

Dan Pardi, PhD

The Human Operating System & Developing a Philosophy for Health



Episode 131



Danny Lennon:

Hello and welcome. My name is Danny Lennon and you are listening to Episode 131 of Sigma Nutrition Radio, the podcast that gives you access to weekly discussions with the world's leaders in evidence-based nutrition, health and performance research. Today I'm delighted to have one of my favorite people in this space back on the show, Dan Pardi. Dan is an entrepreneur. He's a researcher whose life's work is centered around how to facilitate health behaviors in others. He's developed something called the loop model to sustain health behaviors, which aims to help people live a healthy lifestyle in the modern world. And he also does a ton of research within the psychiatry and behavioral sciences department at Stanford University as well as the departments of neurology and endocrinology at Leiden University in the Netherlands and has done a lot of his work centered around sleep and how sleep affects our decision-making, particularly as that relates to decision-making with food choices.

And Dan was previously on the show way back in maybe Episode 31, I think, something around that time, and gave an absolute masterclass on all the intricacies and details of sleep and sleep research. So if you are interested in that area and you want to know all the details about research directly from a researcher in the area, check out that previous episode with Dan, which I'll link to in the show notes.

Dan has more recently developed the humanOS platform, which I want to particularly dig into today. Essentially, it combines educational courses with practical tools to track health behaviors and to make more informed decisions, and I'll let Dan explain it in more detail himself. And I think it draws particularly from a lot of work that not only Dan has done but then getting input from the world's leading—like when I mean leading, the top researchers in very specific fields, and so gets information that's the most accurate representation of what the body of evidence says as opposed to someone who's piecing something together you're not really sure of. So it really is a phenomenal platform that he's put together and I do want to get into that on today's show with him.

The show notes to this episode are going to be at SigmaNutrition.com/episode131, and I will link up to anything we might mention today. There will also be a place to get a transcript if you want to do that and a bit more about Dan's background as well. So let's get down onto the show and get into Episode 131.

Dan Pardi, welcome back to the show. How are you doing, my friend?

Dan Pardi: My God, thank you so much for having me back. It's really, really great to be here.

Danny Lennon: It's a long time coming because I've had so many people asking me when Dan Pardi is coming back after the last epic episode you were on, so finally we've got that sorted for people. And you've got lots of stuff going on which I really want to dive into and in a minute I want to ask you about humanOS and all that's about, but first, before we get to any of that stuff, just for those listeners who are maybe unfamiliar with your work, can we just get them up-to-date on you and the work you do and what the CliffsNotes of your background?

Dan Pardi: Absolutely, and you know, Danny, I've told you this but I'm going to tell your audience too that your show has been my favorite that I've been on, so I was excited to come back to have another chat with you. So thank you.

Danny Lennon: Yeah. That means a lot. Thank you, Dan.

Dan Pardi: Yeah. Well, kudos to you. So, yeah. So I am a health researcher and I also have an entrepreneurial bug in me, so I kind of have this insatiable need to try to design frameworks to take lots of pieces of information that can be overwhelming and to then kind of simplify it or turn it into some sort of

tool that people can utilize to reap maximal benefit from new knowledge. And how I got into it, into health in general, is that I was into sports when I was younger, I got an injury, and I think from an early age it made me have an interesting insight into the body because I wanted to fix myself, and so made me want to read and made me want to understand the body. And I think that was like almost the initiation point for me. In college, I didn't know what I wanted to do but I got two...double major, double minor, all related to exercise science and sports medicine, did a master's degree in exercise physiology from Florida State University where I wanted to go study exercise phys and also sports nutrition, and as I went on in my career I learned that I really liked understanding not necessarily—I think I had a preference for understanding the physiology, how it worked, over application, at least at that point.

And so at that time I was looking at—leptin was just discovered, mid-nineties, and the professor that I was working for was looking at how leptin would regulate blood pressure. So that kind of got me interested in understanding energy homeostasis and how was energy balanced and fat levels controlled in the body. And then, when I was done there, I went on to do work at a place called the Preventive Medicine Research Institute, which is Dean Ornish's institute in Sausalito, and regardless of how you feel about his dietary approach what I really liked is that he was looking at a multifactorial approach to address conditions. So instead of saying, "Okay, we're just going to modify your selenium levels," he was saying, "Let's try to modify the internal hormonal milieu. What's happening inside of your body and what are all the different levers we can adjust or pull, that you can pull, if we teach you?" so stress management, interpersonal communication with your spouse, diet, exercise, all this. And we had 180 prostate cancer patients come once a week for a seven-hour intervention, and in that intervention they would split up into little groups and they would go from to exercise physiologist to nutrition to cooking classes, and at the end we'd all have—every week we had a big meal together and people would get up and make speeches and talk about their life, and it was emotional and it was just really great research to be part of.

After that, I worked in bioinformatics for a little while and then finally made it into the pharmaceutical industry, where I stumbled into a company that had a drug for sleep and I fell in love with sleep, is how I'd put it. It was pretty kind of an instantaneous thing. I don't know if I called it this immediately but I recognized that understanding sleep was like a window into how the body works in general, whether you're looking at the

regulation of your immune system to how the brain functions to even kind of how things are coordinated and timed, all physiological processes. So I ran a couple of functions at the company for a while, research grants and scientific publications, and the research grant component in particular was amazing because I got to interact with the top sleep specialists, sleep scientists in the world on a daily basis. So I would talk to them about the research, I would talk to them about projects that we were doing, and that just deepened my knowledge, my network.

