

## Ido Portal: The Science & Practice of Movement | Huberman Lab Podcast #77

My guest is Ido Portal, the world's foremost expert on human movement. Ido has spent a lifetime studying, combining and evolving elements from an enormous range of martial arts, dance genres, athletic endeavors, and science, to develop a unified theory and practice of movement called "The Ido Portal Method." Here we discuss all things movement, including the role of the nervous system, reflexive versus deliberate movement patterns, and the link between emotions and awareness in movement. We also discuss learning and neuroplasticity, the mind-body connection and how movement itself can be leveraged toward expanding other types of skills- cognitive, creative and otherwise. As one of the most sought out teachers of movement alive today, the knowledge Ido shares in this conversation can benefit everyone—children, adults, athletes, dancers, clinicians and trainers and the everyday person.

#HubermanLab #IdoPortal #Movement

Watch Ido Portal lead Andrew through his movement practice:

<https://youtu.be/JMzThWHk4CQ>

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#### Article Links

The Role of Variability in Motor Learning: <https://bit.ly/3zOafQp>

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- Welcome to the Huberman Lab Podcast, where we discuss science and science-based tools for everyday life. I'm Andrew Huberman, and I'm a Professor of Neurobiology and Ophthalmology at Stanford School of Medicine. Today, my guest is Ido Portal. Ido Portal is somebody who truly defies formal definition. He is, however, accredited by many to be the world expert in all things movement. Movement is one of the more fascinating and important aspects of our nervous system. In fact, it was the great Nobel Prize winner Sherrington that said, "Movement is the final common path." And what he was referring to is the fact that so much of our nervous system is dedicated to movement and, in particular, that the human nervous system can generate the greatest variety of forms of movement. We can run, we can jump, we can crawl, we can move at different speeds. Far more variation in movement and different types and speeds of movement than any other animal in the animal kingdom can perform. My interest in bringing Ido Portal onto

this podcast stemmed from a discussion about just that, about Sherrington and the enormous range of movements that humans can engage in. Ido is both a practitioner and an intellectual. We all know what a practitioner is, it's somebody who walks the walk, who actually performs the thing that they are knowledgeable about. And indeed, Ido has studied capoeira, a number of other martial arts, dance, gymnastics, various forms of sport, he's trained top athletes like Conor McGregor, and he has many, many other credits to his name as a practitioner and teacher. However, he is also a true intellectual of movement. I define an intellectual as somebody who can both think about and talk about a subject at multiple levels of granularity that is with exquisite detail and with exquisite simplicity depending on their audience and depending on the topic at hand. And as you'll soon hear from my discussion with Ido, he is both a practitioner and a true intellectual of all things movement. Today, through our discussion, you will learn how the nervous system generates movement, and the different forms of movement, the different speeds of movement. You're also going to get an incredible insight through Ido's mind and eyes of how movement can serve us in the various context of life. Not just in sport, not just in exercise, but in every aspect of our lives from the time we get up in the morning until the time we go to sleep at night, how we engage with others, how we engage with ourselves, indeed, how movement even informs relationships of different kinds. I found our discussion to be one of the most enlightening and interesting discussions that I've ever had, not just about movement, but about the nervous system. I can assure you that by the end of this episode, you will not only learn a tremendous amount about movement through the eyes and mind of the one and only Ido Portal, but you also will learn a tremendous amount of neuroscience about how the cells, and circuits, and hormones, and neurotransmitters of your body assist in creating the various forms of movement that you can generate, that you're trying to learn and generate, and that perhaps you should think about trying to learn and generate. And indeed, you'll learn some protocols and tools for how to do that. In science, we have a phrase, actually it's a title, that's reserved for only the rarest of individuals, we say that somebody is an n-of-1, meaning a sample size of one. And as you'll soon learn,

00:03:30 AG1 (Athletic Greens), ROKA, Helix Sleep

Ido Portal is truly an n-of-1. Before we begin, I'd like to emphasize that this podcast is separate from my teaching and research roles at Stanford. It is, however, part of my

desire and effort to bring zero-cost to consumer information about science and science-related tools to the general public. In keeping with that theme, I'd like to thank the sponsors of today's podcast. Our first sponsor is Athletic Greens. Athletic Greens is an all-in-one vitamin, mineral, probiotic drink that also has adaptogens and digestive enzymes. I started taking Athletic Greens way back in 2012, and so I'm delighted that they're sponsoring the podcast. In fact, when people ask me, "What's the one supplement they should take?" I always say, "Athletic Greens because it covers all of those essential nutritional bases and the probiotics, adaptogens, and digestive enzymes are vital for things like the gut microbiome." Your gut microbiome is trillions of little microbacteria that live in your gut, and that support your immune system, your endocrine system, and the so-called gut-brain axis, which is important for mood and neurotransmitter production, a huge number of biological systems in your brain and body. Athletic Greens also taste great. I mix mine with water and I like a little bit of lemon juice or lime juice in there. As I mentioned, I drink it twice a day, usually once in the morning, during the phase of the day in which typically I'm fasting or around breakfast time, and then again in the afternoon or even in the evening. If you like to try Athletic Greens, you can go to [athleticgreens.com/huberman](https://athleticgreens.com/huberman) to claim a special offer. They'll give you five free travel packs, which make it very easy to mix up Athletic Greens while you're on the road. And they'll give you a year supply of vitamin D3, K2. Vitamin D3 and K2 are important for endocrine health, for cardiovascular health, for calcium regulation, and so on. Again, that's [athleticgreens.com/huberman](https://athleticgreens.com/huberman) to claim this special offer. Today's episode is also brought to us by ROKA. ROKA makes eyeglasses and sunglasses, they're the absolute highest quality and practicality. I've spent a lifetime working on the visual system, and I can tell you that your visual system has to contend with an enormous number of challenges. For instance, when you move from a shady area to a bright area, your eyes have to adapt to that. ROKA understands the various challenges that the visual system has to face and they've developed sunglasses and eyeglasses with all of that biology in mind. Their glasses were developed by two All-American swimmers from Stanford. And initially, ROKA sunglasses and eyeglasses were for athletes. They designed eyeglasses that then and still now will stay on your face if you get sweaty. You can wear them running, you can wear them cycling, et cetera. They're very lightweight, so lightweight in fact that most of the time you don't even remember that they're on your face. But ROKA eyeglasses and sunglasses also come in a terrific aesthetic so you can wear them anywhere. So, unlike a lot of so-called performance

glasses out there that make people look like cyborgs, you can wear ROKA eyeglasses and sunglasses when exercising, to dinner, to work. Again, the aesthetics are really terrific and really adaptable to all those different environments. If you'd like to try ROKA glasses, you can go to ROKA, that's roka.com, and enter the code HUBERMAN to get 20% off your first order. Again, that's roka.com, enter the code HUBERMAN at checkout. Today's episode is also brought to us by Helix Sleep. Helix Sleep makes mattresses and pillows that are customized to your sleep needs. I've talked a lot on this podcast, and on another podcast, and on social media about the essential need for sleep. Put simply, sleep is the foundation of all mental health, physical health, and performance. Just a few nights or even one night's poor sleep can really hinder your mental health, physical health, and performance in all aspects of life. Helix has customized sleep products, that is mattresses and pillows that are designed to your sleep needs. And you can figure out what those sleep needs are very easily by going to the helix website, they have a quiz, it takes just about two minutes, and ask you questions like do you sleep on your back, your side, or your stomach? Do you tend to run hot or cold during sleep, et cetera? Or maybe you don't even know the answers to those questions, that's fine too, that's an option that you can answer as well. You take the brief two-minute quiz and then Helix will match you to the ideal mattress and pillow for you. I matched to the so-called Dusk Mattress. I started sleeping on that well over a year ago now, and it's the best sleep I've ever had. I'm sleeping much longer and much better through the entire night. And as a consequence, I'm feeling much better, more clear, more physically alert, et cetera, throughout the day. If you're interested in upgrading your mattress, go to [helixsleep.com/huberman](https://helixsleep.com/huberman). You can take that two-minute quiz and they'll match you to a customized mattress for you, and you'll get up to \$200 off all mattress orders and two free pillows. Again, if you're interested, you go to [helixsleep.com/huberman](https://helixsleep.com/huberman)

00:07:49 What is Movement?

for up to \$200 off and two free pillows. And now, for my discussion with Ido Portal. Ido, thank you for coming here today. I've been looking forward to sitting down with you to talk for a very long time. I was first exposed to your work from my post or a podcast I believe of you had a group of people walking down handrails, literally the handrails along stairwells. And as a, I don't want to say former skateboarder, once a skateboarder, always a skateboarder. As a skateboarder, handrails have a particular meaning, but I

was really struck by, first of all, the incredible range of skill that people had and yet their willingness to do this. Right, I think of handrails and walking on handrails or skateboarding on handrails as a potential hazard, and yet some of the incredible proficiency that some of the people there including yourself had. So, like many people, I was drawn to your practice and your work initially through a wide-eyed, "Wow." You know, they're doing some incredible stuff on natural objects, much as skateboarders or parkour folks do. But over the years, we've been in communication and I've come to realize that you're a true intellectual of the topic of movement. And I define it intellectual as somebody who can understand a topic at multiple levels of granularity, detail, general, specific, connections, et cetera. So, to start off, could you share with us your conception of this idea of movement? You know, obviously movement involves translation through space, but when you talk about a movement practice, what are you really thinking about? What are we talking about when we talk about a movement practice? - It's a big question. I somehow left the definition, the very tight definition of it out for myself because I felt it was starting to constrict me and be around me and I let the practice itself really define it. But I think part of our sense of everything is actually a sense of movement and then the stillness in the background of that. So, for me, this is the entity that I refer to as movement, and using that perspective for self-evolution development, of course, the physical side, but also movement of emotions, movement of thoughts, and any other movement streams. And by switching these layers and examining it from different places, you get a better and better sense of it. I think the visuals nowadays and media are what defines for people in the beginning things. And then little by little with experience, they can dive deeper, which is good. There is some aspect, sexy aspect or not so sexy aspect, and then you pull on it and you start to examine

#### 00:10:56 Movement & the Body-Mind Connection

and dive deeper, and then you receive the gift of it, finding out more. - I heard you say once that we are not just a brain with a body, but we are a body with a brain, which I absolutely love because as a student and a researcher of the nervous system, I never think about the brain as its own isolated thing, I think about the nervous system and the fact that the brain and the spinal cord are connected to the body, and the body is connected to this, to the brain. And in every direction, it's everything truly is connected at

the physical level, physiological level. Could you just share for a moment how you think about this body-brain relationship in terms of you mentioned movement of emotions, movement of the body, that you can't really separate the two. And for the typical person who's listening to this, they might not immediately understand what that means. Maybe it's something that has to be experienced, but when we think about the body and the brain and the whole thing working as one cohesive whole, what does that mean to you? Or put simply, when you do a movement practice what are you focusing on? Are you focusing on the movement of your limbs? I have to imagine that's true, but are you also focusing on how that makes you feel or how your feelings make you move? - Okay, okay, so some thoughts, I will try not to answer any of your questions during this interview, but I will definitely give some thoughts and then we can play with it. I think these definitions and, in general, the limitation of words ends up creating some kind of a corruptive process. You know, words corrupt us and corrupt our understanding. So, I think the brain-body, this Cartesian state of mind and thinking brought a lot of good, but also brought a lot of problems. And movement, for me, is the entity that ties everything together. It's the magic, it's the thoughts anima, it's when the coin spins and you see both sides appear at the same time. It's a beautiful analogy from a friend of mine, Dr. Rasmus Olme. So, the mind and body are one of those pairs, and I call it the movement/body/mind system, so it's when it's integrated, it's in motion. There is also a stillness that appears there, of course, and without it there can be no motion, but maybe that is a very good way to start to think of things. There is no really pure mental processes, cognitive processes. There is no pure physical processes, everything touches everything, there is a wholeness, and that wholeness is in motion. Yeah, the movement practice takes these beats and examined them. And here is a pragmatic thing, the scientist, the cerebral thinking about movement, this is important. The emotional side coloring, feeling the colors and the textures of motion. A lot of people who are involved with a movement practice never end up feeling motions, really focusing on how it makes you feel or how it feels itself. And then the actual movement, the action, so, it's action, emotion, and thought. And those are three streams of movement and they interlay together into this kind of a braided experience and whole experience. And I try to bring all these aspects into my practice

