

EPISODE 720

Improve Your focus, Promote Neuroplasticity & Increase Your Attention Span

With Guest Dr. Adam Gazzaley

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SHAWN STEVENSON: Welcome to the Model Health Show. This is fitness and nutrition expert Shawn Stevenson, and I'm so grateful for you tuning in with me today. For years, it was believed that the human brain, as we age, only experiences degradation. That producing new brain cells, a process called neurogenesis, was something that just simply didn't happen, especially as we get to our senior years. More recently, we've discovered that number one, neuroplasticity, the ability of the brain to change and adapt and evolve and to create new connections, literally the chemistry and also the physical structure of the brain can change, continue to change even in our senior years. And we also have the ability to create new brain cells. Specifically the most data is affirming new brain cells being produced in the hippocampus or the memory center of the brain.

SHAWN STEVENSON: So memory, attention, problem solving, speed at which we're thinking, all of these things are vital aspects of our experience as human beings, especially today. We want to be able to maintain these faculties, and even potentially improve them as we age. So not just getting older, but getting better. And there's unfortunately these statements like "you can't teach an old dog new tricks". Well, today I've got news for you. We've got a leading neuroscientist and he's gonna be sharing some data with you. I promise you, it is going to change your life. He blew my mind multiple times talking about his new FDA approved treatment for conditions like Attention Deficit Disorder that don't involve a drug. It involves the utilization of a new technology. Now, is he a person who's saying that technology is the only way to improve the function of our brain? Absolutely not. He's going to enlighten you on how it's one of many very practical tools that we can utilize today to truly create a rich life and a rich experience.

SHAWN STEVENSON: And again, to be able to maintain our memories, our cognitive abilities, in particular, our ability to pay attention in a society that is largely distracted due to our technology. So, this episode is so powerful, and again, this is something that's gonna change your life and really stick with you for years to come. So I'm really excited to share this with you. Now when it comes to memory, attention and other executive functions, all of these things are dependent upon chemistry. And also the chemistry that's happening in our brains is gonna be dependent on the nutrients that are available to run processes. Now, there's a particular neurotransmitter called acetylcholine that's getting a lot of attention right now because of its influence on building our memories, enhancing our ability to pay attention, and also really supporting all these other executive functions like foresight, planning, being able to make executive healthy decisions.

SHAWN STEVENSON: Many of these things are predicated on acetylcholine. And today we have new research affirming a nootropic that's been utilized actually for centuries and its impact on acetylcholine. In the central nervous system, again, acetylcholine plays a major role in attention, memory and in other executive functions. While patients with Alzheimer's disease... This is kind of a degradation of these systems, typically have low acetylcholine levels. And actually one of the common treatments is giving patients with Alzheimer's drugs in the form of inhibitors that block the enzyme that break down acetylcholine to effectively in some ways, but again, largely gonna come along with some other side effects. But the goal of the treatment is to keep acetylcholine levels high in the brain. Well a recent placebo controlled study found that Royal Jelly when compared to a placebo can significantly increase attention and also spatial memory. In addition to that, a study titled Royal Jelly, facilitates Restoration of the Cognitive Ability in Trimethyltin, conducted by researchers in Japan found that Royal Jelly has the power to potentially stimulate neurogenesis in the memory center of the brain.

SHAWN STEVENSON: Truly, truly remarkable. There are very few things discovered in nature that have that capability. And this is the basis for my favorite nootropic called Brain Fuel. And this is from the incredible folks at Beekeepers Naturals. Go to beekeepersnaturals.com/model and you're going to get 20% off storewide, including their fantastic nootropic based on Royal Jelly. And in addition to that, by the way, it's not just Royal Jelly in their nootropics. They also have one of my other favorite things, Bacopa and a randomized double-blind placebo controlled human trial published in 2016, found that after just six weeks of use, Bacopa significantly improved speed of visual information processing, learning rate, memory consolidation, and even decreased anxiety in study participants. This is special stuff. Head over there, check them out. [Beekeepersnaturals.com/model](https://beekeepersnaturals.com/model) for 20% off. And by the way, they're dedicated to sustainable beekeeping and doing third party testing for toxicants. Other companies are simply not doing that kind of work. That's B-E-E-K-E-E-P-E-R-Snaturals.com/model for 20% off. Head over there, check them out, beekeepersnaturals.com/model. And now let's get to the Apple Podcast review of the week.

ITUNES REVIEW: Another five star review titled Love the Show by Thriving and Striving, "Love how you deliver your show with relevance and always backed up with scientific knowledge. I also love your humility and love for what you do. I always look forward to your new releases."

SHAWN STEVENSON: Awesome. Thank you so much for leaving that review over on Apple Podcast. That really does mean a lot. And if you have to do so, please pop over to Apple Podcast and leave a review for the Model Health Show. And on that note, let us get to our special guest and topic of the day.

SHAWN STEVENSON: Dr. Adam Gazzaley is the founding director of Neuroscape at the University of California San Francisco, a professor of neurology, physiology and psychiatry, and principal investigator of a cognitive neuroscience laboratory. He's also the chief scientific advisor and board member at Akili. Dr. Gazzaley has been featured everywhere in major media from the New York Times to PBS to NPR, and the list goes on and on. And he's won a plethora of well-deserved awards. And again, he's brought new technology to the market that is here to support the cognitive function of our citizens in a way that is non-invasive and also backed by a tremendous amount of science. So get locked in and learn about how to improve your cognitive function with Dr. Adam Gazzaley. Adam, it's so good to see you. Thank you for coming down to hangout with us. Really excited about this conversation. Our attention is obviously incredibly valuable today. It's one of the most valuable assets we have as human beings and it also determines our success in life, our accomplishments. We need to be able to point our attention at what we want. My question for you to start is, what's happening to our attention span? You being a Neuroscientist, in this age of digital distraction, what's happening to our attention?

DR. ADAM GAZZALEY: Great question. I'm going to start by just echoing what you said 'cause it's so important. I think it's good for us both to say it. Attention, I would say, is our most valuable asset as human beings. I'll go so far as to say that because without having the ability to direct our limited resources where you want them in space and time, you can't function. All the other things that we do, that our brains do, like remember things, make decisions, feel emotions are all dependent on attention. Attention dictates all the other cognitive functions and therefore everything we do in our lives.

DR. ADAM GAZZALEY: So it is just ground zero for being a functional human being. And it is now becoming increasingly clear that this world of technology that we created, which I love, I like to preface that, not like someone that shuns technology, I have it all, just like everyone else. It has created some very unique challenges for us, largely because our brains that evolved in a certain environment to accomplish certain goals, like surviving, is just very different right now. And so there are elements of our technology, access, and how the rewards are delivered, and even how information is delivered in certain packets and how they compete in multitasking that fragments our attention ability and places demands that we never had before. And it has a demonstrable impact on our functioning, and our happiness, and our performance, and our health. And it's not going away. So yeah, it's here to stay. [chuckle]

SHAWN STEVENSON: Yeah, that's one of the things that really jumped out in studying your work is it really hit me how quickly, how short of a time span this happened. Like you mentioned, we had our brain really evolve to certain conditions for so long, and then suddenly now we have all of this access.

DR. ADAM GAZZALEY: Yeah, yeah, it's a good point. It was slow in some ways because we needed to have computers for what we're experiencing now. And that took a long time to really refine. And then they needed to be shrunk down. They needed to have the batteries that could sustain them and all the technological advances that went into these pivotal moments where everything changes. And I think the pivotal moment that really led to the biggest impact on our attention is the accessibility to high-power technology and the connections that it has with the outside world. That just shifted everything. And so yeah, it was slow but then dramatic. And we're quite aware right now that it's having its reverberations.