And then in 2010, I left to do a PhD. It's something I'd always wanted to do but my kind of career got in the way, so I had an opportunity to go back and I basically started two things at the same time. I always wanted to get back to doing lifestyle research and at the same time I wanted to then develop a tool that kind of helped people put...a big part of my function in the department was to build out the function and the framework and how to receive grants and how to...the process by which we would evaluate publications and contribute...sometimes just at least understand what was out there and then sometimes coauthor with different thought leaders. And so it got me into a systems-level thinking and that's just been really compelling to me for a long time, is trying to think about big challenges as big puzzles. So I developed a behavior model and worked with some people much more knowledgeable than myself in behavior to do this, but what I did is I deconstructed a variety of different behavior models, popular, famous ones, and then I kind of reconstructed one from what I thought were the most valid, impactful components of them, which you can look at the literature to assess that. But the idea is then, can you leverage different elements of behavior into a system where you're kind of...you have these discrete aspects that are influencing you and can you then create a tool that is kind of not just looking at one source of motivation or one sort of behavior technique but all the ones that can help and create a seamless user experience from that. And that's been my mission.

In parallel, I've been doing research looking at how sleep influences decision-making particularly related to eating, and I do that at Stanford and also at Leiden in the Netherlands. And then I've been building, first, the behavior model, which turned into Dan's Plan, kind of the beta tool, and soon to launch is humanOS, which is really closer to the full version of operationalizing the model, that loop model that I developed. It's a beautiful tool. I can't wait to release it to the world. But yeah, that's not

really the CliffsNotes, I guess. [Chuckles] That's a little longer. But yeah, that's me.

Danny Lennon: I think it really gives a lot of context to where we're coming from here, and I think the whole focus of building really a systems approach with behaviors at the core of that is so important because it's talked about quite a lot within the areas of health and how do we make a change within, not in yourselves, but within other people in particular. But I still think within that people don't really have a framework with which to do it, so let's talk about humanOS, and first just tell me a bit about this name because it's absolutely awesome. What does that term humanOS encapsulate to you as the kind of thesis or philosophy behind that kind of name?

Dan Pardi: Yeah, thank you. I really like the name too. Part of what I've always wanted to do is to work with other experts, so it's not like, "Hey, here's Dan, he's the expert in everything. It's not at all. It's more, "How do we build this platform for others to leverage their expertise on a variety of subjects ultimately to help the end user? And so that's been a big goal of mine. HumanOS came about as this idea of an—OS stands for operating system, so iOS like for iPhone, and operating system is the framework, right? And so my kind of the general thesis that I work under is that we need help to be healthy today because the default patterns that are facilitated by normalcy or what's typical around you will predictably lead to chronic health issues and immediate performance issues today and tomorrow, so long-term consequences and even short-term consequences. And one example, simple is sitting inside all day and then getting a lot of artificial light at night. Really not good for your circadian system, right? So we need to have education to understand what are the things that are important and what influences them. We need ways then and tools to then kind of simplify making it easier for a person to do day by day. Then, we also know that if you track an element of a behavior, then getting objective feedback on...and setting clear goals will vastly increase your ability to achieve those goals. And this is some work from Albert Bandura from Stanford, who is the fourth most cited psychologist of the 20th century. So this is really strongly backed work.

Danny Lennon: I was just going to jump in there when you mentioned around this idea of what is normalcy now and I think that's something that is actually quite profound for people to realize within that statement because when we—I mean, on this show before we've discussed a number of things around easy availability of hyperpalatable calorie-dense food, the common habits that lead to sleep restriction, which we've talked about before, things like

people's work hours or the Internet and Netflix and smartphones, all this type of stuff; the other thing of almost the complete absence of most people needing to move during the day, like it's completely "normal" now to see someone who maybe gets up in the morning, drives to work, sits at a desk all day, drives home, watches a couple of hours of TV in the evening, and goes to bed. And within that whole thing ties back to what you said about no exposure to, say, natural sunlight, so we have all these things within a modern world where it's probably now at a point where we can say for many people or maybe for nearly all of us the easy setting or the default setting that could be easy to fall into is almost an unhealthy one and that to be healthy is actually something that is actually reserved for people who actually have to consciously act on that, and subconscious actions lead us to a default of unhealthfulness almost just before of that environment.

Dan Pardi: I couldn't have said it better myself. I couldn't have written it better myself because when I—[chuckles] what I mean by that is to say you just said I probably have to write it versus be able to just draw, you know, conjure that up on the fly.

Danny Lennon: [Chuckles]

Dan Pardi: But that's exactly where I'm coming from and the thesis is that there's a mismatch and we have a lot of mismatch between our evolutionary past, the forces that shaped our genes and the expectancies of our genes. And sometimes we think of like things like exercise as health-boosting, like, "Oh, I'm healthy, but if I do exercise it kind of will boost my health." I think there are a lot of aspects of our health that are absolutely dependent on environmental stimulation and behavior. And so it's not like a "nice to have," it's a "need to have," and it's almost amazing that our bodies do as well as they do with how much we've changed. We talk about, "Wow, we're getting these chronic diseases so much earlier in life." It amazingly lasts so long without the right sort of stimulation. But, a lot of these things are things you can do something about.