00:14:47 Entry Points to Movement



and the way that I live my life. - I think most people who embark on a movement practice will first want to know which movements to do, right? Squats, planks, push-ups, pirouettes, right? Pick your movement, it could be any movement. Are there any sort of just basic entry points that you believe everybody should walk through as they embrace a movement practice the first time and maybe even every time they do a movement practice? I mean, earlier today I had the great privilege of being guided through a long series of movement practices, and yet, the first practice we did involve, at first anyway, stillness not movement. So, if you would, could you inform us how people should think about approaching a movement practice? What is the first layer of any good movement practice? - So, you touched the word movement, and it's important for me to separate it from the word Movement with a capital M. Movements are the containers and movement is the content, and the content cannot be carried in any way without containers. So, the first entry point is to choose containers, and then the second thing to make sure is to put specific content into those containers and then enjoy them. I tell people that it's like a cup of water and you're being handed that cup of water. And nowadays very often people will start to chew on the cup instead of drinking the water, making it yours and discard the cup. And then, maybe later you want to have bone broth or soup so you use a different container, a bowl. So, a movement practice to start can start from anywhere, it's a rhizome, it's an open system, it has no center, it's decentralized, and it can be approached from anywhere, and that's its magic and that's the benefit of it. Some people find the body a good entry point, some people don't even enter from the body. Sometimes you can enter from other perspectives and then inside the body, for example, where should we enter? If we decided to take the body approach, the spine can be a nice decision, but some will choose just the pelvis. Any one of those points are valid. And then, playfulness can be an entry point, an attribute, and this is so open. So, I don't want to limit people and limit their minds in the way that they engage with the practice, but I also want to encourage the self-inquiry. Am I doing movements practice, or am I doing a movement practice? - So, could you help me distinguish the two a little bit further? I think I understand the difference between a sort of the noun versus the verbs. And in some ways here we are dealing with the challenge of the barriers that language present to something that's physical, right? I mean, indeed, there may not be a... I have to assume there is no perfect verbal language for movement. There are certain movements that defy language. I could say somebody jumped at a particular trajectory

00:18:08 Early Education in Movement: Awareness, Play & Examination

at a particular speed and moved this limb and that limb, but by fractionating it something is most definitely lost. So, if someone wanted to, let's say, get in better touch with their body, in quotes, in order to explore the infinite space that is movement, how might they begin to approach that? Is it does it begin with an awareness, with practice, or both? - It begins with education. You know, that's probably the most stable point of entry, awareness to some something as a concept that it is a concept, that there is validity, or because sometimes people look for that to looking at this entity, this open entity. And that's part of the reason why answering questions is not something I can do or even attempt to do. I believe in the power of the non-complete process, like making this table, but living something undone, not perfecting the product, why? Because it offers some kind of a dynamic nature of evolution that naturally unravels from it. Almost like sometimes I do it, I count reps and I'll only count to nine 'cause it tends to leave people in the count and it keeps going instead of giving them the 10. - Everyone wants to end on 10. [laughs] - Yeah, which is because of the decimal system, et cetera. So, all kinds of things like that is also important with the movement idea is to discuss, to examine, to look, to taste, to try, but then also not to try to capture because if you like the invisible loop of Hoffstadt. If you look at it too closely, it's gone, but if you look away, it functions and exists just like us very powerfully and obviously gives us the experiences that we have. So, when people enter movement practice, it is about education, bringing some awareness to the fact that they are living in a body, that they are living in motion, that their mind is a type of movement, that their life is a type of movement. Bringing attention to the movement of the emotions as well. Bringing just attention to the fact that things are in motion. The Heraclitus panta rhei, all in flux, nothing stops besides something that is the background of it and allows it to express, and this is the beauty of things. And this for me is the movement practice is this examination and bringing this awareness into things. As we sit now here, I'm also aware of my body, I'm also aware of the way that things make me feel, the way that your face is communicating to me. And I'm not just in some limited and very verbal, overly verbal state

00:21:19 Stillness, Movement & the Environment, Playfulness

because it misses a lot of the beautiful flux. - I'm going to inject some or project some ideas, and perhaps you would tell me if they're ridiculous, potentially useful, or useful. As I understand what we're talking about now and what we've discussed earlier is that movement can and should be incorporated into one's entire life. I've even heard you say that even before getting out of bed in the morning, one can experience movement, and it doesn't necessarily have to be of the intimate kind with somebody else, it's it can be paying attention to the rhythm of one's breath, or how you get out of the bed. Or actually, in anticipation of you arriving here today, I noticed that as I was going up and down the stairs in this house, that I was injecting a little bit of playfulness in the way that I might have many, many decades ago, but haven't for a very long time. And I asked myself whether or not that's what I do is referring to when he talks about threading this body awareness throughout the day. As opposed to, but of course not exclusive from just saying I have 45 minutes, I'm going to do movement practice before I shower and have some dinner. Right, I have to imagine both are helpful, but in terms of moving through the day and having bodily awareness, clearly there are an infinite number of ways one could do that, maybe you could just share a few. You mentioned, I mean, one could pay attention to their breath, could pay attention to posture. And this notion of play is a very attractive or as we say in science, it's a sticky concept, a concept that kind of draws one in. Maybe if you would, could you share with us just some ideas to get people thinking about or maybe even incorporating movement practice into their day, and maybe even touch on the potential role of play or playfulness? - Okay. Yeah, those are some good directions. I think one thing is this what you call wordlessness. I have been recommending to people non-verbal experiences and the awareness of the body, which is not really the awareness of the body, as you know, not purely or not fully. The awareness of motion is a very good way to start to bring awareness to that layer. And that layer will start to get clarified more and more and more, the more you practice. And then, it will enable for most people, a safe haven away from many states and difficulties, and will unlock a lot of potential attributes, and strength, and freshness, and a lot of beautiful things. Really one of the really perspectives about who we are comes from a person who influenced my thinking a lot, Moshe Feldenkrais, the late Moshe Feldenkrais. And he talks about the body as the core three elements, the core nervous system, two is the mechanical system of muscle, skeleton, et cetera, and the third is the environment, which is a unique way to look at it. And he talks about how the nervous system is both receiving information from the outside and from the inside. And in the first

years of life, you work a lot on differentiating those, what is me and what is not me? And I think movement, when you feel movement, you feel the movement of the outside that is, of course, arriving to you and receiving this, and also your own internal movement. And the same can be said for stillness. So, bringing the attention into those layers, it's a tricky thing. It's one of those elusive things to look at, but it's definitely of huge benefit to start to train it, start to practice it, to feel not our thoughts, not necessarily our body, but to start to recognize the dynamic nature, the flux, the motion, and it occurs in all these layers. So, you will need to find it in multiple locations before you start to more and more make it your own, make it really yours. How, for example, simple, pragmatic things I used to do this, I spent some time in Hong Kong, I would need to get my practice in, but I'm really turned off from commercial gyms and there is not a lot of nature accessible there so I would just strap on my bag and I would walk the streets of Hong Kong, which are very crowded and then I would try to avoid touching anyone. And it would be like two hours of just like moving, involved, fully involved, fully in my body, and experiencing beautiful things, and enjoying and developing myself as well in all kinds of scenarios, up and down in the escalators and off. So, this is an example of a way to practice. And then, the way that we are sitting like these chairs, for example, our chairs are not very dynamic, but there is rocking chairs, right? And this is something I recommend for a lot of kids like in schools, I used to rock on the chair, which is very common. I'm sure- - I used to put my skateboard underneath my chair and roll it back and forth, and the teacher would tell me to stop. And I would just slowly little by little trying to get the most subtle movement I could without them telling me they were going to take it away, or try. - Which is probably horrible, horrible advice and instruction just like sit up straight and chew with your mouth closed because they remove a lot of the self-education and a lot of the self-development and the practical discoveries that are necessary and even will damage focus and thinking processes in some ways. So, for example, I would make the chairs even more mobile and I would support more motion, and then I would be able to bring attention there, but I would also be able to bring attention away from it into other things. And it keeps refreshing me so I don't become stale, the water doesn't stand, this is the beauty of movement. So, you can focus for long periods of time and do incredible things with the mind, with focus, with awareness, attention. And it's like we're skin in the game, so I'm not talking as some meditator and he's describing the act of being very focused, but then I put a stick on the edge of his fingers and I tell him, "Balance it." And everyone can do it for 10 seconds and I tell him, "Okay, now hold it 10 minutes." And

you see that the skill has, he has no skin in the game. It wasn't developed in various scenarios, but so there is a delusion that start to develop and that's how movement keeps me very honest and humble in the way that I view humility and in a way that protects me and keeps me, yeah, it keeps me fresh. - I loved the example of moving through the crowded street with a backpack because of the way in which it's completely adaptive to the situation you happened to be in and highlights the fact that one doesn't need a gym or any specific scenario, although we will certainly touch on ideal learning circumstances for movement and some of the work that you're doing, of course. - The less of your own personal practice, and understanding, and knowledge you've done, the more toys you need. The more you've really worked on yourself, the more high-tech you are. The more low-tech are your tools, the more high-tech you are. And this is the most advanced technology by far on this planet. With all the advancement, it doesn't even start to scratch, and you know it, from the way that we understand the eyes all the way to with all the respect to the Boston Robotics, a 5-year-old motion- - Yeah, yeah. - Movements. Or animal motion with very underdeveloped, still relatively to us as systems. So, important to remind ourselves. - A lot can be done with the body and gravity as I- - Floor, a piece of floor, a piece of wall, a corner of a room is a beautiful scenario, which you can become discover in and play in. And, but we are not so developed so we don't see those options. And this is something that I try to stimulate, and that's why I made it a point to avoid any of the big sponsorship and high-tech tools. And I on point brought a stick into big conventions and/or sometimes I use a shirt with holes in it that just like a used shirt as a point to make when I'm addressing a crowd to keep things where it's important and it's important, we are important, and our experience is important. And we have to be very careful, these habits and these directions, they come from many times good intention, but they are the devil many times, they turn into the devil, just like our technology nowadays and what is happening with people and with depression, with meaning, meaninglessness, also with the body in various perspectives, or even I will also flip it into high performance sports and their price. Because for me, this is not a movement practice, it erases the person in the center of it. And then came places like skateboarding or break dancing where somebody with a disability becomes the best in the world, turns it into the biggest advantage, but you would never be accepted into gymnastics class, and I love that. And that change

to place change in the center, it's important. - You touched on mention of a few sports, maybe it was Charles Poliquin, or maybe it was another trainer that I heard once say that, "For kids, one of the worst things they can do is overspecialize in a particular sport." The idea being that it leads to improvements in performance in a very narrow domain, but they raised the idea that it could perhaps also constrains the development of the nervous system, such that certain emotional states, certain intellectual abilities will forever be shut off because of the intense plasticity that occurs early in life. The more I learn from you, the more I'm thinking that that statement really should be extended to all of life. And I love to remind people because I started off as a developmental neurobiologist, that development doesn't start and end, you don't have childhood and adulthood. Our life is one long developmental arc from birth until death, however long that might be. So, if one is going to be anti-specialist, maybe even we call that a generalist, what does that look like? What are the different domains of movement practice? And as I asked this, I realized I am in serious danger of fractionating movement into a list of words like strength, and speed, and explosiveness, and suppleness, a word that I've heard you use before. And yet, I think for most people because we think in words, often, some of those categories can be useful. So, let's say I was going to embark on a movement practice or a child was going to embark on a movement practice and either throughout the day or for a dedicated period of time, what are the sorts of categories of movement that I might want to think about, ballistic movement, smooth movement? Maybe you could just enrich us with some of the landscape around that. - Okay, first I'll address the first part that you mentioned. And I've learned from you about certain changes in the way that things develop later in life versus earlier in life. And you're right, it is something that Charles Poliquin also mentioned and I learned from back in the day as well from him, which can seem dark a bit and kind of hopeless, but then you should go beyond that. One thing that does seem to appear for me when I look around is these the concepts of unique postures. And I think this is true for postures of thought, emotional postures, and movement postures. Truly, earlier in life, we are creating these unique postures and they get into these drawers or like language letters. Later in life, the process moves more towards integration of these unique postures into all different organizations. The beauty of it is that you can use very few postures to create many possibilities, just like a lib needs a search for a language that contain one symbol only versus two, which he discovered. And this is something

