feel like those two issues got confused. It's entirely possible that some people have short sleep biologically, and I don't even have to say is possible. I mean, we know who these people are.

Dr. Jennifer Martin:

But we also know that there are a lot more people who don't feel well, don't function and do suffer health consequences when they have chronic short sleep. So it's a nuanced message. I worked with the CDC a few years ago to try to come up with some public health recommendations in this area. We landed on the recommendation that the vast majority of adults need at least seven hours of sleep to maintain their health. I think, again, for the vast majority of people, that's what the data show. The data are actually not as strong in cancer as they are in cardiovascular and metabolic diseases, but it's still pretty convincing, and it's actually most convincing when you look at mental health. So things like depression and anxiety.

Dr. Jennifer Martin:

We really see that if you get less than seven hours of sleep on a chronic basis, you are at higher risk for those things. Again, I feel like this argument got a little conflated. There's an argument about behavioral choices, and then there's an actual sleep disorder, and they're not the same thing. This is where I think it's really important, actually, for people who do basic and mechanistic research and clinical scientists to talk to each other, which is one of the great things that happens in sleep science, actually. I've had the good fortune of being a part of some of those studies where there's these really mechanistically minded people thinking about biological plausibility, and then there's someone else who says, "Yeah, but I'm a doctor in clinic and this is what I see"

Dr. John Berardi:

Which is what I think a lot of people have been cluing into with Dr. Walker's work. It doesn't feel like it has the tone that can only be achieved with appropriate clinical representation. It seems to collapse all of humanity into one bucket and tells them all what they should be doing with sleep. But in that short description, Dr. Martin hinted at least four buckets.

Dr. John Berardi:

First, people who require seven to nine hours of sleep a night and get it. Second, people who require seven to nine hours of sleep a night and don't get it by choice. Third, people who require seven to nine hours of sleep a night, and don't get it because of a clinical sleep disorder. And last, people who maybe because of a genetic predisposition, simply don't require that much sleep, I asked her to talk more about that last group.

Dr. Jennifer Martin:

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So now, full disclosure, this is the John Martin theory, I think that being a biologically short sleeper increases your risk for developing chronic insomnia. So let's just imagine that you're a person who only needs six hours of sleep, and you marry somebody who's average, and needs seven and a half hours of sleep. So you get into bed together at night, and you sit there, and you wonder why you're not sleeping for an hour. So, over time, I think that the person who's the short sleeper is more likely to develop bad habits and anxiety around sleep. So, for that individual, it could be that that genetic short sleep is a risk factor.

Dr. Jennifer Martin:

On the other hand, sometimes that person who's a genetic short sleeper gets a heck of a lot more done, and is just fine with it, and they figure this out about themselves and they go on and nothing happens to them. I've had a few of these patients over the years, and they go to bed at midnight, they get up at 5:00, life is fine. The only reason they usually come to see me is because someone that they have in their household told them there's something wrong. But more typically these people, we don't even talk to.

Dr. John Berardi:

Yet I can feel her reticence to sanction to even talk about this sort of thing.

Dr. Jennifer Martin:

Now, I have colleagues who try to study this genetically, and what they do is they say, "Hey, we want to talk to people who only need six hours of sleep or less." Then they bring them into the sleep lab. And they see how long they sleep. The vast majority of them, once you take away all of the external stimulation, sleep a lot more than six hours. The perception that you can get by on six hours of sleep, for example, is not the same as only needing six hours of sleep.

Dr. John Berardi:

The group she thinks needs to hear Dr. Walker's message the most is the group of people voluntarily restricting sleep.

Dr. Jennifer Martin:

I think though, that there is something to be said for sounding the alarm. If we think about a third of American adults get less than seven hours of sleep, and let's even assume that half of those individuals don't need more than they get. That still means somewhere around 15% of the population is voluntarily shortening their sleep.

Dr. John Berardi:

Again, whether it's because they feel busy, because they feel like taking time out for sleep interferes with productivity, or simply because, Netflix.

Dr. Jennifer Martin:

The CEO of one of our favorite streaming services, bragged a few years ago, that they're competing with sleep and [inaudible 00:48:22]

Dr. John Berardi:

Whatever the reason, those folks aren't sleeping enough.

