Mind & Life Podcast Transcript
Marieke Van Vugt – Finding Balance

Original Air Date: October 5, 2023
Retrieved from: https://podcast.mindandlife.org/marieke-van-vugt/

Opening Quote – Marieke Van Vugt (00:00:04): *In terms of sticky thoughts, I definitely think that it comes from an adaptive standpoint. And I think it's also really helpful to think about all of these "maladaptive processes" as more something that's gone awry, but in principle it's a good process. Because it creates this sense of self-compassion, kindness, and mental flexibility—it's not something that's completely wrong with me, it's just that it's not as adaptive in these circumstances. It's all about the balance. And if it goes a little bit out of balance, then it can become a problem.*

Intro – Wendy Hasenkamp (00:00:45): Welcome to Mind & Life. I'm Wendy Hasenkamp. Today I'm speaking with cognitive scientist Marieke Van Vugt. Marieke is an assistant professor at the University of Groningen in the Netherlands, where she's become a pioneer in studying mind wandering and meditation through computer modeling. She's also advancing participatory research through her fascinating collaborations with Tibetan monastics, looking into some of their less explored practices. We get into a lot more about both of those topics in the show, as well as her passion for ballet, and how her experience as a dancer is in a kind of dialogue with her experience as a scientist.

(00:01:28) I love the way Marieke integrates cutting edge neuroscience and computational modeling with a deep personal knowledge of meditation and the embodied experience of dance. She also holds, I feel, a really realistic view of what science can and can't tell us about the mind. I so appreciate her critical lens on the assumptions that we often make in science, and her efforts to make research more inclusive and, thus, in many ways, more relevant.

(00:01:58) I think this will all make sense by the time you get to the end of the episode. There's a lot of different topics in here, but they really weave together beautifully. And in some ways, they all touch on the topic of balance. I hope Marieke's synthetic perspective on the mind is a meaningful one for you. I'm really happy to share with you Marieke Van Vugt.

Wendy Hasenkamp (00:02:20): I'm so pleased to be joined today by Marieke Van Vugt. Marieke, welcome to the show, and thanks so much for being here.

Marieke Van Vugt (00:02:27): Thanks so much for having me. I'm a big fan of the podcast. So I'm excited.

Wendy Hasenkamp (00:02:32): Oh, thank you. So then you probably know, I usually like to start with some background from the guests and kind of understanding how they got into the work that they're doing. So yeah, for you, how did you get interested in cognitive science and the mind and meditation and all of that?

Marieke Van Vugt (00:02:46): Yeah, I mean, it depends on where you want to start. I remember I've been interested in meditation as a little kid. That's the wildest story, that I remember being maybe seven years old or so, and the mother of a friend of mine used to meditate. And somehow I was fascinated by it even though I had no idea what it was. So yeah, I did a lot of "pretend meditation" as well, as a kid. *[laughter]* So this is how I got started on that point.

(00:03:15) And for the brain and science, I think... I didn't know much about it. I remember vividly doing a presentation about the brain in my biology class in high school, and I was really loving it. So I was like, "The brain, that's really interesting. Maybe I want to do something with that later." But the concept of a scientist... You know, I always like to say that I'm a failed ballet dancer who became a scientist. And that's really true, because as a teenager, my career dreams were really becoming a ballet dancer and then that failed. And so I was like, "Well, let's go to college," and I went to this very nice liberal arts and sciences college, and got a chance to try a little bit of everything, and then figured out that I really enjoyed stuff with neuroscience and then went into that. And also, at that point, I was doing meditation, but I think I was one out of the two Buddhists on campus. And at that time, even saying that you practiced meditation was really still pretty weird, so I never even considered the fact that those two could somehow be brought together.

(00:04:24) And then, after college, I went on a backpacking trip to India for five months, as you do in a gap year. And I came across this book by Daniel Goleman called *Destructive Emotions* from the Mind & Life Institute, and I was like, "Wow, so you can actually study meditation scientifically! That's so cool—I want to do that with my life." And then that was sort of my aspiration when I then started graduate school the year after, even though I didn't really go to a meditation lab. I mean, there were very few meditation labs at the time, anyway. It was sort of the kind of thing you almost didn't want to say to people, because it was... well, career suicide, as we alluded to in the recent Mind & Life Summer Research Institute.