that is often seen, like you take someone who moves in a certain way and you teach them all these new sports or techniques, but essentially if you look deeply and you're sensitive, you see it's the same postures that he will have to work with till the end of his life, the same thinking postures. And this is really problematic, where we are not freeing the mind beyond this, how would I say, a scaffolding of thinking and we are actually letting go of the content. We get more and more focused on the way of thinking versus the thinking itself, or habitual ways and forms of thinking, associated thinking, et cetera. And emotionally the same, we are constructing these emotional postures and then we have to go through the rest of our lives working with that. So, this is the dark side, right? But of course, there are always possibilities, both I think invading this early system, to some extent, even if it's 5%, or 7%, or whatever percent, and also on the freeing yourself of going beyond all postures period. Working with the postures you have, but towards a postureless way of doing things. So, this is something interesting to work when people work with movements, but finally are able to go into movement and this magic starts to happen, and then the techniques fall apart and something appears, and it's a face change, it's a transformation, it's a binary moment. There is a jump there for sure, and it's very rare to see both in thinking, and emotionally, and other ways, we have many names for it. And some talk about enlightenment and some talk about all kinds of processes related to it. And I think most of them are shadows of the sun, but it's not the sun itself really. And then, talking about ways of thinking about movement, this is where I use something I called my slice and dice because of the problem of using words, and definitions, and categories, I try to create a lot of them and I write them on the paper and then I crumble them, throw them into the bin, and I keep doing it all my life. The writing them down and the geeking on it is very important, also very important to let it go. I tell people what you forgot is not the same, forgetting is not the same as never knowing it. The crumbling and throwing away is a form of forgetting, but it leaves some kind of a homeopathic trace behind. So, let's take some slice and dice, and try to look at it. Here is a physical one, contraction, relaxation. That's a spectrum, and pretty much everything falls on this spectrum. Also, in terms of analyzing a person or yourself, you can tell me if you feel closer to this side or closer to that side, and then it allows you to examine your practices. How many of the practices are moving you towards balance and how many are it's your addiction of just doing what you're good at versus what you need? Here is another example, physical culture. So, we have the dense realm working with internal concepts and expressing them, abstract concepts, expression. Second perspective, the

Marshall concept, but not in the sense of just fighting, but also partnering, working with another person, a dynamic entity that is communicating with you. The third one is I call the elements, working with the environment. The next one is a somatic one, is the internal practice. And of course, there are all gray zones, and another one is object manipulatory, which you can think of it also as the environment, but it's more small objects, heavy objects, many objects, few objects. And then you can look at this way of thinking, and you can say, "Oh, I have many of my practices in this direction, but not," and you can draw it for yourself. So, that's another perspective, and this way I use dozens of perspectives. And with the years, it gives people a sense of where they want to go, how they want to do it, and what they need to address versus what they like to address, et cetera. Is it helpful? - Very helpful, those different bins are very helpful. I really appreciate that you mentioned that people will often practice what they're good at as opposed to what they need. In gym culture, we refer to this as the guy that always skips leg day type of person, right? You know, big upper body, skinny legs, or you you'll see people that have these enormous thick torsos and they're bench pressing all day, but they clearly need to pull on an object every once in a while to create some balance, but they don't do it because they, for whatever reason, they have an obsession with moving greater and greater poundage or something like that, which in certain sports like power lifting

00:40:50 Discomfort: Marker of Movement, Failures & Learning

or aesthetics aren't the goal, and it's simply to push more weight off one's chest that you could imagine that there's something beneficial there. However, I think that it's really important in intellectual endeavors and in movement endeavors, if I understand correctly, to bring oneself to a place of real challenge on a regular basis. In fact, earlier today, I was in a state of constant challenge 'cause it was all new to me. And as much as I told myself, "Beginners' mind, beginners' mind, beginners' mind," it's hard, I confess, to not want to do well, to perform well, right? And I think that's a natural and healthy thing. Yet- - Not only natural, it is necessary, but I want you to keep it on that side and to bring something to balance it. If there is not this challenge, the process will not work. It has to be this scale. And you're talking about scales of pain, pleasure, and this is another scale. And this discomfort again is necessary and should be recognized as, "I'm in the right place." When it becomes too high and I'm unable to resolve, to make any progress, I



went overboard, but when it's not present, I don't do nothing here. Nothing that I'm truly interested in, I'm just gratifying myself, wankery. It's in essence, it's not about searching for the discomfort, but it's a marker. And I think the question should be who am I serving? 'Cause people do not serve themselves, in essence, they serve part, parts of it, some kind of a fraction of themselves. And this separation of oneself from oneself, and this is also a result of the practice, a good practice. I think maybe the biggest gift I received from the practice is I can say although it will take maybe a certain context, I am not my friend. At times I am, but many times I am not my friend. And by creating this separation, I can assume a certain stability in the face of everything all the way up to our own mortality and death, which is, and maybe beyond, who knows? - Yeah, it was a striking moment for me earlier today when I was really challenged with one of the practices we were doing, and you said, "This is exactly what I experienced this morning, Andrew," that's what you said. And I couldn't imagine that you were having challenges doing what I was attempting to do. And of course, you were, and I believe what you were referring to is that you had put yourself at that edge earlier in the day in which you were making failures, you were failing to execute the way that you were attempting to execute movement. I should just to inject some neuroscience and neuroplasticity there, I can't help myself, it is what I do after all. There are beautiful data in animals and humans showing that in the seconds and minutes after a failed attempt at a motor execution of something, the forebrain is in a heightened state of focus. And when you hear it, suddenly makes perfect sense, of course, why would the nervous system change unless it got a cue to change? And the cue almost always comes in the form of frustration, the [imitates buzzer] or as we said earlier, nah, the nah signal [I do laughing] is the one that preps you to extract more learning from the subsequent trials. And yet, for a lot of people, they feel that ugh, that failure to execute, or even to approximate execution and they feel and experience that ah negative signal, and they lean out of the practice, they start to depart either mentally or physically or both. And if there's anything I think that perhaps we can offer is this understanding that that edge as some people call it or that failures aren't just necessary, they are part of the learning process, they are the entry gate to neuroplasticity. - Yes, contextualizing or recontextualizing that sensation is something I work a lot with and I just remind people and I also reminded to myself, and if it wasn't difficult and we didn't need to redo it again and again, we wouldn't be again on this correct scale, which is dynamic and moving just like rolling downhill. So, there is definitely a necessity to succeed, to orient, there is certain aspects that you want to

achieve, but then there is also the letting go of it and the deambitioning of it. And within that tension, the plus and the minus comes movement, and that that's how I did it. And again, if I stretch it too far away, or if I increase one of them too much, then I would have some issues, but you will with practice learn to recognize the optimal point of progression. Of course, it takes many years and a lot of play and exposure to get a sense of it, regardless of the layer in which it is applied. So, I'm sure in your field and in your pursuits, you are already aware of it and applying it in your life, talking about focus, talking about ways of thinking, creativity, et cetera. But then it's enough that I pull into another perspective and you will see that people are specialists, and then they don't have really the real essence of the concept. It's not theirs, it's applied specifically. The one who changes all the time gets the general component because what appears when everything changes? That is that new entity. Everything changes, something stays. That's what we want to get,

00:47:05 Movement Diversity, Squat Challenge, Injury, Movement Evolution

this concept and this understanding. - I've heard the statement before, we are just a meat vehicle, right? We're just a sack of cells and it's I truly despise that statement because, first of all, it deprives us of all meaning in of our lives. And we can go down the route of philosophy as to whether or not there's meaning or not, but more importantly, it divorces us from the idea that the body and brain are interconnected and have at least equal value at any one moment that they're informing each other. Emotions inform movement, movement informs emotions. One thing that I've heard you say before, and I'd really love to hear you embellish on is this important principle that human beings are truly unique in terms of the enormous range of movements that we can perform. And yet, we are excellent, maybe superior to all other species at certain types of movement. The one that comes to mind is walking, strides, striding. So, maybe we could just explore that idea because obviously a cheetah is very fast, the gibbon seems to have a lot of proficiency at grabbing and swinging from branches, but human beings perform an enormous or can potentially perform an enormous array of movements. Do you think all human beings are potentially able to explore all the different types of movement? And if so, how does one approach that? So, basically what I'm doing is I'm tabling a concept, which is not range of motion, right, for the gym rats, discard with range of motion, I'm talking about the variety of movements. - First, it's not important what I think, if it's

possible or not possible, or if it's even possible for you or not possible for you, what is important is what you truly want to do, what you truly are after. And it's important for me because many times, this way of thinking about things is already limited. I like to say a man doesn't go to the ocean to empty it with a spoon. A lot of the types of dressing up of the concepts nowadays is trying to fit an elephant into the hole in the needle, yeah? Like for example, the concept of practice, and then our lives, as if we have a life. We have some kind of a stream of behaviors, we have there is an argument of free will, et cetera. There is a multiplicity, definitely a man is a legion, that's the real meaning of that phrase. One day you wake up like this, I say, "Andrew, let's meet tomorrow at 7:00 am," but I don't know who's going to wake up tomorrow. And then you send me a text message, "Oh, I'm feeling off," right at 6:55 and go back to sleep. So, examining that and seeing that I think frees you up eventually and start to orient you in a better direction. So, what do you want to do and what, but in the orientation of also what you need to do, what you sense, and what you are developing as an evolutionary direction for you, this is the important bit. Is it possible for everyone to engage in certain specific physical movement? For example, in Scandinavian countries, the squat is not very approachable, it's very difficult. They're more built for dragging heavy things and also in this climate, I guess it, it makes less sense to squat and 'cause you're going to freeze there. So, this is and then you see the squat in warm climates and it's like so open and accessible. They're very good deadlifters usually, not good squatters and the- - They want to get away from the ground. - Yeah, the shallow hip socket, which allows one activity, but then the stability of the deep hip socket architecture of the hip, the femur heads, the Q angles, the shapes, et cetera. So, we are all unique and there are certain elements, which like, for example, my squat challenge is like for most people there is something there, but- - Could you remind people what the squat challenge is? - The squat was my attempt to bring a new, fresh state of mind into the word squat, not as a strength element, but it's a fundamental resting position really. Actually, should be one of the most abundant ones, we replaced it with sitting, which is not really doesn't work well if you're in a natural environment, it's not very comfortable actually to sit for long periods of time, rocks and different terrains so you end up lying down, standing, and squatting a lot. Also, when you're moving low and dynamic, like even collecting berries, the squat is much more dynamic and open. And then elimination is happening there, so it's like it's such a fundamental thing and we totally eliminated it. We eliminated many other things, overhead movements, behind the back, all kinds of back realm what I call the back realm

is totally absent in people's awareness. So, that was my attempt to bring it back into people, and I recommended to in order to really get the transformation, going to accumulate 30 minutes a day in the squat position, unloaded, just resting down, not correct, not erect, many people make this mistake, they didn't read through the whole thing. It's just resting down there. And of course, you have to be mindful of dosages. Some people will get hurt if they try to do it too quickly so they might need a buildup process towards it. And also, I'm not talking about 30 minutes straight, but accumulation throughout the day. And this does a lot of good for digestive problems, for lower back pain, for hip pains, for knees, and generally for aging because it's basically folding your body in the most basic way. Are you folding your body? If you're not folding your body, you will lose the foldability of your body. And this is probably the easiest and the most abundant way to fold the body. So, but this is an example of something that can be very useful with many, many people, but there will always be unique individuals which needs something else. And there are benefits in examining things and also there are benefits in getting hurt, which is not often discussed, especially not in these parts. So, I'm one of the only ones as a teacher that says, "I injured many of my students." And if I did not do that, I would be totally useless for them as well. That totally safe system has nothing to offer, practically nothing is totally safe. And we can, of course, we don't approach it with a ballsy or machoistic thing, but we are aware that sometimes we have to go beyond the boundaries and hopefully those would be the small injuries that will help us avoid the big injuries. But if you try to avoid the small injuries, maybe you'll get those big injuries in there. So, examining which types and forms of movement, the location of the body, speed of execution, the type of organization of the body, which is a whole thing that we can discuss. All of this is up for the grabs and something that we have to create individual relationship with, hopefully with good guidance, where we can get the right scenarios, a facilitator of good scenarios for our learning, which is what I try to do. And less of a technical state of mind, do this ABC or, yeah, like chunking what I really dislike from a long time is like many people they tell me, "Have you met this guy? He's an amazing teacher because he chunked the process into these bits and not even in the correct places to chunk," it was like and it doesn't offer, it locks us, this state of mind. I talk about the chemistry model, I call it my chemistry model where an atom, a molecule, and then a compound is conceptualized versus just chunking. So, there is an actual evolution like I call it also sketch learning. I'm not going to try to draw you, if I know anything about art and drawing, I'm going to start by capturing something very rough.