I think about knowledge. How much information do you need to have in order to do the right thing? And you could absolutely do the right thing without information. I kind of envision like a teenager who surfs. They get up early with the sun and they're outside getting a lot of sunshine, a lot of physical activity, low stress. Let's say their mom makes them food and she's in the—they eat well, right? And this person might do all the right things and not have any of the knowledge about why they should do it. On

the other hand, you could have a professor who—I know quite a few people like this—who have a great amount of knowledge on a subject, arguably as much or more than anybody in the world, and yet they don't do the behaviors that the knowledge would suggest that they should. And so there's no protection by knowledge alone, but we all don't have the luxury of living like a teenager who's near the beach. And so if your actual environment is telling you to go to work, work at a computer, sit inside all day, the knowledge actually helps to kind of embolden you making decisions that are contrary to those around you to serve as a good steward of your own health, and I think that that's why a certain amount of knowledge is necessary.

There's a bit of a trend in the industry of like, “Hey, if we just can create the right tool, then health will be solved.” Mindset will be always be better than the tools, right? You have to facilitate the right mindset to approach life and the tools can then augment it and fine-tune it and support it. But without the mindset, then what happens is you look at a Fitbit and it runs out of battery and you see recharging it as just friction. If you see it as a cancer-preventing tool or a cardiovascular-disease-preventing tool or one of these extraordinarily important things, then the friction of recharging your battery or wearing it de minimis. It's not significant.

And so on one end of the spectrum, just trying to reduce the friction to nothing is actually not the solution. It's actually making people more resilient, tougher and having a clear path. And so tools alone are not I think the answer and neither is knowledge alone, because if you look at the industry there's kind of a divide in the middle. You've got the person who writes the book about paleo and then this is my perspective about why it's important, and the next thing that they do is write a cookbook. So that's the, why is it important and then how do I do it, right? That's kind of like the sequence. But then it stops there. That's kind of the end of behavior and what that leads to is like the endless machinations of like, “Well, let's talk about this one aspect again and let's fuss over the minutiae.” Those conversations can be very important for some to have but what's happening is that is getting in the way of a lot of normal people that don't have health as a career for them making clear and healthy choices, and I know that you agree with that wholeheartedly.

Danny Lennon:

Yeah, I think this is a really important topic because it's actually something I've been trying to think about lately, and often we can get a bit conflicted over as well, because I as well as many others talk about this importance of the educational piece for folks who want to improve their

health and that having some understanding goes a long way to actually initiating or creating that healthier lifestyle because I just think so often people are actually just unaware of how some of their behaviors actually do compromise health. But then, where I get kind of conflicted about is exactly what you just mentioned, Dan, because in order to help a mass population or a large body of people who aren't in this realm of finding health and nutrition as interesting as we do, I just wonder how reasonable it is sometimes to expect that simply knowing a bit more will actually translate to implementation of daily actions that will actually change your life. So like in a very practical real-world level, like is there a better way to approach people getting living healthier than simply saying, “Oh, it's just an educational thing that if we put out this good information and tell people, “If you do this, you will be unhealthy. If you do this, you will be healthier?” Like just doing that is unlikely to yield a result, which I think is the exact point you're getting at, which is I think why I was so excited to see what you've got going on with humanOS where, I think I mentioned to you off the air, where you have not only the behavior and very practical and tool-based approach that people can use to very effectively put in habits but the educational piece that both backs it up and informs those choices as well.

Dan Pardi:

Yeah, thank you, and I'll tell you that it remains a very difficult challenge. So the model that I've created is a template to facilitate long-term behavior modification, but it's also there's a lot of different personalities; people need different things. Like some people will have expert-level interest in a subject and they'll want to go deeper on it, and what you tend to find out the further you kind of dive into a subject is that the ideas are even more expansive. It doesn't get smaller, it gets bigger the more that you understand about it. So really good behavior action is to facilitate clarity, like, “Hey, do this.” And that's why some authoritative figures that are controversial because they have undue certainty about what they should do can have a large following, because it's satisfying to have someone that's like, “This is how it is. Do this.”

And then you've got—confidence, throughout history, whatever subject we're talking about, when somebody comes along and has extreme confidence, they usually develop followers. Like, “Hey, I know what to do.” And that's a fine balance of being a scientist but not getting lost, and so being kind of accurate and being able to pass the red face test, right? And there are some things where you can feel confident to say, “I think you should do this,” and so we try to do that with our courses. What are

the actions that we feel good about promoting with full rights to be able to modify those but saying, “Hey, do this?” And sometimes it actually means the action that we derive from assessing the literature is non-action. It's like, “This is really interesting but we're just really not at the place for you to prioritize this health behavior over others, so why don't you just put that on the shelf for a little bit and focus on these?” It's just a fun and interesting puzzle.

Danny Lennon: I think that's really important and I just want to pull back on it because I think it's something that people shouldn't gloss over, and it kind of ties back to something you had previously said to me about the people are involved within this whole project who are researchers within that specific field they're discussing who have the ability to look at the overall evidence base, and it's something we've talked about quite a bit on this podcast of looking at the overall body of literature to make decisions instead of this idea where some people can give the impression online that they're “science-based” when really all they're doing is picking a couple of things to back up a certain point.

Dan Pardi: Yeah.