(00:05:16) So yeah, that's sort of how I rolled into it. And then that was the time that the First Mind & Life Summer Research Institute happened, I think 2004, something like that. So I went there, and that was the first time I met other people that were interested in this. And I was like, "Well, this is what I really want to do." I didn't really know how, because my PhD advisor was not so excited about that either.

(00:05:39) But, yeah. It's usually, I think, at least in my life, it's been, if you have a certain aspiration, then somehow you hold it in the back of your mind and things happen, opportunities come. And yeah, there we are—20 years later, and I'm doing some research in this area.

Wendy Hasenkamp (00:05:57): Oh, that's fantastic. And I definitely want to come back around to your ballet experience too, because even though you haven't made that your career, I know you're still a very active ballet dancer, so perhaps there's some interesting links and reflections there. But first, let's chat a little bit about your research. And I know there's a few different areas that I think would be really interesting to dig into. The first is you do a lot of computer modeling of the mind—particularly around mind wandering, and distraction, and things like that. So I'd love to hear more about that. We haven't really talked much on the show about computer models, and I'm actually not that familiar with the nitty-gritty of how that works. Not that we need to get into the details, but just for the audience, maybe a little bit about why you would do that approach, and how that works.

Marieke Van Vugt (00:06:46): So maybe just to explain how I got into it, because I didn't even know it existed, actually, when I started graduate school. And then I discovered that there's this whole field of mathematical psychology that's about making computer models of cognitive processes. And, I guess, there's two reasons for why you would want to do computational modeling.

(00:07:11) The first one is more of a methodological approach, because in science we make theories and then we test those theories with experiments. But if you just make the theories with words, then very often there's quite a bit of flexibility with words, so that you can easily sort of bend the words and sort of explain a different pattern afterwards with your original theory. Whereas, if you make a quantitative prediction that just says, "The accuracy will be 85% in this condition and 74% in that condition," it's very hard to change that after the fact.

(00:07:51) So in that sense, these computational models can be much more precise. And also, putting together a computational theory requires you to be very precise, because you essentially have to tell a computer how this process would work, you think. And of course, all models are wrong, so it's not like computational models are more right than other kinds of models. And very often you can't quite capture everything in computational theory, so it's not like they're the best for all intents and purposes. But for making quantitative and precise predictions, in many areas, they are very good.

(00:08:29) And then the other reasoning here, it's more of an engineering reasoning, is that you only understand something when you can really build it. That's sort of an engineering mindset, and I think there's also something quite compelling about that. Again, maybe not everything can be built in these sorts of more computational systems, but for a large subset of phenomena you can do that. So that's why I've been interested in that. And also, for me, it's been a natural consequence from my own training and interest in both physics and math, computer science, as well as cognitive science. And so this is sort of a natural bringing together. I was very excited when I found out that there's a field called mathematical psychology that's all about that. I was like, "This is maybe my special niche that I can do something with."

Wendy Hasenkamp (00:09:21): That's really cool. So do you want to get into some of the details of your models on distraction? I was reading a little bit of your work and how you propose that distractions are "targeting unused resources" in the cognitive system, or something. I thought that was really interesting.

Marieke Van Vugt (00:09:38): Yeah, yeah. So, basically, I created a model of mind wandering. And the fun thing that I always like to say about this is that it's surprisingly hard to get a computer to mind wander—sort of pointing at how uniquely human this capacity is. Maybe that's one of the reasons why, in recent years, maybe the past eight years or so, I've targeted a lot of my labs' focus towards mind wandering, this process of, we often call it "task unrelated thoughts," or the kind of thought process that goes somewhere else than you are consciously directing it to.

Wendy Hasenkamp (00:10:16): Yeah, I guess, if you were saying it's hard to get a computer to mind wander, and that makes sense, because if you tell it to focus on something, it's just going to forever focus on that, I suppose. *[laughter]*

Marieke Van Vugt (00:10:24): Exactly, yeah.

Wendy Hasenkamp (00:10:25): Right. We're not like that. Yeah.