SHAWN STEVENSON: It's pretty cool in one aspect, obviously. We could be sitting in this room but then be anywhere on Earth. Matter of fact, we don't even have to be on Earth through this device. And we were talking before the show. I was a big fan of the movie Cyborg growing up, and like Bloodsport, all these like, Arnold Schwarzenegger and Jean-Claude Van Damme movies. But in Cyborg, when I watched it, I just really thought like, could I be that? Like could I be melded with technology? And in many ways, we are already Cyborgs.

DR. ADAM GAZZALEY: Yeah, 100%. People use this term brain-computer interface, and they're usually referring to implantable electrodes in the brain so that there's a direct interface. But the term is actually more general than that. And a brain-computer interface is your screen on your phone. That's an interface between your brain and the computer. And these interfaces are increasing and penetrating our lives, whether you put pods in your ears that are connected to your device. And so as we increase these connections, even without having surgery, these are brain-computer interfaces that in many ways create dependencies and in some ways turn us into Cyborgs already.

SHAWN STEVENSON: Yeah, and just having that access to almost an infinite amount of information, literally at our fingertips like it has presented itself in a different way than I think we would have expected when we have these kind of big ideas of somebody being a Cyborg or the Terminator and that kind of thing. But truly it's like an extension of us and for some people, like you just said, it can create this kind of connection or even addiction where the phone is like a part of them and they can't be far from it. One of the studies I saw recently is 70% of people have their phone within arm's reach 24 hours a day.

DR. ADAM GAZZALEY: Yeah, and the removal of that creates a lot of anxiety and people are not comfortable being disconnected even for short periods of time. And I would say that to have, maybe this is a value but it's certainly my value that to have a rich life being disconnected from technology is really important. Being able to have a conversation with another person without these distractions, being able to be in nature, being able to be

physical in the world, is really critical. And although I'm someone that creates technology and believe that technology is great, promise to help us, being disconnected is also really, really important.

SHAWN STEVENSON: This is why you're here, because we can find a happy medium, because both of us, same thing. We wouldn't be even connecting with all the people we're connecting with right now without these incredible advancements. And we don't wanna lose ourselves and our essence and what really contributes to health as a human being. And I wanna ask you about this in particular, with the increased access, with so many different things that we could put our attention on and/or, involve ourselves with. What's the difference between multitasking and single-tasking?

DR. ADAM GAZZALEY: Yeah, that's a question that I have worked on for well over a decade. And, it really caught my interest, as maybe like 15 years ago as the term multitasking started to become more and more common as our devices started to allow more multiple screens and switching. And I was like, "What is this whole multitasking thing, and how do our brains really engage in it?" And so I've done a lot of research, now this is over a decade ago before some of the work that I've done more recently with video games and other technologies. But what we now understand as a scientific community is that when we are single-tasking, we are activating networks in the brain that allow us to focus our resources on that, to some varying degree of effectiveness depending on the person, and resist distraction.

DR. ADAM GAZZALEY: A lot of what our brain is doing when we're single-tasking is filtering. There's so much information around us. If you did not filter, you would be incapacitated, which is attention, essentially attention, going back to how we started our conversation, so single-tasking is the focusing of attention on one goal at a time. And the data would show again and again that it is the most effective way to produce the highest level performance because it has all your resources. Multitasking is when we make the decision to split our attention, either to move it rapidly between things or to try to do two things simultaneously. What we learned over the years, my lab as well as others, is that in the brain, what's happening is that there is a switching that's occurring. Even if you think you're doing them both at the same time, if they are attention-demanding, you're unable to parallel process them. And therefore, with each switch of those attention networks, there is a degradation loss of some information. And that presents itself in all sorts of ways. And so performance is degraded when you're dividing it across two tasks. And so that's on the behavioral side, on the neural side, we see why that is. It's just how the brain works. It doesn't split that level of processing.

SHAWN STEVENSON: That's fascinating. So my question would be why do some people feel like attracted or even addicted to multitasking?

DR. ADAM GAZZALEY: Yeah. So couple of reasons. I believe, first, that it would make sense that if you were actually able to divide your resources, it would be more effective. So if you don't realize these limitations, awareness is always key to being healthy or even changing your performance or your health. Like before, we knew that walking was good, maybe people weren't as inclined to or sun exposure anything. And if you don't know that your brain is limited in doing this, you'd be like, "Well, I have five things to do. I might as well just do them at the same time." So, it makes sense that if we were capable, it would be very efficient of doing it. There's also a reward to novelty. And so moving gives you novelty. So you're like, "Ooh, that's new, that's new, that's new." It feels good.

DR. ADAM GAZZALEY: And it's part of our ancient brains that we are rewarded for novelty. It keeps us moving, it keeps us exploring the world. And so I would say that if you look over a period of time, multitasking is probably more fun than single-tasking that same amount of time. So, if A, you think it's good for your performance, and you just start paying attention to how you feel, you're gonna keep doing it. But if you understand the brain and the data and realize that those rewards are really not serving your higher goal of being actually effective, then it's not a good thing.

SHAWN STEVENSON: It's kind of like a slide of hand that's happening.

DR. ADAM GAZZALEY: Yeah. And our brains have so many of them. Our whole reality is really perception that's presented to us by the brain. And some of it is very close to reality, and some of it is not. And so you might have a misperception that this is something that is working for you, and it often does until it doesn't like driving your car and checking your text messages. Many times, driving your car is a fairly automated task. You're on the highway, nothing's going on. When you pull out your phone and you're doing something on it, your attention is seriously divided. And it might be fine, but if something changes on the road, your attention has to switch back. And there is a time delay and a cost to that. And that difference could account for an accident.

SHAWN STEVENSON:Wow. Yeah. We're unknowingly creating these little mini-accidents in our lives. Just basically reminds me of a study, this was published in The Lancet. They did a study on physicians. And they had them to come in and complete a task, a simulated operation, basically. And then they sleep-deprived them for just 24 hours, which is not abnormal, and had them to complete the same task. And after they compiled the data, they made 20% more mistakes. Doing the same thing.

DR. ADAM GAZZALEY: Yeah.

SHAWN STEVENSON: And it took them 14% longer to do the same thing.

DR. ADAM GAZZALEY: Yeah.

SHAWN STEVENSON: And so again, it's just this illusion like, "I'm getting... I'm up more."

DR. ADAM GAZZALEY: Yeah.

SHAWN STEVENSON: "I'm getting more done."

DR. ADAM GAZZALEY: Yeah.

SHAWN STEVENSON: Versus losing efficiency and effectiveness and also making a mess that I would then have to come clean up.

DR. ADAM GAZZALEY: Yeah. It's a really good example, and it's very... I agree, it's a very analogous thing that you think that you're more efficient 'cause you're awake for longer time. I remember when it used to be, and maybe this has not even changed completely, that if you're like, "I need to take a nap," that you're somehow weak. You need a break. If you need a break in the middle of the... "Seriously, you can't work for eight straight hours. What's wrong with you?" But like a professional athlete, they know that they need a break. Everyone training... It's well built into that world that part of advancing is restoration and reengaging. But in other walks of life we have this illusion that we have unlimited cognitive reserves. Like we don't fatigue, like we don't need to restore. That's not true. So I think there's actually a lot of lessons from the world of physical fitness that we could apply to cognitive fitness and performance and just haven't done that. So it's not a sign of weakness, again, it's an illusion that somehow it's weak or ineffective to take breaks. In the long run it's probably more effective.