Danny Lennon: And that really just I think adds to the confusion, and we see this all the time now of like there are people that will come to me and you see these people online all the time where they don't have just a normal set, say, routine for a general activity. They're not getting outside regularly in natural light, they're not eating just a decent diet, but yet they're worrying about very specific things like how to eat to maximize the gut microbiome or something they've heard somewhere which we don't have like the exact answers on yet but there's so much low-hanging fruit that they haven't tapped into.

Dan Pardi: Yeah, and so I call that trend-hopping and you see a huge amount of it where you do care—I think more people care than don't care—but it's overwhelming or it appears so and you do what your friends are doing or the last thing that you read, and then things get popular and that's not the best way to be a steward of your health. The other idea that health is overwhelming and it's such a massive topic, when you actually kind of orchestrate a system, what you find is that every piece of new information that you learn right, if you learn it the right way, then it's reinforcing to kind of a greater archetype of like what we're actually...what you see...you start to see the whole animal versus just trying to figure out what

the animal is from like feeling the leg, you know? And that's really important.

So you have, a lot of what we do, I use kind of a concept of a northern star, an orchestrating principle, which for me goes back to kind of this concept of mismatch and can we live a more natural existence but in the context of real-world realities, right, sitting at a desk, etc. So that has to do with all your behaviors, but if you can see yourself as this person who's trying to live in a certain way versus somebody who's just like immediately like taking a probiotic, then a lot of it—all the behaviors start to make sense together and, in fact, the overall behavior makes more sense the more things you do. It doesn't get more confusing.

Danny Lennon: It kind of mirrors something that people are probably mentioning on recent episodes, this idea of principles versus methods, so instead of looking for one specific method or the new way to eat or the new diet, looking at the overall guiding principles that all successful nutrition approaches adhere to and anything we do with our lifestyle and being healthy in general, what kind of principles to go by, as opposed to a very specific method that everyone must follow.

And just one more kind of on the idea of what is needed to be healthy, I know you've been kind of thinking along these lines and on a deeper level, and I think one of the terms you mentioned in some of our email discussions was this idea of the philosophy of health – what sort of thoughts have been circulating your mind on this stuff of what actually it is to be healthy and this kind of philosophical approach to it?

Dan Pardi: You know, a lot of what we're discussing already is in line with kind of—this is I think philosophy, like how much knowledge is needed. There's one concept that has been interesting for me, which is this explore-exploit concept which there's a book by Brian Christian and Tom Griffiths, who wrote the Computer Science of Human Decisions and they were looking at computer science techniques to kind of guide how we make decisions today, and so this idea of explore-exploit is in reference to what we're just talking about. So explore is the idea of you're always kind of searching. You stay in search mode. You're trying to find the new thing. Exploit has a negative connotation but in computer science just means maximizing the utility of available resources to you. And so a good example of this is when you're a child, you crawl around your house and you literally put everything in your mouth, but maybe that's a good behavior because if you figure out like something that is really good for you to put in your mouth,

you have a lifetime to maximize the benefit of that thing that you like. Whereas when you're an older person, there's some research at Stanford that's kind of rethinking like the decisions that older people make, like they tend to narrow their choices, "I like to eat the same thing every day and I even cut friends out of my life." And what this Stanford researcher's name is, I forget her name, she's saying, well, actually that makes a ton of sense because let's say you discover something new, you have less time to necessarily reap the gains from that, so it actually makes sense for you to exploit what you know. Go to the restaurant so you know you love the food.

And so, how does that relate back to kind of health? I think some people get into that, it's part of that trend-hopping idea where we, instead of doing one really good diet and sticking with it, you tend to be all over the map, all over the place. And I think for a little while that's actually not a bad idea. Regardless of your age, you get in there and you do some self-exploration, but you should also think about, "How do I exploit the known knowledge? And ultimately, is my exploration leading to something that's actually not healthy or am I kind of exploiting what is known well enough and then maybe tinkering with little things here to kind of optimize my own approach?" But I love kind of that philosophical thinking about how to approach this, and I think that we need to—

One other idea that's really come to mind is that you don't want to be in the mindset of like, "Well, let me just learn everything and then I'll do the right thing," but rather to continue to explore, so kind of continuing—keep learning, right? Keep learning, but what we want to avoid is the trend-hopping, what we want to avoid is the feeling of kind of being overwhelmed and everything's so contradictory, and actually kind of learning better ways and then kind of augment that knowledge by like maybe doing again little tests here and there. Do I want to try fasting? Do I want to try taking a probiotic to see if that influences my digestion and how my gut feels? So there are things that you can—I think we should always try to continue to learn and we should always try to do little tests, but try to kind of make that your overall health practice, is not kind of suffering greatly by, like you said, just like trying whatever's popular at the moment but not doing other things that we know are really healthy for you.

Danny Lennon:

Yeah, I think that's an interesting concept of combining the continual learning but with actually taking action and trying things and experimenting with things as you go along because, especially when we

talk about trying to get people to follow certain habits or behaviors, one thing that I think is something I've come across and I've found it to be kind of true in practice as well is that it's very rare that you will provide someone with all the information on a certain topic, discuss why this is going to be beneficial, then they go away and rationalize that and then put it into place. Whereas it's almost often the reverse of someone just tries doing something or they're given a piece of advice by a coach, they do that, they then get a result, and because they've got some sort of result, then in retrospect then they go back and try and see, "Well, why did that work?" and it makes them curious and try and learn more as opposed to trying to learn first and then engage in a new behavior.