And I need to practice that first, that dynamic entity, before I go into the rendering and the shading, et cetera. So, the same way to learn things, so big picture, the small details. And unlike many of my teachers in that I ran into, and I say, with the greatest respect because I don't know who taught me more, my good teachers or my worst teachers,

00:56:36 Animal & Human Movements, Gain & Change

but some of them just teach from the small details into a big picture that never arrives. - Given that humans can generate such a broad array of types of movement, run, jump, duck, squat, leap, and all these types of movements. Do you think there's value in observing the movements of other animal species? I know I certainly enjoy watching other animals move. I think the most, one of the more spectacular animal facts that was shared with me is when I was a graduate student, someone down the hall was working on the little pedals of the chameleon, which can walk up walls. And it was a great mystery as to whether or not they were suction, but turns out they can do it in a vacuum, so it's not suction. Whether or not there was some sticky substance and it turned out, I don't know, I feel compelled to share this with you so I'm going to do it because I have a feeling it will lead us to an insight of some sort, that those little tiny pedals are so thin and so close together that the chameleon actually sticks to the wall by what are called van der Waals forces, meaning it's a very weak molecular force, but strong enough to stick to the wall because they are actually exchanging molecules with the surface they're on. - Wow. - So, obviously we can't do that, and yet I spent hours, because they were in the lab next door, watching videos of these little chameleon walk and the articulation of these feet is incredible because they're literally rolling those little pedals along in a way that it kind of defies anything else I've ever seen. I told myself this was useful, A, because I thought it was interesting, but, B, because I never really thought about how I articulate my foot. I've thought about being a heel striker or a toe striker when I run and no one can tell me which one I'm supposed to be. And maybe you can tell me, [I do laughing] but the point is, or I suppose the question is, do you think there's value in observing the extremes of animal kingdom movement as a way to inform the play space and the exploration space of our own human movement practice? - I think so. I think, first, it's inspiring, it opens up, but I will take it away from the romantic point of view. And I would offer another way to examine all these movements exist in us in ways, in certain ways. Like the work of Gracovetsky on the spine, "The Spinal Engine", and to see how

these old ways of moving even all the way up to exoskeletons and like primary, very ancient or even single cell things are still within us to a certain extent. And then, of course, this gets developed like the Darwinian state of mind got stuck for many years on the survival of the fittest. But actually, I believe, I always believed and I saw some information about it lately that mutation is the heart of the model, not survival of the fittest. - Yeah, people often hear the word mutation and they think, "Oh, mutations are bad." There are maladaptive mutations and then there are adaptive mutations, for sure. - And then, this places the word change in the heart of it, what it wants to do, change. So, it does not want to become better, there is an inherent change in it. And then, of course, they become better at X, Y, Z, fittest is the secondary perspective that arrives in relation to certain things, but there is still a stronger, more ancient driving force into the process. So, for me, this is cool to see these animals take it all the way to this extreme, but it's also still reflecting within us. So, I love to do, like for example, I introduce with people spinal waves, and by bringing these waves into the body, sometimes you get weird experiences like emotional releases and sometimes, and other times it can become an incredible tool to help an athlete which specialized and reach the top of the top. And then, you defrag his system a little bit and offer him some freshness and some segmental movement. And first you fuck him up, that's usually the case. Technically he's off, his coordination is off, but later the growth will arrive. It's a form of playfulness, it's a form of examining things regardless of their success or failure. More understanding that change is important and then after that, we can also look at the more competitive state of mind and the more success and failure orientation, but there is no game without change. So, this is the primary one, and that's why I say, "Okay, you want to succeed in the tasks like we did earlier, but you stayed within the game, to sustain the game, the infinite versus finite game perspective." To sustain the game means to continue to change, continue to transform, and then to win the game sometimes mean game over.

01:02:04 Core Movement, Emotion & Memory, Spinal Waves, Evolution

So, it's like, yeah, within that tension I think it's beautiful to play, and to exist, and to be. - You mentioned something that for me is an incredibly important concept for a couple of reasons, and you mentioned these spinal waves. Right, I have to assume that's taking the torso for us, you know, movement morons that I'll just refer to in coarse terms of thoracic spine. So, I mean, I will stay away from the technical anatomy and the torso and

creating movement either side to side undulation or arching and extension of the spine. - Yeah, dorsal, ventral, side to side, or rotational as well as spiraling. - Have you ever had the experience that of yourself or other people engaging in those types of movements and experiencing particular categories of emotions? And I have a particular reason for asking this, there's no right or wrong answer, of course, but I'm just curious whether or not movement of let's call it the core of the body, things close to the midline as opposed to far away from the midline like the digits far. Is there any, do you have any evidence that that can evoke a certain category of emotional states? - Evidence, I have none, but I have experience and I have some thoughts about it. Ida Rolf is known to have created Rolfing or structural integration said, "The issues are in the tissues." And around the spine, the spine is us, as you know, it's like can take an arm off, a limb, but there's been attempts, but there is no brainy alone, this cerebral thing alone, the spine and the maybe more parts of n-systems inside the torso are important. So, that's why I like to start from that core entity. And then these little fluctuations they create, they unblock things, they start to move things. And you can avoid, funny enough, mobilizing those areas by doing big frame motions, and competitive motions, and techniques all your life. So, even most yogis, for example, they look extremely mobile, but then when you're actually going into the small, what I call the small frame, I borrowed this from Chinese martial arts, small frame, big frame. The big frame is this big changes of our total body in space posture. And then the small frame is barely moving, but mobilizing the little bits that comprise the same pretty much posture. So, these are very beneficial and it has totally disappeared from our physical culture. When you introduce it back, the small frame offers the big frame, but the big frame doesn't offer the small frame because, of course, the small detail come together into the big picture. So, if I want to place my body in a specific position and I have all these bits moving well, I can construct it in whatever way I want. But if I just work on the big one, most chances are I just mobilize certain areas while other areas are totally held or blocked and then I'm specialized one more time. Take me out of this realm and I'll have difficulties. What will sit there in this stagnation? Emotion, material, thoughts, traumas. That's why people get discharges. The body memory is not what we think it is, that's how I believe, it is stored in a lot everywhere, and I've had those experiences. A lot of people have the opposite. When a certain emotion is evoked, they start to undulate the spine. So, this can be worked from this direction or from this direction. And I believe by applying such a practice, it is wise, you basically turn over the lens and you are allowing things to shift, and to move, and to adapt. So, I highly

recommend it and we teach it in a very elaborate and gradual way. And this is needed really because people, when they just go into like some general recommendation, they usually just get stuck into a new pattern, "Ah, that spinal wave, okay, that's it." So, I've been using, again, this slice and dice-like teaching dozens of systems of moving the torso until a person is freed to really move the torso like the language is created, the small enough units are created in your understanding from all these systems and then you improvise, you reach the highest level of the practice. - I love the answer. Let me tell you a bit of why I asked. So, there's a principle in neuroscience, but especially in neuroevolution, they call it evo-devo sometimes, evolution and development, how those link. If you look at, so we have motor neurons, as you know, but for the audience, that live in our spinal cord that cause transmission and contraction of the muscles, allows us to move our limbs. And then, we have motor neurons up here called upper motor neurons that control the motor lower ones. So, once something is reflexive or learned, we're not thinking about it, so to speak, we mainly use the lower motor neurons. We know this because you can do an experiment, it's a rather barbaric experiment, but it's been done many times called creating a decerebrate cat. You actually remove the neocortex and these cats will walk on a treadmill, it's called fictive motion, no problem at all. There are human beings who don't have a neocortex or much of their neocortex is missing, they generate perfectly fine movement. - The pattern has been download. - That's right, and it's truly downloaded into the spine and the connection between the spine and muscles. Now, the motor neurons that control the spinal waves, as you called them, are of a particular category. They have a molecular signature, a physiological signature, they were identified by, he's dead now, but a biologist at Columbia University named Tom Jessell, and many of his scientific offspring. Here's what's interesting, in fish or in animals that really only have the opportunity to undulate and flap their little fins. Though, motor neurons that control undulation in those animals are identical molecularly to the motor neurons that control the spinal undulation in humans. What's been added in human evolution are extra rows, literally categories, of molecularly distinct neurons so that as you move from the center of the body outward, unlike a fish, which can move its fins, but can't actually, it doesn't have digits. We have special motor neurons to move these little bits, these bits, these bits, and I can't do a spinal wave, but I can do the mudras thing, like the belly thing. - Ah-ha. - That comes from seeing the movie "E.T." when I was a kid and puffing out my stomach [Ido laughing] and then realizing that I could wave it, but only in one direction and- Okay. - apparently not up. Anyway, the



yogis out there can chuckle at that, but. - The yogis actually do it to the side. - Oh, do they? - Yeah. - I don't know if I can do that. Anyway, my spinal wave is weak, but I'll work on it. But what I find so interesting about these layers of, I don't want to say sophistication, but these with evolution came the addition of more pools of opportunity. These motor neuron pools, as they're called, are opportunity to engage in new, more elaborate types of movement. But with each new pool became the opportunity to create combinations of new movement. And so, the reason I asked you why spinal waves create one category of movement is that if you touch a fish on one side of its body, it moves to the opposite side, it never moves toward it. But earlier we were doing a practice, somewhat similar of testing this similar reflex. And sometimes I or someone will move toward a touch, we don't deviate to the opposite side. So, I have this untested, at least formally tested hypothesis that movements of small digits and portions of our distal, as they're called, far from the midline body parts evoke different sensations, maybe even far more subtle sensations than movements of the core of our body and the stuff closer to the spine. Again, it's just a theory, but I'm grateful for your answer because it lands at least in the general vector direction of my idea here. - The central orientation is mostly gone from our culture, we don't even walk basically these days. If you look at traditional culture, the amount of walking you do on a rest day, it's huge. And so, we started to create technologies to bring everything into the periphery, controlling it with the fingertips, et cetera. So, we have incredible neurological development relating to this, but our central patterns, swimming, running, jumping, throwing, throwing is not pushing away, that's an example, right? - Like some people when you give them a ball to throw, that you can tell if they've never thrown a ball before. - Yeah, they throw like a girl. - Yeah, they don't just- - That is often said [Andrew laughing] here in the US. And it's, of course, unfair, but it relates to experience, right? That is less maybe promoted or offered for females, so you get this peripheral pattern instead of a central-generated pattern that progresses towards the extremities. One thing I wanted to ask you is I know an area that is not often mentioned is that some of these ancient patterns and systems are primary in many ways, hence those newer developments inside of us are constrained by using the connections running through these ancient systems. Hence, we are much more limited by the gene pool. We are hitchhikers on a piece of DNA, I like to say, and that gene pool is like is driving something so primary that even when you are in kind of the driver's seat in your eyes, you're actually not