SHAWN STEVENSON: Now looking at this concept of multitasking versus single-tasking, so we talked a little bit about how multitasking can be so attractive for the brain. Is there some ways or some changes that happen with our physiology, with our brain that can make single-tasking attractive?

DR. ADAM GAZZALEY: For sure. This is a conversation that I love having and a lot of people don't ask me about it. So I'm glad that you did. I think again, I'm going to make a physical fitness analogy here. Okay. Running. If you start running, it's pretty darn unpleasant. Your body is not used to it. It could be boring, especially if you're not plugged in at the time. You have a limited endurance, so you're not really getting the reward. And so I would say training for a marathon, you're doing a lot of essentially single-tasking, and it takes time in order for it

to actually become fun, in order for you to change that you're like, I love that, I could just run for miles, for hours, and it feels good. You had to adapt your body to be able to engage in that single task in a way that it was rewarding. And I would say the same thing is true for all single-tasking. Like if you are going to write an article, or something that demands a high focus, anything, you could think about it, any job that you're in. I would even go so far as to say have a conversation with a significant other, at the beginning of trying to do that and not allow yourself to be interrupted.

DR. ADAM GAZZALEY: It's going to be anxiety provoking, especially if you're used to switching all the time, you're going to want to move and you may have to baby step into it. Like training for a race. Like do a little bit, do a little bit more, do a little bit more. But if you get over the hurdle, single-tasking could be incredibly gratifying. Not just in terms of what you could produce, which would be greater than multitasking, but it starts having its own rewards that presents itself once you get over that hurdle, like running a long distance.

SHAWN STEVENSON: I just... I wish people could feel that. To be able to bottle that up in a sense and give that to people, because it really is, it's one of the most rewarding things, especially today, because we're able to create things of real substance as well.

DR. ADAM GAZZALEY: 100%.

SHAWN STEVENSON: I was just with a friend of mine in NorCal, Mark Bell, and he's like, he set a world record for squats and things like that. He squat over a thousand pounds, like all this kind of crazy, superhuman stuff. But that was years ago. Most recently he just ran the Boston Marathon. And when he squatted all that weight, he was much heavier, he was a really, really big guy, and he needed that just to stand under that bar. But now he's shifted and he's found another passion. And for him it's kind of like even when you just said the R word, when you said running, it's just like, "Agh, I don't know about that." But then the people that are about that life, and that's what he was, he's just like, "I couldn't see myself when people would talk about loving the running and just like getting all this fulfillment from it," he's like, "It's so weird." When I went to see him, he had just come back from running a few miles, just like, because he couldn't run his nine that he was planning on that day because he had to come and do some stuff with me. And it's just like, truly there is this fulfillment when you invest in a thing that might seem arduous or tough upfront, suddenly it clicks in and you have this heightened level of joy and fulfillment that we don't get access to when we're constantly distracted.

DR. ADAM GAZZALEY: 100%, and it takes dedication and it takes a commitment to the outcome to get there because it's not automatic. You don't automatically like running, you don't automatically like working for a continuous hour without checking your social media

every ten minutes. It's not going to feel as good. So you have to commit to it, understand why that's important, and then baby step into it, and create new habits around it. And if you can accomplish that, the rewards are massive, but it takes time.

SHAWN STEVENSON: Another thing that just popped up for me, in talking about this is, when you have that focused attention, single-focused, single-tasking, you have more easily accessible this flow state, being able to lock it.

DR. ADAM GAZZALEY: Yes. I was going to say that too. I was going to actually go there.

SHAWN STEVENSON: 'Cause we're in flow! Aren't we?

DR. ADAM GAZZALEY: Yeah. Exactly. Exactly. No, it's true. Flow is such an interesting concept and there are the obvious examples of surfers and even people playing video games. But you can reach flow through a lot of different activities. If you engage in it deeply enough and allow yourself to be swept away in it, time loses its same perspective. And, yeah, that's, I think one of the main goals that I certainly have personally is to achieve that flow state in all sorts of things, interacting with my daughter. So that how long can I go before I want to check my phone? I feel the tug, like everyone else, I have all the access, and I set a goal that I want to be present. And it's an obvious goal, it seems like, for any parent, but it's not easy. And again, if you do it enough and you just resist all those distractions, you could get into a flow just like that with... That's all, just as powerful as someone might have, like being an athlete, just even interacting with a child.

SHAWN STEVENSON: Yeah. And that change in our experience or the neurochemistry, that's another attractive aspect of that single-tasking, because, again, you said it, it's just like there's something so attractive to our brain about novelty.

DR. ADAM GAZZALEY: Undoubtedly.

SHAWN STEVENSON: Right. And so, like, social media apps are just designed for that.

DR. ADAM GAZZALEY: 100%.

SHAWN STEVENSON: So what can bring you something of equal or greater value is like when you experience a flow state, it's like something... Oh man. It's just like, it's very difficult to even describe.

DR. ADAM GAZZALEY: Yeah, yeah. So yeah, I think that that I love this conversation. It's something that is very personal to me because I brought it into my own life intentionally, and

know how hard it is. Like it's, I don't feel preachy, like, "Just do this." It's hard. You have to really get why you wanna do it and commit to doing it, because or else you'll just snap right back into that other way of life.

SHAWN STEVENSON: Yeah. Yeah. Man, this is so good. So with this being said, we are well aware... We, of course, we could see it in the external world, but what more and more data is affirming is, and talking to some of the leading people in psychology, psychiatry, neuroscience, there is definitely, it's not just we have better testing, but there has been a reduction in our ability to pay attention, and in particular with children. And rates of ADD, ADHD, have exploded, they've gone up precipitously, while, again, it's just like, "Oh, we're... It just wasn't diagnosed earlier." No, no. The rates have gone up, and it just makes sense because our environment has changed so much, and that's okay. Like, we can acknowledge that that is a thing. And, but if we don't acknowledge it. You said it earlier, you said awareness, awareness is like that domino.

DR. ADAM GAZZALEY: 100%.

SHAWN STEVENSON: And so, being that we're in this situation, and our solutions, and this is the most important part, our solutions for treating this growing issue have not been very effective. Let's just call it what it is. The fact that we have solutions. Great. Oftentimes this is a pharmaceutical model. But the rates are still going up, and the long-term effectiveness is questionable at best. So with that being said, you've been at work for years putting something together that is so exciting, and it's recently approved by the FDA, which is remarkable in of itself, which I wanna have a conversation about that in a moment. But can you talk about your work with video games and being an approved treatment now for Attention Deficit Disorder.

DR. ADAM GAZZALEY: I'm very very happy to talk about this. I wanna do a quick transition piece because I've experienced this before where we just talked about the challenges of technology, and now we're gonna go into a deep dive about a very particular type of technology called video games, and show that they could have benefits on the mind, and I like to transition between them with recognition of the fact that all tools, from fire, to the wheel, to everything, to nuclear power, everything cuts both ways, and has the potential to do harm, or good, drugs could save you or kill you. Fire could light your house on fire, burn it down, or cook your food. And the same is true for technology. So the things that we talked about, the challenge of technology are very very real, but it does not imply that technology can't with the right intentions and the right design be used to help us.

DR. ADAM GAZZALEY: And that's sort of like what was like a big transition in my life after years and years of reading and writing and doing research about the challenges of technology, to say, I think technology has great potential to do really wonderful things for us as humans. And, we have to understand how to unlock that and then do the research to know that it actually does do that. And so that's where I could be someone that writes a book called *The Distracted Mind* and also build video games for ADD. It's very confusing to people. So that's why, because the sword slices both directions and both are true. It's just how you intentionally engage with your tools that decides which way they go. So that's like the high level that I do like to make clear, and I think it makes it a little bit more understandable.