Dan Pardi:

Yeah, I think that somebody who is healthy is a learner, not a knower, so it's don't kind of feel like, "I know this," but always be in a mind state of where you are learning. Now, it's okay to feel like, "I have a sense of knowledge that I want to act on," but I think feeling like staying in that learner mindset is a good way to do it.

And what I also recommend to people is to take it one topic at a time and don't try to do everything in a day, in a week. I can't wait to see, what am I going to be doing in 10 years that I'm not doing now given the experiences that I accumulate and the knowledge that I accumulate by staying interested and staying open-minded? There's a really great saying by Marten Dresen, which is to have strong opinions but hold them loosely, right? And that actually I think means that the opinions that you have can help you actually make action but you also are not resistant to new knowledge coming in and modifying how you feel. So it's a pretty cool idea because I think if you just have only loose opinions and they're not very strong, you could end up with sort of like analysis paralysis, a state of inaction. But kind of solidify, like, "Okay, where am I now? Alright, but am I still open?"

If somebody comes in and they let's say offer a piece of knowledge that is contradictory to a current belief system, "Am I going to basically just completely reject it and talk about, oh, that study's not good because it's animal data or it's epidemiological or...?" All studies have limitations. Be open to it. So, "Okay. Oh, that's interesting. I'll consider it," because it might help you tinker and modify how you're doing something. And, ultimately, don't let your kind of belief system be you or who you're serving, right? You're serving you, and if you can make some adjustments, which you should over time, then hopefully you get better at health and not more kind of like entrenched in a less optimal philosophy.

Danny Lennon:

I think it's the idea of sometimes it's easy to get distracted or go down a rabbit hole of a particular area out of interest but then let that pull you back from the kind of bigger picture of things. One thing I actually did mean to ask when we talk about the kind of broader sense of what health is, I know that people often inherently tie diet and exercise to the things that can improve their health, but as we know there's obviously so much more to that – sleeping, one example that people are thankfully starting to understand more and more. Stress is another one. Maybe people aren't as actionable on that right now either, but one thing I think you can also point to people miss out on is the concepts like, say, social interaction. I mean, some of the data on the impact of social isolation, on mortality and chronic illness is kind of mind-blowing in ways. Do you see or what kind of factors do you feel that we know impact health in this kind of broader sense of the term but yet are maybe missed by people or neglected in that conversation around...and instead they always just think of, say, activity and nutrition, but then maybe forget there are so many other pieces that what we do every day can actually affect?

Dan Pardi:

You know, David Spiegel at Stanford, his most famous research when he was there, so he randomized women who were undergoing breast cancer treatment to support groups and, compared to people that were getting the standard treatment without the support groups, the actual benefit that the women that had the support got was significantly different, and it speaks to the idea of kind of going back to that internal hormonal milieu. There are multiple things that affect it. So we have fundamental needs. We have to have positive social experiences. We have to have—and it's actually one of the reasons why Dean Ornish was so interested in working on interpersonal communication between spouses because a typical pattern for men with prostate cancer as they get older, a lot of their social relationships are with people at work. They quit work because they retire and then there's this really incredible sense of isolation, and if you're not the one person that you tend to still have that you're interacting with is your spouse, and if that is a person that you have, like there's a lot of friction because of the way that you're communicating, that can be really, really problematic because it leads to the social isolation process like, you know, the inability to just have positive social experiences on a day-by-day basis. It wasn't irregular that somebody would die within two years after they quit their job and that was probably the accumulation of the day-by-day stress that was building up from lack of social interaction and lack of purpose. And it's a kind of a great concept of PERMA, which is an acronym, and this is, I'll tell you what that means in a moment but it

comes back, it's all part of this positive psychology movement Martin Seligman was a part of.

And positive psychology, there are now departments that are popping up in universities all around the world, but originally psychology was saying, “Okay, what’s happening to the brain when it breaks?” And some work initiated, one of the founders was this guy Mihaly Csikszentmihalyi who wrote the book *Flow and Finding Flow*, and he was looking at the optimization of human performance and happiness over the course of his career, 40 years at University of Chicago, and that kind of gave way to this newer movement and it's looking at, okay, what are the important components that make us happy as people?

And then Martin Seligman wrote the book *Flourish* where he talks about this concept of PERMA, and PERMA is positive social interaction. That's the P. Or, sorry, it's positive emotions. Engagement, and engagement is kind of these work activities that facilitate a sense of flow in you where while you're doing them you just have this incredible—like there's this timelessness to them, and if you have a hobby, regardless of what that is, if that's something that you can't wait to go do and when you're doing it you feel like you're just kind of out of your body in a way, we want that in our life. Meaning, having meaning and purpose in your life, and then also having a sense of accomplishment, so that you are actually a valuable person in this world because you can get stuff done, and hopefully that kind of, you know, the meaning and accomplishment align. So a lot of times older people might dedicate themselves to some social cause where they—and if you feel like you have that agency to get something done towards something that you care about, those are all sorts of things that affect our health so much that we don’t always talk about.

One part of humanOS that I want to do is there's an element where we're really quantifying how you're doing things, but then there's also knowing that we're really just trying to facilitate lifestyle, so whether it's cooking classes or daily recipes, which comes down to, it's like, “Hey, this is what we're going to eat tonight, and let's not necessarily do a macronutrient count to this but let's have fun making a beautiful meal with bowls and let's sit around the table and talk about our day and talk about life.” And that's ultimately kind of what I think the rhythm that we want to kind of foster and facilitate or support, right? To support.