Marieke Van Vugt (00:10:26): No. And I think that's also the really cool thing about humans. And it maybe also shows why mind wandering can be so adaptive, because I think it's kind of the thought process that allows us to take a step back and say, "Hey, do I want to focus on this? Or maybe do I want to switch to another kind of thought process?"

(00:10:47) So, for example, a lot of the research we do in a psychology or a cognitive science lab is we give people a really boring task, and then we measure their accuracy and their response time, and then we draw conclusions about cognition. But from the perspective of a participant, maybe they're a bit interested if you're lucky, but otherwise they're just interested in getting some money. So it's really not their top priority to do this task. So they also have what another Mind & Life scientist, Dave Meyer, would call the "task of life." And that's way more important than our stupid tasks in the lab. So it's always good to take that step back and realize, "Okay, this is really what's going on."

(00:11:31) So there's this constant, I think, competition between all these different priorities. We have the tendency in cognitive science and psychology to just focus on these tasks, as if that's the whole world. But of course, from the perspective of the participant, really it's only a small part of the world, and it's constantly competing with other stuff. And if you have, for example, a significant worry or you have this really interesting idea, then that's going to be competing with your focus on the task, for example. So yeah, mind wondering, it's constantly in competition with the main task, and if your main task that you're doing in a psychology lab is kind of boring and simple, then you have lots of resources left over, you could say, to do other stuff like mind wandering.

Wendy Hasenkamp (00:12:16): Right. One thing I love, that you've really brought into this... All of us, of course, are familiar with the experience of mind wandering—especially if you meditate, it becomes very, very obvious that your mind is going all over the place all the time. And you've focused a little bit on a concept of stuckness, or thoughts that are really sticky, is a term that some people in this field use. So could you share a little bit about what's happening there? It seems like a little bit more than just a mind wandering, it's like derailing almost, or something like that.

Marieke Van Vugt (00:12:48): Yeah. Well, in a way, you could say, if we're in this mindset, that there's a competition between a task process and a mind wandering process, if this mind wandering process is very "sticky," is the word I like to use, then it constantly pulls us away from all the other stuff we're trying to do. And this can happen, for example, when we're worrying about something. That's an example of quite a sticky process, because it is subjectively so important to us that it tends to creep in whenever we want to do other stuff. So yeah, this is how I think of this concept of stickiness.

(00:13:23) And interestingly enough, it turns out, when you're trying to measure it... One of the ways we have started to do that in my lab is we ask people, "How difficult is it to disengage from these thoughts?" And when people find it difficult to disengage, it's quite sticky. And that would also be associated with this experience of this thought that constantly wants to grab you, and it's very difficult to let it go. And then it also tends to be quite intrusive in the task.

(00:13:51) And also what you will find is that, for example, in the brain signals that we're recording—we like to mostly focus on EEG in my lab—these brain signals tend to respond less to the external world. This is a process that's also been referred to as "perceptual decoupling." So it's as if you're more focused on these sticky thoughts than on the other stuff that's out there that, for example, is the cognitive task that we ask you to do. But the brain's responses to this cognitive task will be much lower, and you will probably be more focusing on these internal thoughts.

(00:14:26) – *musical interlude* –

Wendy Hasenkamp (00:14:27): I really like that idea you were sharing about perceptual decoupling. That feels so accurate, because when you're really stuck in your head or mind wandering or ruminating about something, your perceptual systems aren't really online, you're not perceiving what's happening in the

present moment. And of course, that's such a part of contemplative practice, is trying to retrain ourselves to focus on the present moment, which is often sensory experience. And I know that you've also worked mindfulness into these models. Can you share a little bit about that, like a meditating computer?

Marieke Van Vugt (00:15:34): Yeah, so we also created a meditating computer. That was really fun. In fact, just a fun side story here is that I started this modeling of meditation during a visiting scholarship at the Mind & Life Institute, which at that point was in Amherst (Massachusetts). And they had this beautiful house, which they had for visiting scholars. It was really awesome. And one of the features the house had was also a meditation room. So we had offices, and then we also had our meditation room. So it was sort of a really wonderful time in my life that I could just be working and then be like, "How does this work?" And then I would go to practice a little bit to check it out in a first-person sense, and then I would go back to thinking about the code and writing some code, or thinking about what cognitive operations should be implemented. So it was really fun.