01:12:39 Song, Dance & Complex Language, Movement as Language, Consilience

or you're being totally constrained by that. And I wanted to hear about this. - Yeah, recently we had a guest on the podcast named Erich Jarvis, he's a professor at Rockefeller, who was offered a position to dance with the Alvin Ailey dance company. So, an accomplished dancer and comes from a musical family chose to become a neuroscientist instead and study speech and language. - Wow. But he said something incredible, several incredible things, and really looking forward to getting your reflections on. First of all, he said that when you look at the species in the kingdom of animals, including us, that have elaborate language and true song, they all also have the capacity to dance. All the... It turns out hummingbirds actually have a dance and a song capacity. That perhaps, and this is the going idea now in neuroscience and evolution of the brain, that singing actually came before finally articulated speech and language, that voice involved first to sing, to communicate. I mean, to enunciate ugh, or uh, or mm. You know, but then song may have come first. Where you have song, you have dance and the capacity to dance, which of course is movement of the body. And where you have song and dance, you always find that those species can generate elaborate language. Now, the simple version of this is okay, sophisticated brains tend to create clusters of sophisticated capabilities, but the other possibility, and it's the one that Jarvis proposes and I think it's in line with what you're perhaps raising here is the idea that movement of the body and range and sophistication of movement of the body through all these different systems may have actually promoted or even driven the evolution of the things that we think of as speech and language and the ability to have multiple words for the same concept, or to have elaborate articulation of speech. I find this incredibly attractive as an idea because certainly from as a hierarchy of needs, we needed to move first to survive, and to mate, and to flee, and to attack. It makes perfect sense to me that the layers would be built up fundamentally from the body to the mind and not the other way around. So, that's one piece, and then the other piece, which I'll just share for any reflections you might have that just blew me away was Jarvis told me that when we read, if, and this has been done experimentally, if one records the EMG, the low level muscular activity in the larynx and pharynx, we are actually repeating the words that we read, but so subtly so that we don't actually speak them out, unless there's some sort of neurologic deficit, which some people have, some people mumble while they read. But what that tells me is that language is movement and movement is language. So, again,

we have this convergence, but at a very basic level I'd love your reflections on those are all his ideas, I want to say, I'm just repeating what he said and not nearly as precisely as he did, but how do you think of movement as either the foundation of language or as its own language that perhaps even defies words? - Mm, [gasps]. Wow, those are beautiful perspectives, and I definitely feel the same. There's a lot to say about singing and dancing as well as also as a form of ancient programs of transmission. Sometimes that there is this in some ancient practices, the mantras. And people don't realize that they are tantric practices, they contain a form of vibrating and breathing all tied together into very elaborate way to promote a certain effect. And how would you do something like this in ancient times? This is ingenious. We, even until today, we need a full book to describe something and it wouldn't work as well, so it's like a very ancient form of transmission. The more accurate we became with the language, the more dead it became, because it is less of a movement entity, it is less of a dynamic entity from its nature. And that's why Yukio Mishima says, "It's corrupting, it corrupts us." So, definitely, definitely the conducting force or the primary force for me is movement that is experienced. Every time we talk about movement, basically, even now we are spilling it into a container to call it what it is, but it is beyond that. So, then it is applied into dancing, into singing, into language. There is no other language that I see as a primary mode, and this is a nature of space, time, things moving. So, I think everything moves into the direction of understanding that more and more, and maybe it's not so popular to call it movement or people have some connotations, and it's okay, you can throw away this word and put another word, and we probably need to do that also like regularly, like I start to see the end of this word for me. Things get corrupted again, overused, abused, and then we need a new word. And that's even that word is only needed for communication and for specific processes of education exchange, it's important to stay within the experiences. It's important to continue to promote scenarios in which the experience is primary, more open experience, let's say, and not try to hold down and define overly accurately or if it's done throwing it away and starting again. So, there is no winning concept, you got to the winning concept, you got nothing. You were able to grab it, you were able to, this is very science, right? It's like, "We got it, we got it," and then it turns out to be nothing. And like more and more time passes I feel science is becoming more humble and things are being discussed in this way. And because really what does science do? Report the sun came up a certain amount of billions of times and then tomorrow it will come up again. It's statistics. - Yeah, it's good prediction. - Yeah, yeah,

but we can go beyond, there is something inside of us that can go beyond. Hard to communicate, I can't offer it right now here, but I have the experience and thankfully I have a practice and a way to sense it, to feel it, and to reexamine it, and then we can talk about it, and have something from that. - Edward Wilson, the great sociobiologist, he actually founded the field of sociobiology, E. O. Wilson, they call him, Edward Wilson, had this beautiful word and indeed named a book. Actually, the word was better than the book, sorry Wilson, but the book was a little bit meandering for my taste, but then, again, he's the Harvard professor, not me. Well, Stanford's pretty darn good. This word is consilience, this idea of a leaping together of divergent forms of knowledge to create a truly valuable concept, which I love. I love it because, of course, I'm formally trained as a scientist, I look at things mainly through the lens of neuroscience, but experience is real and observation is real. And even in the field of medicine, you have double-blind placebo-controlled clinical trials and then you have case studies, n-of-1, right? Not often discussed, right, I mean, H.M., the most famous example in neuroscience of a patient that had no hippocampus informed us more about the process of memory and indeed the function of the hippocampus than thousands of independent experiments that followed. So, you can't have one, you need all these different forms of exploration, which is I think we share the belief, if I may, that convergent forms of knowledge, eventually this process of consilience can eject a new concept. And yet, the challenge,

01:21:39 Movement Culture, Community, Collective Knowledge, Wild & Wise

again, is that if we don't have a language for it, it becomes hard to transmit. One of the things that I find incredibly, I'll use this word again, sticky is this notion of movement culture. I don't know who coined that phrase, or I've seen it in the circles and accounts around your Instagram account and others. I don't know if that's a phrase that you coined, but this idea of engaging in movement practice with others, whether or not it's dance or other movement practices because it's so dynamic, there's the unpredictability of it. Even to like today, two practitioners at vastly different levels of knowledge and experience in movement practice, there's information, I like to think, to be gained from both sides. [laughs] So - 100%. So, one thing that I've heard you say before, which really resonated with me is this idea that people have maybe particularly in the US have this concept of, "Oh, I have my yoga friends or the people I dance with are distinct from my family friends, are distinct from." But as you pointed out, gathering around movement

is an age-old tradition. And that perhaps we better off not thinking about people we exercise with or train with, but that friendship and connection made through movement is perhaps the most valuable form of connection. - Yeah, I think it's a product of those practices that are maybe not so aware or not so movement-oriented in the open sense and then you get this sensation with people, but alone, we do nothing, so much so that we're never alone also on the inside and we will manufacture and produce entities inside, so we're constantly in a dynamic exchange, cultural exchange. And practically, I learned this lesson in capoeira, it's a cultural manifestation. Things happen within this context, we rub against reality, we rub against each other and their movement occurs and their insight is to be gained and development happens and then comes other thoughts, collective knowledge versus self-knowledge. We are transmitting knowledge. If we go on top of some mountain, 20 people, 20 normal individuals, and we spent 20 years just fighting four hours in the morning, four hours in the afternoon, and we do it for 20 years, but we're isolated from any other source of knowledge, we would still not reach anything that a very young fighter these days has. We will be unable to develop those techniques, those insights, that's where collective knowledge comes in and transmission jumps us forward, but what is the problem with that? Staying within just those technical constraints and never making it yours, that's the part of self-knowledge. The digestion of this collective information until it becomes digested and becomes part of yourselves, and then you are it versus you are doing it. And this is a clear separation that you can see in sports on a very high level and on a not so high level, even though I would be honest if I say that some people reach very far just with collective knowledge and a very technical approach, and others reach extremely far with very little of it. And there is always outliers, there are always the outliers in that case. Another thought I had when you mentioned evo-devo, evolution development is also the Greek concepts of poiesis and physis. The growing of the seed into the tree, and the other process of the manufacturing of the chair from the tree. Two processes of development evolution, very different. One from everything to something, the other from nothing to something. One is accumulation based, one is subtraction based. Both of these processes relate to collective knowledge, self-knowledge, but they're not exactly just that.

01:26:36 Potential for Movement, "Humming"

And what should we do? This is a question that my friend Rasmus, he asks in his thesis

and thoughts, what is the ultimate for us? Should we manufacture our chair or should we grow like into the tree? Civilize the mind, leave savage the body. Is it in this way or should the mind also be left wild? Wild and wise is a nice combination of words that I like to place together, wild, wise. So, this is something that I try to bring into the way that I live my life and my practice. And I try to bring the information, and the wisdom, and the collective knowledge, but I also try to let go of more and more until an essence is gleaned, until something is appearing and because everything was already there. For example, if I'm sitting here, all the movements are already occurring, all the possibilities are. So, it's just about, I need to open, I open this window, the air would come from here. If I open this window, the air would come. I don't need to drive my motion, I need to discover what is stopping it from happening. Something is constantly holding, and when we remove this immediately movement appears, this is real deep movement versus the driven movement that is a very wasteful of times like walking, you see people pushing through the walk instead of the controlled falling that it should be. Fighting, punching to manufacture the strength and then to have someone who knows how to facilitate the conditions in which you are knocked out. It doesn't knock you out, "It hits versus I hit," like Bruce Lee said. So, this is a beautiful thing to examine and to work within that, so it's to see am I skateboarding? Am I using this perspective? Or am I trying to, to control because of risk and danger, I'm trying to overly control something that actually can never be controlled. The way to control it is to let go of the control and then, okay, but what about all this collection of information, knowledge that I can bring in? Where do I want to play? I can play down here or I can play up here. The collective knowledge is maybe take you further in, and then you're still going need to do your individual work. A lot of people like to romanticize on that and it's you don't need teachers, we don't need nothing, we don't need information. It's not fully honest, you don't need, but depends on where you want to function and how you want to function. They shouldn't be demonized, but they shouldn't be overly glorified as well. - You mentioned about the opportunity for movement, perhaps even all forms of movement coming from deep within, it raises to mind in the neuroscience of motor systems we talk about motor neurons, as I described, the ones that actually evoke contraction of muscles. And then, there's this category of neurons that isn't often discussed, but certainly exist. Aren't often discussed in kind of popular nomenclature of neuroscience, which is the pre-motor system. Most of our movements are the reflection of certain patterns of transmission breaking through from the pre-motor to the actual motor. In other words, we are always in a anticipatory mode

of movement. And as and I think you, the way you describe it, you clearly intuitively understand this, you feel it, and you recognize it. And think of it as it's like a layer of neurons that's constantly humming [hums] ready to go. And it's the release of these gates that allows movement to occur in a particular way, could be very smooth, could be very ballistic. - Which is DNA, the same, turning off and on, all the information is already there. - Right. - And then the possibilities are just allowed. So, I'm allowed, I don't do free will already, but I am allowed to do, I am. There are possibilities and I am dancing within that dance, but I am not the only dancer. So, that's, that's my sensation at least with most states of being, let's say. Maybe there is other states that could be reached, a stability that will arrive from the waters, from the movement of the waters, this humming, these potential possibilities to be in that state, to vibrate like this is very powerful for our lives. To wake up in the morning and feel that living thing is the feeling of movement, and, for me, it's a result of the practice. And so, then it's easy not to stagnate and then the mind can stay focused for hours like we've done today, and I can listen and tune in and I won't lose you. Which is very difficult, like I haven't had a good conversation here in the US it's very difficult, and I've had your attention and you're listening, but it's rare. It's rare that somebody can do that,

01:32:18 Instructiveness vs Permissiveness, Degrees of Freedom

and it's a struggle, always a struggle, but it's definitely my trick, my dirty trick. - In that you said you're allowed and, again, I'm taking some of the language and what you report about your experience and I'm trying to map it to some concepts that relate to neural circuits. In the principles of neuroscience, we talk about instructiveness versus permissiveness. There are instructive cues, like for instance, the ability to pick up this pen, right? There's an instruction, clearly there's a motor command, but that's just one way of looking at it. The way it actually works is that there's a pre-motor system that's already generating that movement, and what we've done is we've flung open the gate and allowed that movement to occur precisely. - Surfing it. - Right. - Surfing that current, or this current, or another current, or opening the window. - Exactly, and if you look at the formal study of movement and improvement of movement, the most basic example I can give is like a tennis serve. And they, if you just, and they've done this many times over. You map the trajectories, and in a novice the lines are all over the place, it ends up looking more like a tangle of rubber band ball, right? Whereas in the Federer or the

expert, you almost wonder if it's just one line being drawn, but it's the trajectories are incredibly stereotyped. That's the reflection of one little narrow gate opening again, and again, and again. Of course- - Let me inject something here from an old neurologist, you can say, Bernstein, the Soviet. And he talked about degrees of freedom, and they did in order to increase productivity in Soviet Union. I don't know if you you've heard this story. - [Andrew] No. - He was brought in to examine the movement habits of the workers and he collected some information. He placed, he was one of the first kinetic, I don't know how it's called in English, the kinetic capturing of motion with moving pictures in that time. And so, he placed these dots and they took these photos, which became kind of moving. And what he discovered was something very interesting, the accuracy of the heat of the sledgehammer increased while the variants in the various points became more, not less. So, it wasn't a fixed pattern, it was a meta pattern. And this pattern is adjusted in this way to achieve the perfect execution. Those were very early findings, and I'm not sure how does that sit with everything, but I'm sure there is some truth to it from my experience. Basically, the self-adjusting dynamic nature of the system allows you to reach a very constant and stable end result by being so open and letting go of your control. - Mm-hmm, the example you give fits very well with the one that I described before because and I'm recalling the experiment. If people want to look this up, it's a paper, we'll put it in the show note caption, a guy also happens to be at Harvard named Bence Ölveczky, a Hungarian, I'm clearly pronouncing his name wrong, but I know Bence. And I remember the slide in my mind's eye, and the trajectory that was mapped was the movement of the tennis racket, not of the limbs themselves in the Federer case.