And so I see humanOS as being this tool that accompanies you along your life, and one year you might take four, five or six courses from us, but the

next year you might, you know, maybe it's different, maybe your interaction with it is really just you're kind of checking in every day for like daily workouts and for recipes, and I see it changing over your lifetime. I see people coming in and using it successfully a bunch of different ways, but that's okay to me. Like it really doesn't have to be a power user all the time. So I wanted to have that flexibility to say like, "Alright, how come we support this person on what they and how they want to use it now?" And yeah, if it's just reading our blogs occasionally or listening to the podcast or whatever, if we're part of their health practice, which I define as the overall efforts you're making towards being healthy, whether it's knowledge accumulation, skill acquisition or even like modifying your kind of like physical activity practice, everything is under that umbrella of health practice. And so we want to be a part of, some part of, your health practice. So that's kind of like the bigger scope of how I see successful usership.

Danny Lennon: Yeah, I think that's really an important concept because so often, like you said, we go through almost cycles of how much we either need to engage with something or to what degree or what type of engagement we need and, I mean, that kind of common maxim of "once the student is ready the teacher will appear," you kind of force information or a certain level of interaction with someone, and so having that ability to swap and change between that is important.

And just why we mentioned that kind of whole social component, I think one interesting related topic on this that kind of particularly ties into this conversation because we've already mentioned, for example, Fitbit or using this online monitoring tool for various health aspects, is when it comes to technology, because I think maybe in certain ways some people have started to talk about how technology or just the amount of time people use devices that are connected to the Internet, how that...maybe people think that inherently means less activity and less social interaction and maybe less time doing healthful behaviors, and I think maybe, particularly with the imminent explosion of virtual reality, I presume people...that that fear is still at large, but at the same time there's probably never been a bigger opportunity than there is now to use tech to allow consumers to actually empower themselves and be proactive in their healthcare.

Dan Pardi: Yeah.

Danny Lennon: Whereas before it's previously, "I'll kind of go along doing things and then, if something kind of breaks down, then I go and get help off an expert," whereas I think what tech allows someone to do is this kind of proactive actions they're taking before something happens. So when it comes to tech, what do you see as the role that maybe tech can play in the future of health? What is the potential for it?

Dan Pardi: Yeah. So some of the problems that I see with tech now is we have a lot of health enthusiasts designing health applications. So what that means is they're good technologists, they're good at developing technology, but they don't actually have kind of a lot of wisdom when it comes to health. I see this all the time. Or, the opposite of it is that you end up with people that are very credible and they end up not making good technology. So it's finding that balance where you have both is important, and we're going to see more of that as—I mean, there's plenty of people that are using this, so the audience is there. That's good. So I think over time, kind of like with podcasting almost, that the amount, the quality of conversations overall I think is elevating because the audience is proven. And so now we're seeing lots of really, really good conversations taking place.

I think that technology is helpful when it doesn't try to do too much. It's not trying to take you by the collar and force you to be healthy. It's not trying to over-program your life. It accompanies you. It's there for you when you need it. It's like a passive servant in a way. It should also be supportive. So it's actually quite interesting because if you were a really good performer on steps, let's say, Danny, and you usually get 10,000 steps a day, I can be more punitive with you if you don't get your steps. I can say, "Hey, over the last couple of days, you're not performing as you usually do."

Danny Lennon: Right.

Dan Pardi: If you're just kind of getting started and you're constantly under your own goal, then pretty much every bit of feedback that you get should be positive, like, "Hey, good job! Way to go! You're doing it. Keep going." If I tell you like, "God, you're underperforming, you're underperforming, you're underperforming," what do you do in response to that sort of negative input? You turn it off, right? You just turn off the device. You stop using it.

Danny Lennon: Right.

Dan Pardi: Right? Now, on the other hand, for you, if you're always performing well, if you get 2000 steps and you used to get 10, then I'm like, "Hey, Danny," I'm your technology, "awesome job, man," then that doesn't have any meaning. And so having systems that are also adaptive to the user, I think we're going to see almost like nutrigenomics is going to help people have better diets, I think adaptive technology that understands the individual and natural kind of ebbs and flows, we'll see that as we have more data to kind of back it up. So I'm excited about that. Like it's always kind of giving me the right feedback to get me to do a little bit better. Sometimes it's supportive. Sometimes it's kind of a kick in the butt. So that's one thing.

And then I think, ultimately, having this architecture of like, how do all these pieces work together? And there are too many individual components, and I don't see health as being a 100-app solution where you have one app that does one thing well for a hundred different things. I think ultimately, as I said earlier, it's the mindset that you have that is the major factor here. And yes, you can use technology through courses; through, again, like kind of skill development; through culture to get somebody like, "Hey, I'm a part of this culture, this is what we do." All those things can be facilitated by technology and are really, really important. And then I think once you have that right mindset, the technology helps you just live consistently with your ideals, and I think the combination of the two of them are best.

Danny Lennon: Like you say, there's so much available in terms of different pieces of tech that someone can use that often maybe people either go too complicated or end up getting data on themselves that maybe isn't all that actionable.

Dan Pardi: Yeah.