DR. ADAM GAZZALEY: One other piece that I think is really useful in this transition is that our brains really respond through a process called neuroplasticity, that probably many of your listeners are familiar with, the ability of the brain to change itself at every level. Chemistry, its structure, its physiology, all changes in response to experience. Experience drives plasticity. It's the entire basis of learning in the brain. And we often thought, for a long time, that plasticity ended after critical stages of development, and then you just decline. We know that's not true. The older brain has a lot of potential for plasticity and growth as well. So it was really this foundation in neuroscience and my desire to see technology used for benefit that sort of collided around 15 years ago. And thinking about how we might use technology as a tool to help our attention, where it has very frequently diminished our attention.

DR. ADAM GAZZALEY: And the gateway to that, is that technology can create experiences, and experiences drive brain plasticity. So that's the general, but the devil is in the details, there's lots of bad experiences, and good experiences, just like we've been talking things go in both directions. So 15 years ago I had those ideas converged, as well as... I'm a neurologist, I don't see patients now, but I did for many, many years, largely patients with Alzheimer's disease. And I, like many other physicians, psychiatrists, and other neurologists have a lot of frustration with our model of thinking that somewhere out there, there's this magic brain pill that's gonna fix it. We just wanna find it. We'll find it. But we haven't yet. And we haven't. And it's been 70 years and we have, as you really eloquently described, we have these treatments, but they're not really what we're looking for. They don't work for many people. They have potential side effects, they have actual side effects. And we see the rates increase. And it's not just ADHD, depression and anxiety, suicide, dementia, all going up. We've seen a drop in cardiac disease and in... Despite a pandemic infectious disease, and we've seen the reversed trend occur for afflictions of the mind. So we have to do better. And the idea that we could use technology to create targeted, personalized experiences.

DR. ADAM GAZZALEY: That challenge us in such a way that they harness the brain's plasticity to change itself, and lead to a higher performing machine is what attracted me. And that's sort of the basis of what I've been doing for 15 years. So I just like to say that before I dive

into video games, because video games, like they have a lot of weight, just like psychedelics do and a lot of things. Like there's a lot of preconceptions based on your own personal experience or what you read or what your experience of your children are. And not to say that any of them aren't valid, but I do wanna point out that video games are a type of experience. Delivered by technology, usually designed to be fun and engaging, and they certainly could have their own troubles associated with them, but, if you wanna use technology to deliver an experience to people, doing it in a way that's fun and engaging so that they're deeply immersed in the moment and that they come back and again and again, seem like a really good idea to me. And so that's a little bit of the sort of background of why I started building video games, 15 years ago. Because I felt that this is a way of taking technology, flipping it around, designing it intentionally, and then doing the research to show that we could create video games that actually improve attention.

SHAWN STEVENSON: Wonderful. I love this segue, by the way, thank you for that setup. This is fantastic. And the little pause moment in between these two parts is, I told my youngest son, Braden, who's about to turn 12 next week, or this weekend actually, that I was interviewing you and you had built video games that can actually help to improve folks who are dealing with ADHD and ADD. And he was like, "See, I told you dad, I told you video games are good for you." You know? Right. And I was just like, "Well, so pump your brakes. There's a certain type of video game and certain research has gone into building this."

DR. ADAM GAZZALEY: Yes.

SHAWN STEVENSON: So I'll tell you more about it once I talk to this...

DR. ADAM GAZZALEY: Yes, yes.

SHAWN STEVENSON: Brilliant thinker. All right, so what is the basis behind what you've built? Can you talk about how this is similar and or different from general video games out there?

DR. ADAM GAZZALEY: Great. So in a lot of ways it's very similar. So, and it's also worth pausing and noting that video games, even entertainment video games, even some of the most controversial games, like first person shooters, have data, lots of data showing that they could have benefits on cognition. So there are a high level experience, full of lots of rewards, lots of challenges. Kids that play them might suffer in other ways but you give them some cognitive tests and they're like far exceeding their peers that aren't playing video games. Data has shown that. But abuse them, through overuse and they misplace other important things in your life. And now those couple advantages aren't worth it anymore. So like everything has over-abuse as an issue, and video games certainly have that. So in some ways it's similar to other video games.

DR. ADAM GAZZALEY: As a matter of fact, one of my main goals was to make it feel like a video game, not like medicine. Bring on the high levels of art, music, story, that really engage people in the video game experience, 'cause I think that has a lot of value, but there are a lot of differences. So noting that video games could have benefits on cognition was really inspiring to me, because they're not built for that reason. So let's say we built them for that reason. What would we do, that was like the challenge, right? So you can create a game where the mechanics, the interactions, the rewards, the challenges, are specifically designed using an understanding of neural networks and cognitive systems that they're challenging you in a very particular type of way to really push those networks and those operations. And it happens accidentally in video games, but you could design a game where that's the entire goal of those mechanics.

DR. ADAM GAZZALEY: And then obviously building the fun and the reward cycles around it. So that's one thing that makes this particular video game, that's an ADHD treatment, very different, and also I have another dozen games that I've built with my team at UCSF that are still like in the lab. They're not quite out there like Endeavor is. But they all the same, they all use very particular mechanics to challenge the brain in a very targeted way. That's one thing. The other thing is that they're all closed loop video games. So what does that mean? Closed loop is where the input into the game, let's say, it's your performance metrics, it can also be other types of data are then driving the environment, the challenges, the reward, and the stimuli that you're receiving. So let me break that down a little bit.

DR. ADAM GAZZALEY: So that creates a closed loop between your brain and the processor. And what that means is that you are engaging with an environment. So picture a video game environment where the elements in the game, the challenges and the rewards are personalized to you every second to your own abilities. And what the closed loop does is it creates a way of challenging someone right at the threshold of their ability, all the time, so that they don't just give up because it's too hard or it's too easy, and it pushes them constantly. Picture again, physical fitness, analogy, which I love, picture having a cyborg personal trainer, someone that had infinite access to your data, to your performance levels to your fatigue at all moments. And then was what's constantly adjusting your challenges to keep you right at that edge the whole time. If you just had a bad day, you are extra fatigued, it would just back down a little bit, give you some room so that you didn't give up and then push again at the minute you were able to bring on those reserves.

DR. ADAM GAZZALEY: That's what these games do. They have a closed loop system that they really harness the plasticity of the brain by challenging it right at that edge all the time. And so these are some elements that take years and years to develop in the video game because you want to keep the fun, but you want to have the engine deliver the mechanics and the

closed loop system in just the perfect way to change the brain in the way that you want to. And then we do years of research to determine that it actually does that. So, which is not true of most games. So those are the components that make it different. If you just picked up an iPad or an iPhone and played one of our games, you wouldn't know that necessarily. It would feel like a game, which is what we want, but that's what's under the hood and that's what takes decades to develop.

SHAWN STEVENSON: Oh, it's so fascinating, and it just, again it makes sense. It makes so much sense, especially if attention is a thing that we're targeting here.

DR. ADAM GAZZALEY: Exactly.