01:35:50 Variety, Diversity & Virtuosity

So, that I think aligns well with what you're describing. Yeah, that exploration of degrees of freedom is where the opportunity for real advancement and expansion of skill shows up. As that I think the way it's been described to me is that we go from unskilled to skilled and then there's mastery, and then there's this top tier, which is this beautiful, thin layer that so few people occupy, which is virtuosity, in which the practitioner invites variability and chance back in as an opportunity to do truly new things. - It made me think many years ago, this kind of thinking about so what is that entity? Because obviously, it's not technique, and it wouldn't even be honest to say it's a movement pattern, there is too much diversity there. I started to talk about, I called it movement



sleeves or meta technique, but the word technique is already misleading. So, there is some kind of a dynamic sleeve in which you can move in as long as you are not out of this sleeve, you are still within the boundaries of achieving the result that you're after. And then, the result is adaptation of all these elements inside to keep you in the sleeve. The sleeve is not constricted as we once thought, "Oh, beautiful technique." There are many ways to skin a cat, and that experience, and that variety, that diversity goes into virtuosity. It's true freedom because your focus is on the right thing. You don't point at the moon, look at your finger, and that's really in essence being a virtuoso, for me, like mastery, let's say if there is such a thing. - Oh, there's I do believe there is such a thing and I'll flatter and attempt to embarrass you by saying I think that I'm not alone in viewing you as a virtuoso of movement. I think that's what comes to mind because there's this notion that not everything is pre-planned, that even you might not know

01:38:06 Vision & Movement, Focus & Awareness, Panoramic Awareness

what you're going to do next until the moment of execution, but that here I'm projecting my own assumptions. I'd like to talk about mindsets in approaching practice a little bit more, but I want to wade into that territory by talking about vision in the eyes, something that we both share a deep interest in. I from the background of visual neuroscience, but also from the realization that we have this incredible ability to adjust the aperture of our visual window, we can focus very narrowly and we can focus very broadly. So, something I encountered, I think first as a child, realizing that I could spend all day watching ants play in a very fine domain and then look up and go inside and realize there's a whole world and realizing, "Wow, I'll never be able to consume the full range of experiences at any one moment." There are ants probably in the corner of this room doing their thing. And so too our approach to movement can be, as you mentioned, very big and dynamic in terms of the broad movements of our limbs or fine articulation. When you begin a practice and as you move through a practice, do you apply a regimented way of focusing your vision? Are you in panoramic vision? Are you in a very narrow field of view? Or does it entirely depend? And for the person who's a true beginner, a true novice, like myself, how should I show up to the practice with my eyes? - The eyes are a good starting point as you help a lot of people to understand. And when you encounter difficulties with other layers, it's very powerful to start with the eyes. Another thing important to understand and to experience, you can't believe me, or you've got to

examine it for yourself, we do not move the eyes as well as we think we do. 'Cause as long as you can see and move the eyes, people never think about it, that it can be trained, that it can be improved, et cetera, and the effects of it are far reaching. The eyes lead to the inner eye, you can think of it in a beautiful metaphorical way. And it's a representation of the way that we use various cognitive and mind processes and also, of course, affect the body. The eyes lead in many ways and the head is also a very because all of these inputs are coming in here. So, it's very easy to lead the body and if you look at it centrally from the head, it's a very powerful and easy thing. For example, when you teach boxers how to bob, usually it's not done in the way that I believe it should be done, you teach it with the periphery. They teach it from the feet because they have the idea, which is correct, that you need to do it in spatial conditions, in movement, in space. But in reality, the head will organize the feet for you. Instead, you are now putting two elements together and then with years of practice, you hope of tying them together well. I prefer to do something else because if I'll pull your head now to side, you will immediately start to organize your feet under you. So, I give you just one element to manipulate the system from, that's how I would teach someone something like this. Many animals hunt with the head, so you can see the body running forward while the head is turning to the side, the whole thing follows afterwards. So, it's a very powerful way to address movement, not the only one, there are many modes, thankfully, and we're very adaptable in that, but definitely a primary one. And then, the use of the eyes is, of course, maybe the most important element with that usually. Yeah, what else can I say about the eyes? So, how do you come in? Well, it depends on the practice, you need to start to have some kind of a checklist of what you're looking to do. And then by this, you can start to tailor the way that you use your eyes. The same thing I do for posture, the same thing I do for stance, the same thing eventually I do for state. And there is different flavors, there is no correct way to use the eyes. Sometimes it's very peripheral, soft, open awareness orientation, sometimes it's very focused. Notice that I'm pulling these two opposites, awareness and focus, which is often put together and fused, but and then the eyes are like the immediate and the easiest entry point into that. Another thing is the placement of the head and the eyes, like for example, when we lower our chin, we seem to see better. When we raise the eyebrows, there is too much exposure of top light sources and so people would usually when looking into the distance will tilt their chin in. And in many scenarios, tilting of the chin to the side, or placing just like listening with the ear, placing a certain eye or dominant eye, depending

on various scenarios. And this is all like information that I can come in cerebrally, and think about, and jump my practice forward. Instead, of just letting the experience teach me that, I'm using some kind of a thinking process to improve. And this is not cheating, this is great. Will it work? We got to try, it's a process. And those are some thoughts and to start to play with. - Yeah, I love that you mentioned chin down because we all have a natural reflex when chin goes down, eyes goes up, and the opposite is true when head goes up, eyes go down. And there are two separate clusters of neurons in these cranial nerve nuclei that, as we call them, when eyes are up, it increases our level of alertness overall. This is not woo science, this is the function of these cranial nerve nuclei. When our eyes are down, we go into states of more calm and quiescence. And this makes perfect sense, you know, and then the eyelids usually go down and then people fall asleep. Eyes up does not mean head up 'cause, as you said, there's a very dynamic control over the amount of luminance depending on the environment. So, that and then, as you mentioned, this difference between focus and awareness, I think is a really important one. When we are in this more panoramic, soft gaze and broad awareness, big swaths of visual field, as we say, the neurons that control that come through a pathway called magnocellular pathway. In any event, those neurons are much thicker, thicker cables, they transmit much faster, just like thick pipes can carry more water more quickly. And your reaction time is at least four times what it is in this awareness mode than it is when you're narrowly focused on something. And this is counterintuitive, I think, to a lot of people, but the person who is running to catch the ball is not tracking the ball in a smooth movement, most of their vision is in peripheral vision. When we drive we're in this peripheral vision and our reaction times are much, much faster. So, I don't know if I'm reluctant to encourage people to shift toward a particular type of practice toward a particular type of vision. I think what you and I, I hope agree on, correct me if I'm wrong, is that exploring these different extremes and everything in between is where the real value is. Panoramic focused, eyes, head up, eyes down, head down, eyes up, playing with it and exploring it and as opposed to for the first 10 minutes of practice being panoramic vision. You know, the sort of- - Yeah. - earlier today we were joking about and kind of lamenting the fact that this word biohacking exists or that the optimal performance, it's that they're unfortunate terms because they suggest that if you just plug it in, it's going to be like two plus two equals four and you're going to get it right every time. - Another pragmatic bit here, if I can offer, is since our culture has been more geared and pushing us towards focus, the focus use of the eyes, and primary language,

reading, and other things, we have less opportunities to work with the more open panoramic one. So, it would be smart to start to balance things out a bit more. When you're in nature, you don't look at each leaf, everything is moving, and you are kind of immersed in that. And then, something attracts your attention, "Oh, it's a bird," and you focus, and you go back into the general state, the base state, which is open awareness. Here, we switch things around in our modern culture, we are mostly focused and then we sometimes daydream, which is maybe some kind of a balancing act that comes from deep within, I don't know, maybe you can share some information about that, but I see that many time people need to, the focus is overly done by far in our lives. - I couldn't agree more, and I think a lot of I'll even venture so far as to say that a lot of the visual deficits that we now see in young people, myopia, literally nearsightedness, occurs because if we look at things that are too close to us as children or as adults, the eyeball actually gets longer. The lens focuses the visual image in front of nearer to the lens, nearsighted, than in front of where it should land. And basically, it's a lack of panoramic vision that is or open awareness that's driving these changes. And nowadays, we are essentially, most people are 90% of the time in this narrow focus mode. You know, right before recording, we took a break and went up to look at a vista and to look off to the distance, incredibly useful, easy practice at some level, but I think most people are not doing this sort of thing. And the way that it shapes the mind

01:48:28 Hearing & Movement

and the perception of time, of course, is a whole other kingdom of ideas. But one thing I'd like to relate this element of vision to and open awareness is earlier you mentioned the cone of auditory attention, the other sense that we can play with in as in our practice and throughout the day. Do you see any value to both paying attention to things in a very narrow cone of auditory attention, but also just walking and listening to all the sounds at once? I could imagine that could be useful. And in terms of physical movement practices, I was going to say where are your ears? Your ears are always more or less in the same place, but where is your hearing when you approach your practice? - Another set of parameters to think about, and to play with, and to be aware of. Also, I have the experience that some people are better at using this system or that system. And you would be amazed how differently the same results seemingly outside results are done by different practitioners and different scenarios. This goes into this mutation and change

idea is what really jumps us forward eventually some kind of a mutation. So, it's like all of our culture, and practices, and success puts us closer and closer to each other, so we have the same opinions everywhere around the world becoming more and more the same, less and less different, but the real hope comes from the different, so and we have a difficulty in promoting that. And so, this is another thing that can be promoted with the right practices, the right, for example, I work with corporates or even worked with governments before to bring in some of that freshness with simple habits in the workday, or in the education of children, or in companies increasing productivity. I don't really give a fuck, but I am there to give what I view is important and what is important maybe increases productivity, but it's more important to me that it improves people's lives who are involved and improves, yeah, being and becoming, being and becoming, these two entities. I'm not there, I'm on my way, I'm a process. So, thinking about hearing, the way that people use their ears, the way that people use listening. Again, we can talk about placement of the head and posture, sometimes angling as well, sharper angle, chin down, some people tend to use the shape of the ear, people with different ears closer or further out. This is it's if you're very sensitive and you're looking around, you would see this is affecting people's motion. Even the shape of our face, like the development of the vocal chords and speaking will totally change how we are, how we look, but how we listen also will do the same. I don't have any proof of it, but it is something I believe in. - Well, people will even make their ears bigger, right? We, we try and become like little fennec foxes or something by, I mean, a lot of people don't realize that's actually why we do this is to capture more sound waves, right? And the leaning is that the localization of sound is based on a simple brainstem calculation of interaural time differences, the time in which something, the brain intuitively, it just knows 'cause it's a pretty hardwired circuit that if a sound arrives first to this ear then that ear, that it's likely coming from over here. Whereas, if it's dead center, arrives at the two at the same time, that it's almost ridiculously simple when one hears it, no pun intended,