Dr. Jennifer Martin:

The one thing we know for sure is, when you don't get enough sleep, you're sleepy. That's clear. And one of our founders of the field would famously say, "Sleep is important because it's the only cure for being sleepy." I'm paraphrasing, but sleepiness we know can be dangerous for people. The last point I want to make is that, I'm a

psychologist, and this scared straight message is not super effective for most people. So I think that if our goal is to try to get people to take better care of their sleep as an important part of health, scaring them with the negative consequences is unlikely to lead to sustainable behavior change.

Dr. Jennifer Martin:

People will make sustainable behavior change if they realize benefit from making the change. So, I'm of the opinion that we also should be touting the good things that happen when people sleep well.

Dr. John Berardi:

Despite the fact that a lot of this episode has focused on the criticisms of Dr. Walker's work, it is, after all a series about criticism. I think it's important to point out that we're not talking about the same kind of thing as in the [DR. Wans ink's 00:49:44] story in part one. Again, the Wansink's story suggests a long history of either intentionally fraudulent scientific misconduct, or unforgivably incompetence. He broke a lot of rules written and unwritten to further a problematic agenda. Walker's story to me feels more like borderline behavior. Maybe part of the reason I feel this way is how they both responded to being called out.

Dr. John Berardi:

Now, Dr. Wansink, clawed and scratched and evaded and blamed. Some of the papers he had retracted, he tried to "fix." Resubmitted them for publication, got them published and then had them retracted again for more bad science. One can't help but feel an oozing unrepentant stare. But Dr. Walker, he put up a public post patiently addressing the issues brought up by his critics. He appeared on podcasts issuing apologies for what he thought were mistakes. He updated his book releasing a second edition, addressing at least some of the issues brought up by Alexey and others.

Dr. John Berardi:

This paragraph is currently on the book page of his website. Since publication of the first edition, thoughtful questions and criticisms have been raised regarding the book, including a number of errors that required revision. As an essential part of what I see to be good scholarly conduct, I have written a detailed blog post that addresses these questions and issues in depth. I further discuss these issues in a recent podcast. Finally, I have made a full set of corrections to the book published in a second edition, which is now out in print.

Dr. John Berardi:

So he appeared to be acting in good faith, he seemed appalled by his mistakes, it felt like he wanted to do better. But Alexey isn't convinced that the problem has been or even can be resolved.

Alexey Guzey:

Yes, sort of did not expect the second edition to be much better to be honest, because he did also write a response to my essay on his site and I believe that the response is just really, really bad. He attacked a bunch of claims that I did not make. He never really addressed any of the important points that I make. He never really addressed the issue of the fake data. Maybe he'll add a bunch of qualifiers that, "Oh, yes, you do not necessarily need to sleep eight hours, maybe you should sleep seven hours." And he will remove this claim about the doubling of risk of cancer.

Dr. John Berardi:

But Alexey says the problem is that as long as Dr. Walker sees himself as "the sleep diplomat" which is the name of his website, he can't be counted on to be objective.

Alexey Guzey:

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My impression is that he is not deliberately trying to just lie to people, my impression is that, Walker actually thinks that sleep is really, really important. I think that what he wrote in the book is probably what he actually believes. It's just that his beliefs are not very rigorous, because he's so excited about sleep. His handle on Twitter, I believe, @sleepdiplomat, so he sees himself as this person who is sent to us to educate us about the importance of sleep essentially, and once you are in this role, then it's very easy to be overexcited and to maybe pay a little bit less attention to the claims that run counter to what you believe and to pay more attention to what you do believe.

Dr. John Berardi:

Case in point, Dr. John Ioannidis. You may recall I mentioned him earlier for his work in meta science. In a 2020 issue of Wired magazine, David Friedman called him a prophet of scientific rigor. Indeed, callers of BS worldwide have lionized him for years for his work in error detection. For his frank and fearless criticism of others work, yet even someone renowned for making us aware of our biases isn't free from them. He recently published a rash of highly criticized papers, full of poor methodologies, and frankly bias. This time instead of calling others out, he's the one being called out.

Dr. John Berardi:

In the wake of this criticism, he's behaved just about as badly as one can. He doubled down on his crumbling assertions. He launched counter attacks in the media, and even went so far as to publish a paper seemingly designed to insult and humiliate a particular PhD student who dared criticize him. He's proved his point in the most powerful ways that, "Yes, we are all subject to bias, even our most strident BS detectors." He's also reminded us that the more attached to an agenda we are the worse our bias. Which brings us back to Dr. Walker for someone on a mission to, "make you fall in love with sleep." How objective could he be?