Danny Lennon: And I remember a really great example you gave me before of if someone starts looking at how much REM sleep they got on a certain night, for the average person, like how actionable is that?

Dan Pardi: Yeah.

Danny Lennon: Whereas if they start recording how much time in bed did they spend, then that's something that they can actually change and they can modify their behaviors of bedtime, that they can change that. So I think how actionable a set of data is is really important, and usually where it's simpler we can find more actionable steps from that. And I think the second one is not only is it collecting data for data's sake but as we kind of talked of as well

of having it in a way that almost...it's nice to see that data but also just the fact that you're collecting it creates an awareness and creates a consciousness of what you're trying to do.

Dan Pardi: Yeah.

Danny Lennon: And, I mean, people listening to this show are extremely familiar with, say, tracking food on something like MyFitnessPal and getting an idea of your overall caloric or macronutrient intake for a day, and I think we've discussed on this podcast how even for a lot of people that I see in the long-term will probably never track their intake or never need to even track macros or anything like that, they can have healthy behaviors otherwise in the initial stages. Doing that even for one to two weeks can give people skills they can use for the rest of their life because it's created an awareness of what they're doing just by doing that kind of short period of tracking, and I think that obviously can then expand past just tracking your food on MyFitnessPal. It can have all these other factors that you mentioned that once you start doing it, that awareness alone is probably going to increase your chances of making that a sustained behavior or at least modifying your behavior in some way once you actually see what it's doing.

Dan Pardi: Yeah. So this is a really key part to how humanOS was set up and this idea of skill acquisition and skill mastery is fundamental to what I wanted to create. So if you think about somebody who, let's say, is interested in a subject, they listen to a podcast, they read an article, they become interested in the subject, and they read multiple articles on it, have they necessarily developed skills to then take that learned knowledge and then apply it for a long-time behavior? Not necessarily. There are steps that are missing, making it less likely for that to become practiced long-term. Now, it doesn't mean it can't happen, but it means it's less likely to.

So if you think about if you read a book, you remember a fraction of it and a month later you remember even less, but when you pick up a skill like riding a bike you have that really forever. And so the argument that I make is that taking a course where you're actually walked through information in a manner that gives you high retention or we facilitate over learning, which is a process where you are basically more likely to be able to kind of recapitulate to know the information six months after the course is done, then just you're forgetting it all in a week, where once you have that information, then whether or not you choose to use it it's actually a skill that you have and you can have it forever. So a little bit more effort of

learning the right way, spending an hour perhaps on a particular subject, once you have that skill, then you can exploit that skill for life. Now again, whether you choose to do it, how it fits in your life, that's one thing, but not having that skill means that you might engage in those behaviors accidentally and periodically but it doesn't mean that you're going to do it with enough frequency for it to actually benefit you long-term.

And so my goal is for people to come in and develop a huge variety of lifestyle skills that augment their overall health practice forever. So the skills that you acquire, you then have them, and that I think is really beneficial. It's really beneficial.

I'm currently developing my own skill on fasting, so we created a course on it, I learned a lot about the subject working with Jeff Rothschild, and it's going to be one of the first courses that we release. And I've come to believe that it's actually a missing component to our health, and there's a lot more research that needs to be done to understand application and who it works best for and when and how and pitfalls, but generally I've been writing a lot about aging. So I'm doing something called Better Aging Series, which will be a part of a better aging course, and most of the things that we see in the aging research are looking at calorie restriction mimetics, which is basically, what are the biological processes that are triggered in response to calorie restriction? It turns out that fasting triggers a lot of those processes seemingly without a lot of the negative consequences of calorie restriction. And so then there are also supplements that do it and things like that, but fasting is a pretty easy way to do it. And then there's, how do you do it? Do you want to do intermittent fasting, truncated eating windows? Do you want to do extended fast over a period of time? Do you want to just cut your protein? But once you kind of have like that framework, now, I mean, I'm going to stay—my ears are perked to new information that comes out, but I have enough of a framework for that to I think kind of develop the skill, but the skill's there.

Danny Lennon:

That's fascinating and hopefully we can chat a bit more about that in the future. I remember talking to Dr. Eric Ravussin for this podcast around the area of anti-aging, calorie restriction, things like alternate day fasting, and some of the data on that like you said is really, really interesting. It's just fascinating to look at. So I'd be interested to see your partial experiences with that.

But we'll start wrapping things up here, Dan, just before we get to the final question or two. What kind of notes and takeaway messages do you want to leave people with around humanOS or what should they think of humanOS as a service and what will it be able to kind of provide? What way do you want them to think about it?

Dan Pardi: Yeah, and amazing that you've had Eric Ravussin on, by the way. I just wanted to congratulate you for that. He's a real big bigwig. [Chuckles]

Danny Lennon: He's awesome.

Dan Pardi: Just a quick comment. I have such respect for people that have dedicated their life to understanding, to advancing all of our knowledge on the subject and I'm glad to see that super-credible people are now actually joining podcasts like yours to kind of share their wisdom with us. So anyway, just a quick aside.