01:52:43 Walking Gaits

but it is an incredibly valuable way of thinking about how the architecture of the body changes our experience. Along those lines earlier, you mentioned something and it flagged an important question for me. When I see people walking sometimes I think, "Wow, they really move in a strange way." Occasionally you see somebody, they walk

really, it's impressive for whatever reason, you know, and you just think, "Wow, they sort of glide along." People come in different shapes and sizes, short torsos, long arms, et cetera. Do you think that if people have a body type that facilitates certain kinds of movement and not others that they should intentionally try and move in the way that is right at the edge of the kind of friction and challenge in order to shape new possibilities, or do you think that they should lean into the smooth execution of what comes most naturally to them? - Yeah, I think a good practice is to have many walks because they're required. And, of course, there is a very efficient and endurance, stamina-oriented thing that if you have the experience, it will naturally develop and unravel. And if not, you can get some collective knowledge and improve. And then there is a lot of emotion, emotional things related to walk like how I'm walking into a business meeting and/or how I'm walking out of a bad situation. And there is a lot of beautiful things to research there practically with yourself, trying to approach someone with the chin slightly down, very linear, very efficient in the straightest line, or trying to approach someone a little bit more rounded from the side and tilting your head, and you will see totally different results, totally different communication that happens over people's heads. But if you're sensitive, you realize that, "Wow, this opened the door." Instead, many people you start on the minus. My sister, my big sister, Atali, she always says, "I started on the minus, why don't I start on zero with them?" You know, so, but it's part of the approach. You can affect that, and you can start even on the plus if you are the sly man as the practitioner needs to be. So, this is something to play with and to work with and then you have, of course, body proportions, and ways, and we have all these like technical invasions, mathematics, and trigonometry, and architecture, they invaded our bodies, they invaded our nervous system. And now, our walk and our physical practices, they look linear and efficient, the path between two points is a straight line, it's not, this is biomechanics, it's not mechanics, nothing there is a given, there's no gospel. So, the walkers is sometimes have to go around or sway from side to side, and there is coiling and coiling and there are moving bits. And what about the coordination of my breathing with my walk? Because if I walk too linearly, there is less pumping of the air naturally in and out so now I have to forcefully bring it in and out, I'm wasteful. And that's why you see in last years, these incredible runners, especially in long distance, doing things we never thought were possible in the worst possible way that we used to think, pronation and all kinds of things like our technical thoughts were totally misguided and wrong. And then, somebody comes in and does it in some way that is totally wrong and he gets results we could

never get. And that's the beauty of playfulness, experimentation, change, being different.  
- As you're describing this I'm smiling

01:56:55 Playful Variability & Evolution, Improvisation & Openness

because one of my favorite neuroscientists, he's out of the university of Chicago, was in a meeting and there was an argument about evolution of the nervous system and he said, "At the end," and people were arguing about whether or not this gene in one animal was homologous to this gene in humans, et cetera, it can get very dicey. And he said very, very appropriately that, "One of the major jobs of evolution is to take existing cell types and circuits and give them new functions. But that can only be done through the playful exploration of new possibilities," which I think maps very well to what you're saying, that at the extreme thresholds of technical execution, you know, mastery, mastery, mastery, you, your obviously performance is very high, but the opportunity for evolution of the sport, or the music, or the dance, or the intellectual endeavor is limited because you're not introducing variability. In the attempt to get proper execution, you're limiting oneself. - Hence, I want to offer something that is relating to you. We should be wary of defining the mechanisms and putting certain meaning with certain processes and ways because just history and experience shows it doesn't work well for us most times, or it becomes like this much more elaborate thing even if we were somewhat in the right direction because even thinking this way can offer a lot. Like for example, your advice about heat, dopamine, light, offers a lot of benefit, but also can create problems and it can enclose something which the improviser will find, the MacGyvers, right? Like take a pink, some paper clip, and you make it into something great. And this is really our, we are the biggest improvisers around like that's what made us who we are, I think, and this is incredible what we can do with it. You know, the Russian-American space exploration story with the space pen, famous story about the development of the space pen. - I don't know. - It's a- - A space pen? - Yeah. - No, I don't know about this. - I think it's an urban myth. I don't know if it's true, but I like it so I use it. Well, there was this, of course, a space competition and the Russians put the first animal in space and the first. - He was a macaque monkey or something like that, yeah. - Yeah. And then Laika, and they put the first Sputnik, the satellite, and men in space, but Americans took the man on the moon. And on the way a lot of technologies got developed and the Americans because of lack of gravity out there developed the space pen with a huge investment,

the Russians used a pencil. [Andrew laughing] So, I don't know if it's true, I don't think it is, but it represents something in the state of mind. Like you look at, for example, the military equipment in Soviet equipment, it all can do multiple things and it means that it's heavier, it's less efficient, it's not as light, but even the Navy SEALs will still carry an AK with certain conditions, why? Because you can pour a whole bucket of sand into the mechanism and it will keep running while the most advanced German Heckler & Koch and accurate and light weapons, for every grain can get stuck and overly specialized. And there is something about this openness that we humans need to keep, and also maybe something for our leaders to be more of less specialists and more in this openness, less capable in this or that way, but more capable of doing the whole thing. - I love the story, whether or not it's a legend or not, it's legendary because it's fantastic. As you say, in the laboratory, whenever someone takes on a project in my lab, I always say, "You know, you have to ask yourself how much technical detail and challenge you want to take on because with more technology, advanced technology, yes, there's the opportunity for more discovery, but more downtime. Your PhD will literally take longer if you're going to use a microscope that's out of commission 30% of the time, and you just have to understand that." So, there's a dynamic interplay there. - By the way, I think that scientists get it right, it's where you transmit the knowledge out of the scientific field because science have debate and everything, you're not so connected, of course this can happen as well, but then when it goes out and the simple person without the experience takes it more as a gospel, as a fixed thing, and then it was just a report. - Right. - It was just reporting some functions here and play with it, see what it does for you. Because with all the greatest information that I can give, the person will examine it and it might be not useful at all for him. This is the practitioner, make it your own, go practice, try heat, cold, light, movement, awareness to this, awareness to this. And this is up to you to make it yours, but we don't like to have this responsibility. - No, people prefer to have that this will work the first time every time and will serve you best compared to everything else. And while there are more reliable tools than others, in my mind, the more reliable tools tend to be ones that are grounded in our innate physiology as opposed to some, I don't like the word hack, in fact, I loathe the word biohack, as we were talking about again earlier, because a hack in my mind is something that is designed for one purpose that's used for another, it's not the most efficient use of that tool, nor is it naturally the best solution. Whereas, biology has some very good solutions,



02:03:05 Reactivity & Personal Space, Touch & Proximity to Others, Play & Discomfort

but they don't always work, not every time. Earlier today, we did a practice in which involved an invasion, shall we say, of peripersonal space. We weren't standing super close for any particular reason, but there was God forbid - God forbid. - But there was we were close enough together we could touch one torsos and we were doing that as part of this practice. And you encouraged me to pay attention to how does it feel to have someone in your peripersonal space? And then, this notion of reactivity. I find this an immensely interesting and potentially powerful practice because I think a lot of people, I know a lot of people suffer from anxiety just being in a face-to-face conversation. Some people have a lot of anxiety about being physically close to people, whether or not they know them or not. And many people are reactive, they are in that anticipatory state of something that is going to happen. And sometimes this relates to trauma and negative experience, but sometimes no, sometimes they're just not used to being in dynamic, excuse me, exchange with other beings. And so, one thing that I love about the movement practice and how dynamic is that one can explore that space. Maybe you could talk about that a little bit more. - Yeah. Touch, proximity, all these things, also taking very, it takes a very, I think, limited place in our lives. People are not touched and they don't touch enough. There is certain bubbles of peripersonal space according to culture, according to environment, what is right, what is wrong? And then came all the, of course, political correctness, and harassments, and all kinds. And this is a problem, it's a problem to navigate all this scenario. And I think we are, there is definitely this side which is suffering. People go to BJJ classes to touch, not to learn BJJ. Most of it, they're not even aware of it, before they would go to a prostitute, maybe. It would not be honest to say that, yeah, this is not required or necessary more in our lives. Children who are not touched, there is a lot of information about that and the problems, but adults who are not touched, there is not a lot of information. And I think it's no less of a problem because it's something that has to be constantly present. And then, proximity being able to, as you said, remove certain reactivity and to learn to control that volume control over how reactive I am, and in other scenarios, how do I remove this reactivity altogether is very important for performance and also for our lives for clear thinking, et cetera, because everything is moving through us and is being monitored by us so everything has the potential to detract us from a certain direction of exploration or and if you're reactive, you're a slave, and it becomes worse and worse and worse. Or as, for

example, a fighter, or a football player, et cetera, has to know what to take, what not to take. The fact that you can sense more doesn't mean you should react to it. And the practice helps that by bringing people into these scenarios, but oftentimes disarming them. Like when we were working closely today, and because you have a certain background with boxing or fighting, I can tell you, you are missing some kind of a way to be in that space that is not marshaled. So, you carry a certain tone, although you're a very kind person, but oftentimes you held me without realizing you're holding me with a lot of strength, for example, and it just, it was clear to me you're not fully aware of what is unfolding and it's just, of course, a question of experience. So, to be able to be in this scenario, but do something else, which is not geared towards winning, losing competition, or just being able to play with another person. Like for example, contact improvisation took that and played with that, and the work of Steve Paxton for the ones who are not familiar. So, this is where I call it the hybrids become very useful, like we don't when you are practicing in this open way, you are not bound by specific rule set or ways of doing things. It can be a fight, but it can be a dance a moment after. Another thing that I learned from capoeira the situation's very tricky there 'cause I've seen kids doing cartwheels in Brazil and scissors fall from their pocket. Why, why would you go to with a scissor in your pocket? Obviously, there is certain intentions and then at other times you see back flips and beautiful things, but people die in capoeira every year. - Neck breaks or something? - Kicks through the face from various violence. It's I've explored other martial arts and boxing, I was involved with MMA and BJJ, but I tell you the most violent arenas is that vibe 'cause it's unknown. One moment, it smiles, another moment, it's something else and it's uncontrolled. There is no categories, no weights, and it's a street phenomenon. So, you have musical instruments, sometimes they break it on your head. People don't see that, but you can look online on YouTube and see some of that side of capoeira, which is actually the day-to-day in Brazil and the reality and how things unfolded. So, it's very important to explore many ways of being within different distances and spaces from other people and touched in different ways and not contextualizing it always in the same way. I can touch your chest in one way, I can touch it with the exact same pressure and speed, but it will feel very different. The parameters, I'm not sure, certain intentions, certain combination of postures or ways, and this is beautiful exploration. And again, I would encourage you and others to explore the discomfort. For example, certain discomfort to be with a man in a certain scenario or with a woman and trying to see what is that? Because if we're truly strong, we are not afraid

of anything. If we truly know who we are and we are in that exploration, we don't know the end result, but we are in a research and then we are not afraid of being in debt or this, and we don't come out of boundaries, and this will improve our culture tremendously. Of course, there must be agreement, you never force yourself, but you meet someone who is also interested in that exploration and then you do it. And there are many scenarios to do that with traditional practices, like learning to grapple or going to contact improvisation and studying there, or going to dance, to Latin dance class or and there is, of course, my favorite is to create and to come up with your own hybrids of that and scenarios. Communicating with your loved one through movement, not sitting around food and talking, moving together in all kinds of ways. Sometimes it's walking together, but sometimes it's all kinds of, it can be game, playful, it can be romantic. And there are many shades, sex doesn't start here and end here, right? It's like a continuum, and we don't even need to define it in that way. So, with time, I think it unlocks a lot of things. People become much stronger in a good sense, in sense of becoming, being, and we abuse less, and we can approach, yeah, other aspects to us. - I love the idea that through the exploration of a range of physical contacts provided one knows they can always return to their center, so to speak, then there's a lot of opportunity that opens up. I wish there was more of that encouraged in children's play, but also, as you mentioned, in adult environments. Because yeah, nowadays for all sorts of reasons that you've touched on, the idea of keeping at least in arms length distance has become critical. There are a lot of environments actually where hugging is not allowed. I don't know what it's like in Israel, but in the states many institutions you're not allowed to touch anyone else's body. There's actually a wonderful study that comes to mind from an Israeli laboratory, a guy named Noam Sobel, who's over there, who has shown that by recording people's first interactions that when people meet, if they shake hands, they almost always, I think it's greater than 85% of the time they will then wipe the chemicals from the other person onto their own eyes, typically their eyes or their face. This changed a little bit during the whole pandemic thing, but this is thought to be a carryover from what other animals do in terms of exchanging microbiome elements, exchanging chemicals that we're constantly feeding our subconscious with the chemical knowledge of the chemical constituents of other people, right? So, it goes way beyond how people smell, how they look, et cetera. More touch seems to me just, as you said, provided it's consensual, it seems like it's just a really good thing overall. - And I think maybe also important for discharging, discharging certain experiences, remodeling, reframing. So,