Dr. John Berardi:

What's interesting, though, is that Dr. Walker is asked to walk between two worlds, the world of an ardent pro sleep activist and the world of an objective sleep scientist. And certainly one can't do both at the same time, which raises the question of whether his book or any popular science book for that matter, designed to inspire positive health decisions should be subjected to the same level of scientific rigor as scientific work.

Alexey Guzey:

It is true that this book is not directed solely at academics, but I think I would pretty fundamentally disagree with this critic.

Dr. John Berardi:

Here he means the idea that his criticism of Dr. Walker's book is pedantic, that he's criticizing it as if it were a scientific work, which is a standard too high for pop science.

Alexey Guzey:

They have five big points that they make in the main part of the essay are actually important. They are of the sort, what is the relationship between sleep and mortality? What is the relationship between sleep and cancer? What is the relationship between sleep and depression? But specifically regarding whether it's appropriate to apply the level of figure that I'm applying to the book Walker himself writes, and I'm quoting him, "This book is intended to serve as a scientifically accurate intervention." He not only writes this, but then he cites the book in his academic papers. And I believe serves as an encouragement to other researchers to cite the book in academic publications. So, at the end of the day, the book has been cited a couple of 100 times in the scientific publications.

Alexey Guzey:

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It does seem to me that he is in fact claiming that this book is scientifically accurate, and he is in fact showing to us that it adheres to the standards of evidence that are accepted in science and that the book should be relied on scientific evidence. It does seem to me that it is very much fair to assess the book, as if it were written to be scientifically rigorous.

Dr. John Berardi:

Dr. Heathers wonders though, if it may be even more important for popular science to stick closely to what we actually know versus steer off into conjecture.

Dr. James Heathers:

These things have cut through.

Dr. John Berardi:

Here he means books on sleep and nutrition and other health related topics.

Dr. James Heathers:

Because they're addressing ideas that directly affect people, people are trying to take care of themselves, and it comes with a certain sense of attention to detail and a certain component anxiety when it comes to competing sources of information.

Dr. John Berardi:

So, when paying attention to scientific detail is called pedantic.

Dr. James Heathers:

I would not so much push back against that, as push that idea into a corner and flame thrower. What other field of human endeavor invites more attention to detail than getting facts about the world right? At what point in time do you better define the argument and the quality of thought that someone's coming at you with than when they're trying to assemble big blocks about how you're supposed to live your life based on all the empirical evidence we have on the topic? That is the time for pedantry. I mean, if you've ever written an email to someone about something completely inconsequential, "Where are we going drinking on Saturday night? What did you think of the play we saw on Tuesday?"

Dr. James Heathers:

And someone writes back correcting your grammatical mistakes, that's annoying pedantry. But does your book that tells people how to live, that sold millions of copies contain errors? And do those errors fit a pattern? And have you checked all the actual references? That's just normal editorial behavior combined with normal scientific diligence. If people aren't used to it, or they don't think it's appropriate, that's their problem. It's normal. That is from our world. There are places where you're supposed to pay attention to detail when you build a space shuttle. When you design an MRI machine, when you hand out $1.7 trillion in infrastructure funding. These are the points in time where we want a little bit of pedantry.

Dr. John Berardi:

Dr. Martin, though, urges us to remember that sometimes in the absence of definitive data, we have to make a best guess.

Dr. Jennifer Martin:

Scientific integrity has to be at the core of all of this. Right? I think the debate that we were discussing earlier is not around the science itself, it's around the interpretation of the science.

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Dr. John Berardi:

Which is what much of popular science is. A best guess at what to do with the results someone found in a lab.

Dr. Jennifer Martin:

I know that a lot of Dr. Guzey's criticisms were related to how the science was presented in a simplified fashion. But unless you're talking to other scientists, I think some of that is by necessity. Having read the book beforehand, I thought that Matt did a nice job with trying to make some really complicated issues digestible for the average person. Then when I think about debates like this in general, I think what is each person trying to accomplish? I think that, Matt Walker is passionate about sleep as am I, I think it's something that has been overlooked and underappreciated for generations really, in terms of how people live their lives and stay healthy.