SHAWN STEVENSON: Got a quick break coming up. We'll be right back. The human brain is the most powerful pharmacy in the universe. And I'm saying that because every single thought that we think creates correlating chemistry in our bodies. And that biochemistry is designed uniquely for you. It's beyond bioidentical hormones or bioidentical neurotransmitters. These are designed specifically for your own receptor sites. So what you're making within your own body, based on your thoughts, your perception of reality is of the utmost importance. And obviously thoughts of stress, and anxiety, and worry, and fear. These are gonna create cascades that make us feel a certain way. The same with more positive and affirmative feelings and thoughts of joy, of love, of connection. But all of our emotions matter. Now, the thing is, if we're talking about health and longevity, we wanna make sure that we're stacking conditions to have more positive, affirmative thoughts and buffer us from the stressful thoughts that we are inevitably going to have. Now, our sleep hygiene, our movement practices, and also our nutrition are of the utmost importance in helping to modulate these things.

SHAWN STEVENSON: And when it comes to managing stress, there is one particular type of tea that has been utilized for thousands of years that stands head and shoulders above the rest. A study published in biomedical research found that test subjects with a variety of health complaints, including anxiety and poor sleep quality, were given Lion's mane medicinal mushroom or a placebo for four weeks to monitor their metabolic and psychological impact. The participants who utilized Lion's mane had significantly reduced levels of anxiety and irritation than those in the placebo group. The researcher stated, "Our results show that Lion's mane intake has the possibility to reduce depression and anxiety."

SHAWN STEVENSON: Not only that, scientists at the University of Malaya discovered that compounds in Lion's mane are able to significantly improve the activity of a nerve growth factor in the brain. Nerve growth factor is essential in the regulation of growth, maintenance, proliferation, and survival of various brain cells. If we want to have a healthy brain and

protect our brain cells, which we don't have the regenerative activity of brain cells like we do other cells in our bodies, we've got to take care of our brain cells. This is one of the few things ever discovered that has that protective capacity for me and my family, we wanna make sure that the medicinal mushrooms that we're utilizing Lion's Mane, Chaga, Reishi, and the like, are all done via a dual extraction to make sure that we're getting these bioactive compounds in a more full fashion.

SHAWN STEVENSON: So via a hot water extract and an alcohol extract, there's one company that's doing that and infusing these incredible medicinal mushrooms into things like organic coffee, organic hot cocoa. When I'm talking about the folks at Four Sigmatic, go to foursigmatic.com/model and get 10% off storewide of all of their incredible medicinal mushroom elixirs, cocoas, and their organic coffee blends as well. Today I actually had the Lion's Mane and Chaga organic coffee blend. This is one of those things of course it puts you on 10, but it helps you to modulate and manage your energy. It's not one of those things where you get this jolt of energy and then it leaves you lagging later on.

SHAWN STEVENSON: It's very steady, mild-mannered behavior and also helping to really activate the cognitive function that we're looking at, when we're talking about things like Lion's Mane Medicinal mushroom. You can get 10% off storewide plus more. They've got some incredible packages that you've gotta check out in specials over at foursigmatic.com/model. Go to [F-O-U-R S-I-G-M-A-T-I-C.com/model](https://F-O-U-R-S-I-G-M-A-T-I-C.com/model) for 10% off worldwide and more. And now back to the show. So I've heard you say this multiple times already, that this appears to be targeting systems in the brain.

DR. ADAM GAZZALEY: Yes.

SHAWN STEVENSON: Versus a pharmaceutical model that doesn't necessarily target a system, but more so like an isolated neurotransmitter, for example.

DR. ADAM GAZZALEY: Exactly. Yeah. Let me break that down. It's a really, really good point and we could have easily brushed over it, but when you take a molecule, which is, we can call it a pill. We can call it a drug, it's all the same thing. You take a molecule, those molecules are usually almost all the time affecting neurotransmitter systems, either activating them or inhibiting them in the brain, and they do have outcomes. Like you take Adderall or antidepressant, anything, it'll have an outcome, usually one that you notice. The problem is that these neurotransmitter systems are widely distributed throughout the brain. They do lots of different things in different places. You're essentially hitting your brain with a sledgehammer. There's no target selectivity outside of that receptor system. And that creates effects. And then something that we call side effects. Side effects are just other effects.

Right? They're just, you're calling them side effects because they're outside of your goals, but they're really just other effects. And they exist because of the lack of specificity and targeting.

DR. ADAM GAZZALEY: There is no way to activate the underlying computational unit of how the brain works, which is the neural network that I know of, other than having an experience. We have no drug to do it. We have no brain stimulation to do it. The way our brain activates networks is through interactions and experience. That's how the brain evolved. So we're just sort of using the basic hardware and software of the brain as it evolved in its most natural way, is that, if you want to target improvement in a certain function, activate the network selectively. We don't have a drug to do that, but we have experiences that can do that. So I hope that helps really dive into that point. 'Cause it's a really critical difference between molecular medicine and what I'm describing here is what I call experiential medicine.

SHAWN STEVENSON: Now this is.. is like a huge through line for this conversation is that we ignore, unfortunately, the fact that experience is what is changing the brain. And like you said, we can come in with a blunt instrument, but is this actually addressing why the brain has wired the way that it has in the first place? Which is gonna be based on experience.

DR. ADAM GAZZALEY: Exactly.

SHAWN STEVENSON: And so, like you said, having receptor sites for something like serotonin. By the way, we'll put up a study for everybody. This huge meta-analysis, looking at the serotonin theory hypothesis of depression and it being disproven decades ago essentially but recently researchers have kind of unearthed the data and just kind of like, 'cause it just keeps getting looked past. Not to say that manipulating serotonin isn't effective for treating some things.

DR. ADAM GAZZALEY: Right.

SHAWN STEVENSON: But it's this, like you just said, this is a full body potential. There's receptor sites in the gut, the brain, all this stuff.

DR. ADAM GAZZALEY: And all across the brain.

SHAWN STEVENSON: Are we actually looking at addressing the specific systems,

DR. ADAM GAZZALEY: Yes.

SHAWN STEVENSON: That are influencing our mood and behavior and things like that?

DR. ADAM GAZZALEY: Exactly. Like the idea, just to riff off of what you're saying, the idea that there's just a chemical imbalance that needs to be adjusted. That's too naive, that's just not how it works, right? It's not just like, I need a little, just a little bit more of this and then I'm fine. It just, it's not how it works, it's a much more complex, dynamic, interactive system than it just needs a little more gas or a little more serotonin. It's just not how it works.

SHAWN STEVENSON: Yeah. And it never made sense to me. And fortunately, again, having access to incredible thinkers and mentors like one of my friends, Dr. Daniel Amen. He's doing all these brain imaging and just, again, that chemical imbalance being based on a conversation like, are we actually analyzing your chemicals? Are we looking at what's happening in your brain? And of course we can have patterns of behavior that we then diagnose. And all of these are great tools, but what if we have something that is truly minimally invasive and effective, backed up by data. And versus the side, which you said it earlier, this label of side effects, it's really a direct effect, right?

DR. ADAM GAZZALEY: They're effects. [laughter]

SHAWN STEVENSON: We just... I love this so much where like these are just effects that are different from what you thought.

DR. ADAM GAZZALEY: Exactly.

SHAWN STEVENSON: These are, they're all effects.

DR. ADAM GAZZALEY: Right.

SHAWN STEVENSON: That have side effects essentially, that are not just improving attention, but other improvements in your cognitive function potentially. And being able to access a flow state, potentially like, there's good side effects with this form of a treatment.

DR. ADAM GAZZALEY: Yeah. Yeah.

SHAWN STEVENSON: And my question being, to transition into that, getting this treatment approved by the FDA, this has never been done before. This is groundbreaking.

DR. ADAM GAZZALEY: Yeah, first time.

SHAWN STEVENSON: Can you talk about that?