So that's a really good question and I've posed that to myself, like, actually, what do I want people to get out of it? And I think being really explicit about it is important. So the very first thing that, and I'm still working on it now, is I'm creating a course called Road of Health. This will be available at launch and all of our onboardings for our new users are actually going to try to get people to watch this perhaps 20-minute presentation, and it's essentially like an extended value proposition of what humanOS does. It's like this is the problem that we see, this is how we think we can solve it, and here's kind of like the mindset that we want you to kind of be in, and here's how these tools help you, and here's how you can get started. So I'd rather create a better user than a lightweight user, and so my hope is that when you understand the value of the tools, again, your mindset changes and then your engagement with those tools is different. You might take a course differently. You might track differently. For trackers to work, they don't work for you. You have to empower them with value and say, "Okay, hey, I'm here, I need to get more," let's say, "steps." So you're the one doing the work and we're supporting it. And so being in that right mind frame is critical.

So what I would say is come and when we launch, take that first 20-minute course. Get walked through a process of this is our best way to kind of position how we think that this entire tool supports you for life. And then, see where your curiosity takes you. Do you want to take another course on a certain subject that you're curious about that we have available? Do you want to integrate one of your trackers? Do you want to

buy a tracker and try it out? Do you want to make a recipe tonight and see what happens? So that's basically what I would say, is get involved, start...

And my goal is that over time people become better and better users of the system, and I don't mean that so our metrics look good. I mean that so that you're being helped to the maximal degree that we can help you. And I'm personally excited to learn to use the tool, like you know, build something you want to use. So I've kind of built that. And so that's what I'd say.

Danny Lennon: And where can people go online to not only find more about that or where can they just track you down online as well?

Dan Pardi: Yeah. So we're launching humanOS rather soon, but what I would say is right now if you're hearing this and Dan's Plan is still up, go to dansplan.com and sign up, sign up for the blog. You get our blog posts. I put one up just today. So my podcast, humanOS Radio, I'm interviewing three different types of people but I'm starting off with only professors mostly for the first 20 to 30 shows, and there are specific reasons that I want to do that but I want to go to real experts on a specific subject and see what they say about a topic. That doesn't mean that some sort of health advocate can't be extraordinarily helpful, but there's a lot of that out there and this is just something that I wanted to do. But then I also want to talk to entrepreneurs. So on one hand we have people that are generating knowledge and data on a certain aspect of health that relates to lifestyle and our health; then, I want to see how certain entrepreneurs are then translating that information, hopefully into applications that help us implement it. And then also probably some investors that are looking at health from a long-term perspective. Where are things going? People that understand multiple sectors, technology and health and are trying to predict or making bets on where things are going to be in 10 years. I think that's a really interesting conversation too. So that's basically the scope of the podcast, but yeah, start there if you're in the podcast. Take a listen to a few of them.

Danny Lennon: Sweet, and I will link up to all that stuff in the show notes for everyone listening, and obviously I thoroughly recommend going and checking that stuff out. So Dan, we'll wrap up the show on the final question that we always do end on, and it's simply if you advise people to do one thing each day that would improve their life in some aspect, what would that one thing be?

Dan Pardi: I would say, as somebody who sees themselves who has to be a steward of your own health, be a learner. Dedicate a little bit of time every day to learning something about health, or regularly. Now, that means, so you're engaging with health knowledge. Some are going to be good, some are going to be bad. Also, be careful about what your sources are, right? Because somebody can be very convincing and wrong. So try to go to the best sources, people that have a track record of actually getting peer reviews so other people are essentially criticizing and critiquing the work. So constantly try to find really good sources of information.

And then also, so you're a learner, and be what I call a slow learner. So instead of trying to drink from the fire hose, attack a topic one at a time and really try to then understand it and develop skills in it. So make it fun. Don't feel like, "Hey, this is overwhelming and I need to do it all right, perfectly at once," but approach one little subject, enjoy it, talk about it with your family, share the information that you're learning, stay in that learner mindset, and stay open to having your position kind of modified, but have strong opinions and hold them loosely, and imagine being in that mindset for the rest of your life is going to be a part of your health practice. And so enjoy it and constantly try to learn and to improve how you're living.

Danny Lennon: I agree with all of that and I think you are doing more than your fair share to help people with that because, like you mentioned, any of the information that's either part of the courses or even with your own podcast coming direct from world-class research at the top of every field I think is so important because that's where you usually get the true information and the true evaluation of where the evidence lies. So I just want to say thank you so much for your time today. Really, really valuable information and really always love discussing these topics with you. And for your ongoing work, you're doing some really awesome stuff, so I want to say thank you and it's much appreciated for that.

Dan Pardi: You're one of the best voices in the field, Danny, so keep doing what you're doing and I appreciate the work that you do. So, yeah, thank you for having me on, thank you for those compliments, and thank you for the efforts that you make too.

Danny Lennon: Thank you so much, man, and I will talk to you soon.

Dan Pardi: Okay. Take care, man.

Danny Lennon:

That was the awesome Dan Pardi. You can check out the show notes at SigmaNutrition.com/episode131 to get links to everything we discussed today as well as a transcript of this episode and a lot of other good things. If you want to show your appreciation for the podcast, I'd be absolutely honored if you considered sharing the episode on social media, leaving a review on iTunes or becoming an official supporter of the show on Patreon for a \$1 patronage, and details of that are over at Patreon.com/sigmanutrition. You'll get all the details of what that's all about. And if you do decide to support the show, I'm extremely, extremely grateful. And for those of you that are doing so already, I'm extremely grateful to what you do and the continued support you show. It really does mean a lot, so I can't overstate how thankful I am, guys. So, thank you to everyone who continues to support and download this show.

I will be talking to you in the next episode and, until then, have an amazing week.