Dr. Jennifer Martin:

So I try to understand what the point is of the criticism. To be quite honest, I'm not sure I know what the point is. The point that sleep really isn't that big of a deal, and we should stop worrying about it, because I have a hard time with that. I also think that sometimes scientists get stuck in needing to find the perfect answer when the good answer would have a big public health impact. Most people don't argue with the recommendation to eat five servings of fruits and vegetables a day. Now imagine if instead of saying that the CDC wrung their hands and said, "What if four is enough? What if you really need six?" What should we do? You know what? We have no idea how many fruits and vegetables people should eat, so we're not going to say anything about it.

Dr. Jennifer Martin:

We've been okay with this approach in other areas of science. Right? Exercise three times a week, 30 minutes a day, does it really matter? Let's just take our best guess and try to get people to live healthier lives. So, I feel like that's where sleep science is right now. We know that there's about a third of the population that get less than seven hours, we know that that third of the population disproportionately suffers from negative health consequences. We have some experimental data to suggest there's a biologically plausible explanation that has to do with sleep. Let's talk about it. Let's encourage people to do it.

Dr. John Berardi:

It's this feeling that Dr. Walker is fighting the good fight. That's sure, he's not perfect, none of us are. But he's a passionate, compelling champion of sleep. That seems to offer him some degree of protection from criticism. And it's the same feeling that leads folks to question Alexey's motives. After all, "What kind of lowlife would attack a superhero dedicated to helping people live better, healthier lives?" One sentiment that came up often as I prepared this series was this one. "Aren't we just throwing out the baby with the bathwater here?" In other words by criticizing Dr. Walker's work, aren't we throwing out his good message by highlighting his mistakes? The answer, of course, depends on what you see as baby and what you see as bathwater.

Dr. John Berardi:

If you're a sleep advocate, a health and fitness champion, someone who wants people to sleep more than the baby, the important piece is getting that message out, and you won't want that thrown out just because there were some exaggerations or inaccuracies along the way. But if you're asleep scientists, scientific accuracy maximalist, someone who believes the only way we can know whether sleep is important or not, is with good data, then the baby, the important piece is sticking to the evidence, and you won't want that thrown out just because someone thought the best way to get people to sleep was to lie.

Dr. John Berardi:

So, when someone like Dr. Greg Potter, whose dissertation work at the University of Leeds, focused on sleep and metabolic health said the following. "I do think there are various inaccuracies in it, and I think Guzey points those out effectively. I think that the reality is that a lot of people who have read the book will have done things to attend to their sleep hygiene, and made some changes in their lifestyles, which now support their ability to get better sleep. My guess is the book probably had a net positive impact." He was telling us that the ends, positive impactful message justifies the means, that inaccuracy is, that the baby was Dr. Walker's advocacy.

Dr. John Berardi:

When Guzey and Gelman write in their 2020 paper, if getting a lot of sleep is so important, why are so many lies needed for people to pay attention to it. They were telling us that the means are important too, that the baby is scientific accuracy. One thing that came up a lot, Dr. Martin even brought this up a few minutes ago is that since Alexey was criticizing Dr. Walker in his book, and since Dr. Walker believes sleep is very, very important than Alexey is trying to suggest that sleep isn't important.

Alexey Guzey:

A lot of the responses I got were, "But sleep is so important." On the one hand, it seems clearly obvious that sleep is very important. If you don't sleep for three nights, you go mad or something, become completely dysfunctional. When Walker chooses the position, so the defender of sleep, so when I critique him, people view me automatically as the attacker of sleep, and the attacker of the value. So they automatically assume, "Oh, so he says that sleep is not important."

Dr. John Berardi:

That's not what he's saying, but again, I get that kind of critique. If you think the baby is the sleep message, that the message is what's at stake here, then you'd see Alexey as attacking the important thing, but Dr. Heathers thinks there's more at stake.

Dr. James Heathers:

Science can be very, very messy. And unfortunately, the things that people are most interested in, a lot of the time are the messiest of all. Part of me just groans inside when someone does another nutrition or an exercise RCT, because there's a point past which investigating really complicate the topics that start out with kind of cells and biochemistry, and they go all the way up to macro patterns of behavior, where there's an unknowability that starts to creep in, there's a control that you can't have over certain factors. As you're well aware, considering what you've done with your life, the vast majority of the time, you're dealing with this continual ecological fallacy of what happens with 1200 people in a controlled experiment with bad tools versus what happens with [Susan 01:07:12]

Dr. John Berardi:

And it's in this messiness, Dr. Martin says, we need to find a way forward.