DR. ADAM GAZZALEY: Yeah. So it's been a long journey. So this idea of a video game to improve attention started in my mind in 2008. And then, there was something that we built into a game called NeuroRacer. I'll quickly go through the 15 year story. And that became a research study that we published in Nature. It was the cover of Nature, very exciting, September 2013, so almost exactly 10 years ago, right? Coming up around 10 year anniversary. And what we showed there was that this game was able to improve attention abilities in older adults outside of the game and had sustainability of effects. And we actually recorded brain activity, before and after to show, that the improvement was correlated with changes in the front part of our brain, the most evolved part of our brain, the prefrontal cortex and its connectivity with the rest of the brain.

SHAWN STEVENSON: Amazing.

DR. ADAM GAZZALEY: And that was really the landmark publication and research that gave birth to a company that I co-founded called Akili, which then took the closed loop design of that particular game and licensed it from my university, from University of California, San Francisco. And then over the last decade has developed a much better game, better art, music story, interactivity, everything, but uses the exact same mechanics and closed loop design. So the same engine, just a way better delivery wrapper system. And then, over the last decade, over probably close to two dozen studies have been performed all replicating the original finding from the Nature paper. And I just wanna pause on this because it goes back to our conversation about single-tasking and multitasking, it's so interesting, before and then I'll get to the FDA right there. But basically what the finding that we keep replicating again and again, all sorts of different populations, kids including kids with ADHD, adults with depression, people with lupus, MS, on and on, same finding.

DR. ADAM GAZZALEY: Essentially, what we found, and this was my original hypothesis, is that the game actually challenges you to multitask. Not 'cause we want you to be a better multitasker, but because it is such a high level cognitive challenge for the brain attentionally to move your attention rapidly to resist distractions that if the game is designed to push you to do that with the goal that when you get out of the game and have to single task, you'll be better at it. In other words, we didn't change you, your personality is no different like it is with many drugs but we gave you access to resources that you now have attentional control that you could use to multitask, but you could also use it to single task. And our data shows that although the environment that we train you in is not single-tasking at all, when we test you with the most boring tests of single-tasking, pretty much across the board, across all those populations, you're better. Exactly the type of environment where kids with ADHD suffer the most. And so that's the main scientific finding. And over the years we've also showed that children, especially children and now adults who just came out and adolescents

just came out just in the last several months, that not only is their attention better on the tests, which now we know very, very well, I feel very confident with that finding.

DR. ADAM GAZZALEY: But they notice the improvements in their daily activities. They notice they could focus better, they could manage their activities better. That is something I did not know to be true. And it didn't have to be true. You could have better tests objectively of attention, but not just notice it in your life. Now, 70% of people, 70% of adults in our last study, noticed that improvement. They see it in their performance. And so to bottle all of this up, all of this research and development and design was presented to the FDA as a medical device to treat inattention in children with ADHD as the first of its kind, it's called the de novo pathway. Very hard at the FDA to go through these pathways as opposed to what's known as the predicate pathway. Where we are just sort of like, here's a new type of antidepressant, basically the same as the last slight modification. That's not what this is. This is like an entirely new category of medicine. So it takes a lot to go through the process evaluation of both side effects and our efficacy on having meaningful change. And then right in, during COVID, one of the big COVID gifts for me and having a daughter was approval by the FDA first ever video game approved for any medical condition. And in this case, it was our game Endeavor. We call it EndeavorRx to treat inattention in children with ADHD. So super exciting after like hundreds of people involved in this decade, over a decade of effort.

SHAWN STEVENSON: You are a historical figure. [laughter] It's so cool. I'm sitting here with a Napoleon/William Wallace like this is...

DR. ADAM GAZZALEY: It helps though, it has to get out there now and really reach its maximal potential, right? I am so obviously pleased to hear you say that. And I want that to be true. I do. And even since I was a little kid, I wanted to do something important at that level, which few scientists get to do, no matter how smart or how much resources you have, it's like a convergence of a lot of things. And I feel like this is on that pathway and we hit milestones no one ever did before, and I'm super proud of that. But we're not fully there yet. We still have like a paradigm shift of people, doctors, insurance companies, medicine is a pill. I'm like, no, no, no. Medicine could be more than that. It could be a video game, it could be an experience.

DR. ADAM GAZZALEY: And so there's work to do now to get it out there and to show its effects in bigger populations. And we just now moved from our prescription version for children to an over the counter version for adults just released. You get it without a prescription. We felt that that was a bottleneck that many adults didn't want. They were happy to recognize that they had ADHD. They didn't feel like they wanted to talk to a doctor about it, but they wanted to treat it. So we just put that out as an over the counter. Like you might think of Claritin over the counter, and so you can play the same game with the same

mechanics, same closed loop as an adult. Our data shows that it's even more beneficial than it is for children. And so this is all the pathway now of taking something that we've done so much work on and going through the really challenging part of getting it into people's lives. So that's the part now that we're up to.

SHAWN STEVENSON: So where would people pick up that prescription or that over the counter?

DR. ADAM GAZZALEY: You could get the over the counter on the app store. So right now it's on the... So the prescription for children is available through your doctor. So EndeavorRX has tons of information, things you could print out, show your doctor, like here's a video game approved by the FDA to help treat what I have for parents that want options for something different for their children. And for adults, you could just go on the app store, look for EndeavorOTC. We have a big website that tells all about the data. And we actually just released another feature that I've been waiting to drop for a long time of a focus score that we showed is a metric from gameplay that correlates with our clinical outcomes. So you get that when you start playing, so you know where you are, it predicts where you're gonna be in six weeks and then you get updated on it. So that's something we didn't have when we first released, but I know people like to quantify things. They wanna know how they're improving. So that's available on the app store. It's gonna be coming to Android soon, but that's where it is right now.

SHAWN STEVENSON: Amazing. Amazing. We'll put everything in the show notes for folks as well to get access to. And when you said earlier that this de novo pathway, it made me think about, you know, everything is related in tying back to other aspects of health, like we've used many fitness examples, for example. And for me it's de novo Lipogenesis. So the creation of new fat. So basically this is a new channel that you went through with the FDA. That here to for, especially when we're talking about something like, things that are kind of in a way grandfathered in, like it's just a slight change. Like this is a new thing, a new channel. So the ability to get this done is truly remarkable because the FDA, again, it's like, it's largely funded by pharmaceutical companies.

SHAWN STEVENSON: And some of this data has been out recently and I've been championing it because we have a system right now that is so focused on the treatment of symptoms and not really looking at like, how can we make people better. How can we create conditions to where we don't need these things? And creating this kind of revolving door or these kinds of repeat customers of the farming of sick people. And so with this being said, I'm curious, being that that has been the model for so long, and you said the key word earlier, you said medicine, and it's only been a few decades, just like our boom in technology, that medicine has become isolated to this one thing, right? And prior to that, even Hippocrates, he had all

of these different treatment protocol. This is the father of modern medicine. But because, and this is just a big part of it, because of money. It's really devolved to be this kind of isolated thing. Medicine is seen in this very vanilla, strange thing when even something like... if we're just talking about lisinopril, right? So if we're treating hypertension.

SHAWN STEVENSON: And here's a little fun fact, I haven't talked about this in a long time, but I went back and was like, because everything, even synthetic things are coming from something here existing on the planet. And I found that it was some compounds found in snake venom that were isolated to create essentially this very small relaxation of your blood flow, right? Your cardiovascular system. I was like, oh, that's interesting. Super fascinating stuff. But having this kind of blunt instrument, what are the side effects? Right? And so just to circle this back in my question. Medicine is so much more because that's an isolated compound where we might have something like... And this is... I'm just throwing this out here, like an avocado that has thousands of different chemicals. Thousands of different micronutrients, so many that we don't even understand yet or haven't discovered.