(00:16:26) But eventually this meditation model is consisting of a competition between this mind wandering process and an attentional focus process that's now focused not on... Well, actually I think my first meditation model was a model meditating on a visual stimulus, because it is more similar to a cognitive task, so it's easier to model. But, I mean, in principle could just as well be the breath, it doesn't really matter. Computationally speaking, it's just you're focusing on something. And then initially you're focused very strongly, but the feature of this model is that, basically, any kind of stimulus will tend to decay in time, so it will tend to grow weaker. Just like all of our memories, basically, everything that occurs in our mind will grow weaker over time. So the weaker and weaker this, maybe, intention to focus on the breath or on the visual stimulus, that will tend to make the model more prone to switch to another priority, which could be mind wandering.

(00:17:28) And so there's this constant interchange. So you would be focusing on your meditation object, and then at some point you would be taken over by the mind wandering process. And that mind wandering process is essentially, in my model, a series of memory retrievals. Because basically, I think most of the time when we're mind wandering, we're just remembering one thing, and that brings up another thing, and another thing, and another thing. And then I had a lot of trouble figuring out how this mind wandering process would end. I looked into... well, obviously cognitive science texts wouldn't really say anything about that, because they are not really about how meditation works. And then I went into a meditation text and also couldn't really find anything. And I talked to meditation teachers.

(00:18:15) Well, so the best thing I could eventually come up with is something like, it's just this thought that pops in your mind that reminds you of the meditation. So I guess it must be another memory that's just hanging out there. And the more difficult it is to reach that memory, the longer you're going to be distracted. So this is how this model works.

Wendy Hasenkamp (00:18:33): I really like that. The cycle of distraction and focus is something that I've spent a lot of time thinking about. The small amount of research that I've done in this field has been on that concept. So I've nerded out a whole bunch thinking about that.

Marieke Van Vugt (00:18:48): Actually, I basically present it almost every time I talk about this model, and I talk about meditation. I start with your paper. *[laughter]*

Wendy Hasenkamp (00:18:58): Oh, that's great. That's great to hear. I'm really glad it was useful. Well, I was just bringing that up because I love this question you raise about, "How do you get out of the mind wandering back to the focus?" When I was doing this work, I was really wrestling with that question of,

"What is this awareness? How does that awareness emerge?" And it feels like kind of really a black box. It's such a central part of meditation practice and of what we're trying to train in meditation, but it's interesting how slippery of a concept it is when you really try to nail it down. So I just appreciate that you're trying to make steps in that direction of formalizing that.

Marieke Van Vugt (00:19:38): And at the same time, this reminds me to mention that this is just really the concentration aspect of meditation. It's the concentration aspect of what we call focused attention meditation in sort of the more scientific literature—really concentration meditation or maybe single-pointed meditation, depending on the tradition you're coming from. So there are many other forms of meditation, and actually that's also what I partly do more research on now. But figuring out how to model these more awareness practices is way harder, and I haven't quite been able to do that yet.

(00:20:19): Often meditation is misunderstood, I think, in the popular literature also, as this kind of a process that's just about being constantly concentrated on it. Whereas I think a really important part of it is actually more going back to these sticky thoughts. Because a large part of the meditation, in the way I've learned it, at least, and the way I think about it, is that it's becoming more friendly towards your own thoughts. And funnily enough, when you become more friendly to your own thoughts and you realize they are just thoughts, then they tend to become, in general, less sticky. So this is how I got interested in this whole concept of stickiness, and also in exploring the idea, first of all, how we can be measure stickiness? And secondly, are thoughts in general more sticky when people are suffering from disorders such as depression, for example? And if we go for certain interventions, like mindfulness, can that reduce the stickiness? So all of those questions.