Dr. Jennifer Martin:

I read Matt Walker's book before it was criticized, and my initial take on it was that he did a pretty impressive job at trying to make some difficult science accessible to the lay person. So I was pretty impressed with the task that he took on in writing a book like that. A lot of what scientists do is hard to digest. And now I'm going to have a soapbox moment. So I'm warning you. If we had better science education in the United States, and when I said things like statistically significant, the average consumer knew that that met 95% certainty that my finding is real, then we can talk about all these little details.

Dr. Jennifer Martin:

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If my goal is to try to help people think about sleep as an important part of staying healthy, and I spend 100 pages first explaining to them what statistical significance means, and what a histogram represents, and what are standard error bars, I've lost them.

Dr. John Berardi:

Again, though, for the scientific purist, this is inadequate.

Alexey Guzey:

The other reason they disliked this criticism is that, it does seem to me very possible to be both rigorous and accessible. So my essay that we're discussing right now, I tried to make it very accessible. I like to believe that I succeeded it, it seems to me that it managed to both be very rigorous and explain to us what we do know, what we don't know, and to both create some sort of a narrative that's exciting to read, but at the same time, not dilute the level of scientific rigor.

Alexey Guzey:

It seems to me to essentially be a cop out when people say, but it's intended to be a pop science book, because pop science can be both engaging, and interesting and rigorous at the same time. Maybe it's more difficult to write such books. But well, a lot of the things that are worth doing are difficult and also the things that are not worth doing are very easy.

Dr. John Berardi:

Okay, so this is where we're going to end part two of this three part series. In part one, we learned about a fringe area of science designed to Call BS on poorly done research in the interest of having it corrected or removed. Here in part two, we moved from published science to popular science, talking about Dr. Matthew Walker's sleep book, Alexey Guzey's criticism of it and how a leading sleep researcher Dr. Jennifer Martin thinks both about the book and its critics.

Dr. John Berardi:

Before moving on, I should mention that, we did invite Dr. Walker to come on this show to share his perspective several times in several ways, but sadly, he declined. With that said, I still hope he'll come back for the next and final part of this series in which we meet a BS detector who targets not scientific source material and not popular science books, but the dissemination of popular science in places like for example, Joe Rogan's podcast, we'll hear about his criticism of two prominent appearances on that show, and we'll even hear back from one of those guests.

Dr. John Berardi:

But before we end, I need to tell you about a little contest we're running with our two sponsors, Precision Nutrition and Change Maker Academy. There are $15,000 in prizes up for grabs, and all you have to do to enter it's really simple, is to subscribe to the show wherever you listen to podcasts, and take a screenshot of that subscription. Next, rate and review the show, positive, negative or neutral on either Apple podcasts, if you use an Apple device, or on something like Castbox or Podchaser if you don't, then take a screenshot of that. Once you have those two screenshots, email them to us at reviews@drjohnberardishow.com.

Dr. John Berardi:

Make sure you spell it D-R-JohnBerardishow rather than D-O-C-T-O-R, and you're done. Like I said, really simple. From there, just before the release of our next show, we'll randomly select three winners who get to choose from among 15,000 in prizes, including a spot in the Precision Nutrition Level 1 Certification Program or the Precision Nutrition Level 2 Certification Program, or Precision Nutrition Coaching. Winners get to choose which one they want. Winners also get

to choose one of the following, the copy of my book, Change Maker, or up to $75 in Precision Nutrition apparel. Finally, winners also get a spot in Change Maker Academy's new course, The Career Blueprint.

Dr. John Berardi:

So, why a contest? Well, when podcasts get a lot of ratings, reviews and subscribers, they have a chance of living a long happy, productive life. It's just the way the algorithms work, but without subscribers, ratings and reviews, a podcast toils in obscurity. So again, for a chance to get some really great stuff from our sponsors, while doing us a solid, please get to subscribing, rating, reviewing and sending us those screenshots. Oh, and if you previously subscribed, rated and reviewed, you can send us your screenshots too, we'll include you in the contest as well. Can't wait to find out who wins.

Dr. John Berardi:

Before signing off, I'll like to thank our production team, Marjorie Korn, my research partner and co-writer on the show, Martin DeSouza, our producer, Dylan Groff, who edited and sound designed this episode, and thanks to you for listening.