SHAWN STEVENSON: What is the effect of that system-wide versus this thing that is maybe one major compound and then a dozen other things to help your body to assimilate it, right? This food is acting as this change, biological change for your physiology, for your brain. And it just, it is. It is what it is. But we don't call that medicine. We call this thing medicine.

DR. ADAM GAZZALEY: Yeah.

SHAWN STEVENSON: And miss out on the breadth of what medicine could be.

DR. ADAM GAZZALEY: Yeah. This is... We could go deep on this. It's something I feel really strongly about. If you just walk up to a random person and ask them what medicine is, if they say a pill, pill That's mind blowing, right? That's a major marketing that has created that impression, because it's a very very limited view of medicine. And some of the challenges and having thought about this so deeply is how do I take this video game that I know works from the research that we've been doing and others have been doing, and turn it into something that people just believe is medicine right across the board from the practitioners to the patients to the FDA to insurance companies is a really fascinating challenge. And this word is used pretty freely, but in this case it's really true.

DR. ADAM GAZZALEY: It's a paradigm shift. A paradigm creates a box around you that you almost can't see outside of it, like the matrix, right? You don't know you're in it until you get out. And we're in a paradigm where we think medicine is just... Since we've been born, that's how it's been presented to us. And when I went to medical school, it's you either cut it or you take a pill basically. And the idea that there's much more than that is clear, but challenging.

And so for this particular approach, what I decided to do is let's just play by whatever the rules are now, right or wrong, and treat it like it's a drug. So we did double blind, randomized, multi-site placebo controlled trials of our video game, like publishing in Lancet Digital Health and said, look, this is no different than Adderall study.

DR. ADAM GAZZALEY: In matter of fact, our first author has done many Adderall studies. And so we presented it to the FDA as, how can you review this differently than a drug? Because we just treated it like one. And it still took us years, but that was the strategy. I actually think that the whole model needs to change in addition to the successes we had with this particular, it's not reproducible just to keep doing these giant super expensive bricks and mortar trials every time you have a new experiential treatment. But we did it that way because I felt that no one had done it before, and it needed to cross the threshold by just playing by the current status quo. And we were successful, but it was really expensive and long and hard. And one other interesting tidbit here is, I frame this as experiential medicine, but I certainly did not create experiential medicine for the mind.

DR. ADAM GAZZALEY: I think, maybe the first one approved by the FDA delivered through a video game, but experiential medicine is in many ways the oldest medicine for the mind. Things like meditation and mindfulness that has spanned the globe for thousands over a thousand years are experiences as medicine used to release suffering in many many ways. But the unique opportunity that I had and our company had and our lab has is that because technology can, has such accessibility, unlike human delivered experiential medicines like a meditation instructor or a therapist and has the ability to be delivered reproducibly. You can do the same type of double-blind trials that you can with a pill. And we figured out how to do that. And so, it's really hard to say, here's my meditation practice. I want it to be a medicine. And then the FDA would say, well, this is what our trials look like. Try to do that here. Really difficult. We were able to use technology. This is the move. We're able to use technology in such a way that we could mimic the status quo methodology that is accepted to approve drugs as medicine, which allowed us to become an experiential medicine approved by the FDA. I hope that makes sense.

SHAWN STEVENSON: I almost wanna stand up and cheer right now. That's incredible. That is so phenomenal. So phenomenal. I think a much more advantageous view of medicine would be something that creates a therapeutic effect. Right? And with that being said, there's so many different things that can function as medicine and create essentially... and this is another thing I've been really working to impress upon culture for many years, is that your thoughts create chemistry in your body. Your thoughts alter what's happening in your physiology. And the person who introduced me, who got me to like really kind of craft that awareness of that concept is a cell biologist. And the person who really impressed, epigenetics into the culture decades ago was this guy, Dr. Bruce Lipton. And whenever I would

talk to him about different things like this potentially causing a disease, he would always be like, Shawn, no no no.

SHAWN STEVENSON: It's the mind first. It's always the mind. And he, for him, and it took me a while to really accept it, that your mind is really the most powerful pharmacy in the universe because it's not just like identical hormones, right? Bioidentical hormones you're taking. You're creating stuff for you, for your receptor sites, homegrown inside of your body. Now of course, we can come in with and bring other things in that can create therapeutic effects and be of benefit. But the most powerful pharmacy is within us. And it's gonna be based on our perception. Our experiences can really transform our health for the better or for the not so better.

DR. ADAM GAZZALEY: I mean, we speak the same language. I could not say that any better myself. I mean, one really good example of that is the placebo effect itself.

SHAWN STEVENSON: Oh, yeah.

DR. ADAM GAZZALEY: And that's the example, right? Like, why is there a placebo effect? Even cancer treatments at placebo effects. Placebo effect is the mind. Its expectations driving outcomes beyond the active ingredient. And it exists for everything. So, you know the data is there, there have been [laughter], thousands of studies that have proven.

SHAWN STEVENSON: It's crazy.

DR. ADAM GAZZALEY: This point.

SHAWN STEVENSON: Thousands of studies. The placebo, you have to account for it because people are gonna have effects just based on the belief that they're taking something...

DR. ADAM GAZZALEY: 100%.

SHAWN STEVENSON: That has a therapeutical effect.

DR. ADAM GAZZALEY: So that says a lot about the power of the mind. And it's something that we... it's troublesome to me that we have not been spending as much time and money in harnessing that as we have in trying to find this magic molecule to fix it. And I've thought about like this, for so long, a lot of it is generated by money. Some of it is generated by the fact that people are lazy often, right? To be able to, and I get it, to be able to take a pill in the morning when you brush your teeth and depression is gone like that sounds pretty appealing.

If it could happen, sure. But the reality is that when it comes to the brain and the mind, it's not gonna be that easy. It's gonna be work.

DR. ADAM GAZZALEY: And in some ways that's like the good part of it. It's like, like our ADHD treatment, it's not a pill that you just take and forget about and you're better or worse from it. You gotta work. Like our game is hard, you know, it's the ultimate personal trainer. Like those 25 minutes you are working and, you know, so, but four weeks later when you're like, "Oh, I'm thinking differently. I'm seeing differently. I'm able to..." Then you get both the benefit of being better, but also the reward of knowing that you worked for that benefit. So that's like the plus side of what experiential medicine is, is that the downside is that it's not as convenient. And so it's gonna not appeal to everyone and I know that. But if you embrace it, and I'm not just talking about treatment I'm talking in general. I'm not even just talking about digital experiential medicine. I'm talking about taking up running or meditation or walks in nature. It could even be very passive. But if you commit to experiences as medicine and put the time and the work in, you get this double benefit.

SHAWN STEVENSON: Yeah. This is so good. So, I know that we have some, I think... I'm talking to you so I could say this, the human brain is always automating things, right? It's always looking for ways to automate. And so that can bring about open room for laziness.

DR. ADAM GAZZALEY: That's true.

SHAWN STEVENSON: In a sense. And so I don't know if we're inherently lazy. I know, you know, there are plenty of animals that take time off and roll around and just chill. And at the same time, I really believe it's our culture. Our culture has really altered the way that we engage. I think that our ancestors, historically, we knew we had to move, we had to do things in order to get results.

DR. ADAM GAZZALEY: Yeah.

SHAWN STEVENSON: Whereas today, because of changes in our culture, we have more and more access and really believe in this potential. That I could do this thing and get these results. I can get rich by doing the lottery, right? Like all I do is get this ticket and potentially I can become rich. Or I can take this drug and potentially have the body of my dreams. Or you know, fill in the blank, whatever it is. And so our culture has changed and kind of seduced us in a way that has made us more lazy and kind of open to that thing, that pill for an ill, or a pill for a solution.