Wendy Hasenkamp (00:21:17): Yeah, I'm glad you brought that up because I was thinking about that too, of the idea of stickiness and thoughts. I feel it bridges a number of different struggles that people can have in the kind of mental, cognitive, psychological realm. Like you mentioned, depression is something that's very marked by stickiness and stuckness of thoughts, but also trauma or PTSD, where thoughts just keep coming back. So I think it's interesting to be able to kind of move one level up from these different diagnoses that we have and these different categories that we've created about, "Oh, you have this or this issue going on." Whereas it can move things forward, I think, at least maybe even therapeutically, to think about it at this other level of like, "Oh, really what's happening is your thoughts are stuck in this loop or something, and how do we get it out?" So it also maybe sheds some light on why mindfulness or meditation practices can help all these different kinds of conditions.

Marieke Van Vugt (00:22:14): Yeah, exactly. And I think, if you think about it, sticky thoughts is probably a problem in many disorders. So I've really focused on depression, but I definitely agree that this is probably a problem in many disorders. I can imagine also addiction is an extreme case of stickiness, but then maybe the substance that you're addicted to is the sticky thoughts, for example.

Wendy Hasenkamp (00:22:41): Right, right. And anxiety in a similar way?

Marieke Van Vugt (00:22:45): Yeah. And PTSD. So I think it has lots of potential. So this is why I think it's so interesting to try to figure out, are there ways that we can track these kinds of sticky thoughts over time that we can better understand why they're sticky, for how long they are sticky, and [under] what circumstances? How can different manipulations or interventions affect that? And also, that's where I've been thinking about computational modeling as well. Can we use, to some extent, these computational models to predict what will be the effects of certain interventions on stickiness? So if you can model meditation, maybe we can better understand how it may have an effect.

Wendy Hasenkamp (00:23:27): Yeah. This is bringing up just one other thought. I would like to go down a path on this, is I heard recently the researcher, Lisa Feldman Barrett... you might be familiar with her work. She's done a lot of work to advance the predictive models of how the mind works. And she was talking about trauma and how, basically, when you experience something as threatening, it can wire into your model of the world, and your predictive systems just kind of keep repeating that in order to keep you safe, and make sure that that threat doesn't occur again. So it got me thinking about this idea of stickiness and prediction—and is it serving a purpose from a survival sense, or something like that, and it's just kind of gone awry? So I wonder if you think about the predictive stuff in your models, or if you've thought about that in relation to stickiness.

Marieke Van Vugt (00:24:20): Yeah. Thanks for bringing that up, and I've never made that connection with the predictive stuff and stickiness. Having said that, in terms of the stickiness, I definitely think that it comes from an adaptive standpoint. And I think it's also really helpful in general to think about all of these "maladaptive processes" as more something that's gone to awry, but in principle, it's a good process. Because it creates this sense of maybe self-compassion, kindness, and actually therefore, almost like this mental flexibility that, "It's not something that's completely wrong with me," it's just that maybe it's not as adaptive in these circumstances. It's sort of like there's a mismatch between the circumstances and the process. So if we're a little bit more chill about that process, then we should all be good.

(00:25:16) For example, also stickiness, becoming obsessive about something is also maybe a form of stickiness. And that can also be really good, it allows you to really dive into solving an equation or really developing a theory. Sometimes that requires really obsession. And I would almost sometimes say that, if we can also have an obsession with meditation, that allows us to do this very boring process for a long enough time to cause a change. Or any kind of difficult skill requires some level of obsession. So that's, in general, I would say not bad, but it's all about the balance, and if it goes a little bit out of balance, then it can become a problem.

(00:25:58) So I think that's generally a very important thing to keep in mind. Makes everything, of course, much more complicated because we can't say, "Oh, this is good, this is bad," it's really about the balance, but at the same time, maybe that's the kind of conceptions we need more than ever in this world that tends to become so polarized. I remember you had a very inspiring conversation with Amy Cohen Verela about this.

(00:26:24) And then, on the other hand, the predictive stuff, I've definitely been following that. I've not really been using these kinds of predictive models myself. And the most important reason is that I find the concept of predictive processing very compelling—that we're constantly having some concepts that we place upon the world, (by the way, this is my understanding of the predictive stuff) that perception is an active process. It's not like, "Oh, you have some pristine input that you then perceive, and that's independent of your preexisting ideas." No, we constantly are sort of creating our perceptions. That makes a lot of sense to me.