it's like touches, it's very powerful in that. If you're touched and you're touching a lot, you're unpacking and you experience that touch that maybe has been traumatic and you're reframing it, you have the opportunity, which is something interesting. I've heard some story about some traditional culture in which when you were burned by mistake, they would immediately burn you again. And it made me think, and then there would not be any burn marks and there would not be the same side effects, that's the claim. It made me think it's like, "What's the source of this?" And I realized that maybe it allows a certain completion to happen that in the traumatic moment is not there. So, the re-exposure, while you're still open, the pores are still open, allows you to reframe the experience and then the unfolding of the rest of the event is very different. This is if you're touching in your practice in the day-to-day, and you're working with people, and you're being touched, and people come closer, further away, it happens naturally. Yeah, and if you pass a certain limit and it becomes too much, there is always, of course, communication that has to be present. Certain cultures make this communication pre, certain cultures post. The Israeli, for example, post, here pre. - Ah, so in Israel, they'll say, "That didn't feel good to me," or, "That felt good," or, "That was fine." - Yeah, it would be more common. Here in the airport, the guys telling me, "I'm going to slide my hands up towards your crotch until I meet the hard stop," and then he does this in a way that is supposed to show me, I have no enjoyment in that and for me it just feels aggressive. But his intention is good, showing me. But if it was a loving touch, it would be nicer for me actually, personally that's it would be gentle, but he goes up there and he shows me, "I have no enjoyment in this." [groans] That's my testicle right there, so it's different choices. [Andrew laughing] I don't think it's like worse, but this description can be a bit dissociated. And what does it make me think? Is it truly what he feels or not? 'Cause it feels robotic, so it's not. So, sometimes I'd rather not say it and I'm going to touch your chest and just place my hand on the chest. And, of course I, we can't avoid a problem, I'm not suggesting that there is, but there is an examination. And because I moved around and around the world, I've seen many things and I've seen benefits here and benefits there. And in the practice, I think it's important to discuss this, to examine this, I don't have a solution, but it's something to talk about. - It is something to talk about, and I'm glad you raised it because I think that it's so clear to me that much of the value of a movement practice involves this dynamic interaction with somebody else. As you pointed out, it can be performed on one's own and practiced throughout one's day. But the unpredictability is a key element to all of it, and in bringing out all the potential

that you've described. In reference to this notion of trauma and burn and re-burn. My colleague at Stanford, David Spiegel, he works on trauma and has actually on this podcast, he voiced that he's against things like trigger warnings because of the way that it puts the nervous system into this state of readiness and reactivity that can exacerbate problems. Whereas, it's very clear from the literature on trauma and trauma relief that the way to deal with that is through a controlled, but clearly a controlled re-exposure to the trauma in order to diminish the emotional response over time. I mean, it's very clear if we avoid the thing, obviously we don't want to re-injure ourselves or re-traumatize, but if one avoids the thing that makes them upset over and over, all it does is serve to create a heightened state of readiness, it primes more trauma. - Yeah. - So, I think it makes good sense. - I think impressions are very useful here also when stepping into an area in which trauma can occur. And then, by going through the impression that it already occurred, you create some kind of a thermal layer of protection, so I've already been hit when I'm entering that space, it's so beneficial. Or I've already been touched in a way that I didn't like if I go to a contact improvisation class, and just running this scenario in your head

02:18:13 Visualization & Experience, Feedback

protects so well, yeah. - I'm glad you mentioned running scenarios in your head. I've been curious all day as to whether or not you do visualization or mental rehearsal of physical movement. This is it seems to be a popular idea in the states, people are always asking me, "You know, can you just imagine a movement and learn it better than where you to actually perform it?" My hunch based on and my understanding of the scientific literature is that visualization can be useful to some extent for people that are very good at visualization, but for many people, it doesn't help. And that there's nothing like real physical practice to improve physical practice. - Yeah, the word visualization's not good, obviously, it has to be experientialization in a very complete way, not just visually, of course. And unless you already developed certain experience, tangible experience that has benefited from feedback, from outside feedback. It is not a very useful thing to do, and it ends up being fabrications. But if you are very experienced and you already gained the benefit of being burnt here or overextended here, then you have a certain experience and then you can strengthen certain aspects of it, but you got to be careful because you do not have feedback. And because of the missing feedback, you

might develop delusions. It might be that you develop stronger patterning, but ultimately this would lead you away from the aliveness of the movement itself. Drilling, for example, very useful to learn a general infrastructure of the movement sleeve or the technique, but then to dress it up,

02:20:14 Linear Movement & Movement Investigation, Examination

you need feedback, you need it to be alive, you need to receive something corrective. - I love it. For many people, they approach movement in the form of weight training, or yoga, or running. Yoga's a bit more dynamic, but it fairly linear types of exercise and movement, Peloton, rowing, those kinds of things. I think most people will probably not depart from those practices entirely because they like them. I'm speaking about myself, I like some of those very much, I enjoy them. But in terms of thinking about adding a movement practice to one's already existing exercise regime, I can imagine threading it throughout the day, I can imagine having a dedicated movement practice. One thing that I have started doing on the basis of some of your teachings, and I just sort of created this idea is rather than statically standing there and lifting weights, actually walking from, as I alternate repetitions, it occurred to me that I'd never done a curl, a bicep curl with one foot in front of the other, and then I'd never actually switched that up. And it's kind of an odd stance to be standing in parallel and curling one's arm, it's kind of a ridiculous movement when one thinks about it. So, I started incorporating some of that, you get some strange looks in the gym, but I just give them strange looks back. So, what are your thoughts [I do laughing] about these very linear forms of exercise? And, do you encourage people to expand the play space, as it were, for these kinds of exercise? Or do you think that movement practice is just best explored through three dimensionality, gravity, and maybe a stick or a ball? - Hmm, it's definitely a problem, and it's approachable. People want a quick, people want a hack, people want the icing, there is no cake. There is no cake, and it's just like industries of icing, icing, icing on what? What are you putting it on? So, for me that, that's why I'm going towards this side, it's like I have my life, now tell me what movement practices I should pursue. You are movement, in essence, you are not thinking of yourself in any serious way through my eyes. There is a dynamic entity to you, the body is a huge part of it communicating, you have genetic layers, there is a personalities that got developed and built around various influences, but then there is also some kind of an essence, something that reeks from within the

cells. And if you grew up in my family and I grew up in your family and it would still be the same, and that it's something that I always try to think about, what is that inside of me? So, I think these practices, they're very good, but they're not designed for the goal that we think they were designed to do it, it orients towards something else. For example, yoga, there is a good book called the "Yoga Body", which will destroy a lot of people's yoga practice. And it goes into how did we get to this yoga, the influence of Swedish gymnastics and Mongolian contortionists, and the Western, the West affecting it, and then the ancient practice, which was barely asana-related, posture, position. So, actually you said yoga is less linear, yoga is very linear, very linear these days, these lines. Look at all the traditional dances, they look like nothing like yoga. Look at tai dance, look at Chinese dances, martial arts, it's all rounded, it's all curved, it's like the like out nature, what you see in nature and the movement of the animals. So, where does it come from? These are things to understand because it designs you now, it shapes you. You're placing yourself in these forces of change and these streams of change, and you have a good intention, you just want this or that, but the joke is on us. And this is the movement practice for me is first education, let's start to think about this. I have nothing that I can just sprinkle now, some magic powder that will help resolve this because it's a start of a deep investigation. And then, some of the things, let's talk pragmatically, because what you described is not about you placing the foot in front when you're curling, it's about the examination, this is why it is a very good direction. And then, you will need another one, another one, don't get stuck on that foot in front of it and try to do with the eyes closed or with a different head posture, and you will see things arrive, unrelated things because the associative mind, the thinking, this relates, this doesn't get to the heart of it, never. So, just infusing these elements like in a cup will create endless combinations, possibilities, and a lot of discovery. And this for me is humility of the practitioner. I don't know, I try like today with you., I tried various combinations and oh, I discover something, oh, there is, this is a playful approach, and this is a researcher approach. I don't try to fit my truth into something, I'm there to examine. I don't have a motive yet, why? Because I'm fine, I don't depend on that to define myself. I'm a human being, but if I don't have that sense of worth, I'm already like geared towards I need to do this, I need to prove this, I have this agenda. And this is how we get all the lies in the world and all the problems and difficulties. So, these practices, they are related to it to prove this, that, this way, why we need muscles for X, Y, Z. And a lot of the reported outcomes are often from my place is like funny. I hear

about something like I heard you say about gratitude practice that actually experiencing from outside as somebody else, or you are receiving gratitude is actually more powerful. It's true, but I see why it's true, I'm not sure everybody sees. If somebody tries to feel gratitude, just sit with the eyes closed or watch a movie and sense the gratitude there, it will be clear to you, one is very difficult to do and the other is very easy. Hence, if gratitude is achieved easier this way, that's why it works like that. Although all the traditional practices are about you and by challenging yourself to sense that gratitude yourself, they achieve much more powerful thing, but this is not the research people and the people in the research, we don't have a lot of those people. So, a lot of the things that can arrive to us, weight training, the benefits, or the way that the hormonal effect, the effect of cognition, et cetera. When you open a bit and you go far out, you see certain things, not the truth, but maybe less delusion. There is nothing definite, but there is something maybe more wholesome that appears. Yeah, I think this is so this is a state, a state of exploration. I don't want to have the same thought if I already had it, why would I want to have the same thought? I already had it. I don't want to have the same practice, I don't want to. I curled already in this way, I want to experience something else, I want to. There is a benefit to gain, No, but that was better. The better is better, is not more, is not faster. It's like better is better, and better isn't, we don't know what better is, right? So, it's like it's open. Oh, this is better, I don't know. It's just more weight, it's one more kilo, but maybe if I remove one kilo, I discover something like, for example, power development that has been shown to gain certain benefits when you lighten the load and you accelerated more in certain conditions, but who discovered it? A practitioner, a math person, not Verkhoshansky, Zatsiorsky, they reported something, but it was already within the grasp of the practitioners. And I think, and as a researcher, this is very powerful to remind yourself this and to work with that. And as a practitioner, as a living human being, for everyone, I think something very useful. And then, those plays that you're doing, people give you the weird looks, and it's like yeah, I tell people, "You don't want to be normal. If you don't get the weird looks, you're not moving in the right direction." You're moving in a very fixed and you already know the result of that direction, let's say at least that. So, continue to play with that, continue to play. Look elsewhere, look at places you didn't look at because this is still like within the same layer, one foot in front, one foot behind, what happens when you do it with a smile, the same workout, and when you do it with a frown? Or what happens, breath holding or blood restrictions, all this is great play, and I think very beneficial to do, to go through. -



Love it, I think that's a wonderful message. And what I keep hearing from you over and over again is that people should explore, explore, explore. And listen, I want to thank you for your time today, first of all, for the incredible teachings here at this table, but also the introduction to a movement practice. Although, now I'm tempted to say that I've been moving my whole life, I just didn't know I was- - It's true. - that it was such a vast landscape. Also, that your willingness to tread out in this journey that is truly unique. You know, that the greatest compliment that one can give in science is the one that I'm going to tell you now because it's entirely appropriate, which is we say you're an n-of-1, right? That and you truly are, I don't think there's anyone that has been as willing to embrace existing practices, evolve them, create new practices, and to share so broadly to really be willing to give and teach so much knowledge. You know, earlier you made the mention of your goals of in part of being wild and wise, and I'm here to tell you that you are both wild and wise.

02:31:45 Zero-Cost Support, YouTube Feedback, Spotify & Apple Reviews, Sponsors, Momentous Supplements, Instagram, Twitter, Neural Network Newsletter

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