DR. ADAM GAZZALEY: Yeah. I think I agree with you. I think that is a really astute perspective. And, it takes intentions and focus to battle against that. And, you know, I look at a lot of

things differently now that I have two kids for the first time in my life and two young daughters. And I'm like, how do I raise them in such a way that their values are oriented to not wanting that easy way out, that quick lazy fix, but knowing that real value in life usually comes from effort and that's okay. But yeah, there's a, you know, I think it extends across so many different domains, what you said, and we're paying a price for it. You know, we've been talking a lot about attention and our attention deficits and we know that. But this, it's so much bigger than that.

DR. ADAM GAZZALEY: I think what's happening to the human mind, I call it a cognition crisis to like extend it across the full range. And I actually even think of the challenges that we're facing now, not the least of which you were describing is beyond what we think of when we say there's a mental health crisis. I don't think that you need to have a clinical diagnosis of like major depression or anxiety disorder to be suffering, in what a healthy mind could and should be. So how we feel empathy for each other, how we make decisions, how we think in the future. It's suffering across the planet. And I think it's manifesting itself in ways that are very obvious just by reading the news every day. And so we have some serious work to do, I'd say, on the mind. And I like, you know, for me it feels good to return to, it's sort of a return. I use that word. Sometimes I catch myself, 'cause like we're talking about a de novo treatment. But in many ways it feels like a return to valuing experiences as ways of improving ourselves.

SHAWN STEVENSON: Yeah. And coupled with that, you've also been an advocate. And just, again, these things are very logical, but there are many different ways to create these therapeutic effects. The innovation that you brought to the market is incredible resource for everyone and also, just the basic principles and things that are involved in your life. You're somebody who utilizes exercise as well. Can you talk a little bit about that like some of the other things that can have a positive influence on our mind and our ability to focus?

DR. ADAM GAZZALEY: Yeah, happy to talk about that. It's really important for me to talk about it particularly because people get pigeonholed and I could easily become, oh, that's the video game ADHD guy I am not that. I am more than that not just in terms of what I do in my life but in terms of my values. And these games that we're building are as excited as I am about them and their outcomes they're meant to be very time-limited tools that you take to sort of refine your abilities. That's why they, you can't even play our game for more than 25 minutes a day. It will not allow you to. Not everyone is happy about that but that's the way it is. And we do not want you overdosing on our medicine. And so I am very pleased with what we did but there's so many more important things that are critical to be healthy and comprehensive and a full human being.

DR. ADAM GAZZALEY: Again, I see this much more clearly now through thinking about my own young family. I would say physical fitness is sort of at the top of the list. We are meant to

be creatures in motion. Our whole perception is driven by an interplay between how we perceive the world and how we act in the world. This perception action cycle is what our brain does. So you need to be moving in the world not just classic physical fitness, which I could not say enough good things about pushing yourself both from a strength point of view and from an aerobic point of view but even just being in motion. And, you know, again, with technology good and bad. You could just sit there like this all day just moving your thumbs that is not good for you. So being in motion, challenging yourself physically really just right up there with challenging yourself cognitively not better or worse they're just twin towers. As we know, there's a new found awareness that many of us knew but many people are discovering for sleep and being able to get quality sleep.

DR. ADAM GAZZALEY: I have a baby, I don't get quality sleep and I feel the difference but we know that it's not just hours and it's important and we really need to prioritize it for brain health, especially as we age. Stress is an interesting one that I like to think about. No stress is not good for the brain. Our brain, like all of our physical, like our whole physical body responds to pressure. You need to be pushing on something in order to maintain the health of the system. It goes back to the plasticity. If you are completely complacent and completely at relaxation, always, you will not maintain the high level functioning that you want. Too much stress, stress that is sort of chronic and helpless stress that you cannot get out of, is super bad for our brain. So that's why stress is complicated.

DR. ADAM GAZZALEY: Like there's a middle ground where it's the right level that it's healthy. And like most things, like again cuts both ways. So it's more nuanced than stress is good or bad. And then the last thing is what we put into our bodies, our nutrition which I know speaks to you very closely. And how we take in nutrients that benefit us, our whole body, our brain is critical to become educated in and to value. Because again we are not disconnected from our environment. That's like one of my most favorite messages that I don't usually get to talk to but thinking about a human being as an island of I, of me, it's an illusion. We do not exist like that. We are completely interwoven with nature and our environment in every way, from how we perceive the world to how we take in nutrients. And that is like, I think, a big part of our survival on this planet is to embrace that reality.

SHAWN STEVENSON: So powerful. So you just really summarized how the issues today it's not about the video games for our kids, for example. There are multiple studies indicating that this improves cognitive function. This improves other facets of people's lives as well. But when we have the video game coupled with Mountain Dew Red and Doritos, coupled with 10 hours of sitting at a clip and then maybe, get up to go piss and then another five hours. And I'm saying this from experience, when I was in college, sometimes my schedule would be based on how many hours of gaming I can get in before I had to be somewhere.

DR. ADAM GAZZALEY: I have done this too, so I get it.

SHAWN STEVENSON: And so couple that with the sedentary behavior, couple that with the lack of social connection in the real world. Like this is where we see...

DR. ADAM GAZZALEY: Bring in lack of sleep.

SHAWN STEVENSON: Right, of course.

DR. ADAM GAZZALEY: It's all of it.

SHAWN STEVENSON: Of course, that part. And so but what if we have these other ingredients plus utilizing technology in an efficacious way like we can really do something special, you know? And so I'm so grateful for you and the work that you're doing. Can you let people know where they can pick up your book, get more information and remind people where they can get access to the game as well?

DR. ADAM GAZZALEY: Yeah, so I have an aggregate website which is my last name, gazzaley.com, G-A-Z-Z-A-L-E-Y.com. And on there, there's access to all of my companies that I founded, the video game, a company Akili, my book, my photography, all the things I do. Akili, A-K-I-L-I, is the name of the company. You can find it that way. Endeavor is the name of the game. EndeavorRx is the prescription version for kids and, EndeavorOTC, is the game that's over the counter for adults.

SHAWN STEVENSON: Amazing, amazing. Again, thank you so much. This has been awesome hanging out with you.

DR. ADAM GAZZALEY: Thank you.

SHAWN STEVENSON: Thank you for coming to hang out with us.

DR. ADAM GAZZALEY: I had a great time as well, thank you.

SHAWN STEVENSON: Awesome. Dr. Adam Gazzaley everybody. Thank you so much for tuning into the show today. I absolutely love this conversation and if you did too please share this out with your friends and family. Share it on social media, of course. Take a screenshot and tag me, I'm at Shawnmodel on Instagram. And I'm at The Model Health Show on Facebook. And of course you can just send this directly from the podcast app that you are listening on. Forward this to somebody that you love. Send them a text with some empowerment. I appreciate you so much for hanging out with me today. And we've got some incredible

masterclasses and amazing guests coming your way very, very soon. So make sure to stay tuned. Take care, have an amazing day and I'll talk with you soon.

SHAWN STEVENSON: And for more, after this show make sure to head over to themodelhealthshow.com. That's where you can find all of the show notes. You can find transcriptions, videos for each episode. And if you got a comment you can leave me a comment there as well. And please make sure to head over to iTunes and leave us a rating to let everybody know that this show is awesome. And I appreciate that so much, and take care. I promise to keep giving you more powerful, empowering, great content to help you transform your life. Thanks for tuning in.