(00:27:02) But computationally speaking, I think there are some people that say that only Karl Friston understands these models. *[laughter]* And I would say that that tends to be a little bit the case. Or to the extent that it's been worked out, has been such simplistic situations that they're not really relevant to the kind of scenarios I'm thinking about. So then, I don't find it very usable on that computational level. I'd rather go with computational models that are a bit more concrete for the kind of predictions I want to be making.

(00:27:34) – *musical interlude* –

Wendy Hasenkamp (00:28:11): You mentioned a little bit ago that you're interested in studying different forms of meditation as well, besides this kind of focused attention meditation. And so that brings me to a really fascinating aspect of your work. You've been working with Tibetan monastics in India and studying some of their more unusual—at least more unusual for us in the West—kinds of practices. So maybe you could share a little bit about that?

Marieke Van Vugt (00:28:36): Yeah, absolutely. I'd love to. I mean, actually one of the most inspiring parts of attending the Mind & Life Summer Research Institute a few weeks ago again, was that this time there was actually a panel of five Tibetan monastics that came to Garrison as well. And for the first time, I think there was a real conversation. So very often in the past it's been that especially the monastics felt sort of too shy to really contribute to the conversation, and then there was not much of a conversation happening. And now we're finally starting to see that, so that's very exciting.

(00:29:10) So I've been working with a group of Tibetan monks from a monastery in South India called Sera Jey Monastery. It's one of the most important Tibetan monastic universities. (Tibet basically had three major universities—Sera, Drepung, Ganden—and they've all been reconstituted in exile, and now they're in India.) And really a lot of people think that any monk in the Buddhist tradition practices mostly meditation. But, for example, in those monastic universities, that's really not true. And mostly what they practice is, you could say, philosophy, but also, very interestingly, monastic debate.

(00:29:52) So what I mean actually with "practicing philosophy" is that they memorize the scriptures, then they contemplate these scriptures and think about, "What does it really mean? Is this consistent with my experience? With previous texts?" and so on. And they maybe try to find some holes, and then they debate it with another person, in a collaborative sense.

(00:30:14) So, when you look at it, it almost looks like the monks are, (and nuns do it too, by the way) monks or nuns are fighting with each other. And they're shouting and they're clapping; it looks very exciting. But then actually what they are doing, when you learn how to do it... (Actually last week at my university we had a summer school where one of the tracks that we offered was monastic debate. So our students also learned to practice this monastic debate technique.) And it's really collaboratively trying to find inconsistencies, and having a certain position. So it's not at all about convincing another person of your position or your point. It's really about, "Okay, you're free to choose any position, and I'm going to try to figure out what are the problems with this position? And then we'll find out together." And yeah, that's what it's all about. So it's very exciting.

Wendy Hasenkamp (00:31:10): It is. It's so cool. I remember the first time I saw this, I was just blown away. Because I think we also, in the West, tend to have this concept of monks and nuns as very quiet and calm, and they're just sitting and meditating or something, as you said. And this is the most active, loud... it's like some combination of theater and sport. And it is, it's very exciting to watch. Even if you don't understand the Tibetan that they're saying, you kind of can get the sense of it. And it's also very choreographed. So it's a fascinating practice. And in thinking more about your work, it really, I guess, is a form of analytical meditation. Is that right? Is that how they view it?

Marieke Van Vugt (00:31:49): Yeah. I would say so. So you have the individual analytical meditation where you for yourself consider like, "What does it really mean?" a certain concept. And the kind of main topics of Buddhist philosophy are really exploring interdependence and impermanence and the nature of things, whether they're singular or consist of multiple parts. And that seems all really simple, but if you really explore in your own experience from... This is just my understanding, of course, of what they are doing, but

even in my very limited experience, if you really explore these topics, you very quickly start to find lots of problems. I mean, this microphone that's standing here in front of me seems very solid, but I can also be sure that in maybe a hundred years, it probably won't be there anymore. So when is this changing? When is it going to be disappearing? It's very interesting how that all works.

(00:32:44) And I can easily understand that this can also be a very transformative practice. And that's also the kind of intuition I got when I talked to these monks. I mean, they have such a sense of gentleness to them, also a sense of tremendous humor and mental flexibility. So I was like, "Something's going on." And I think, for example, His Holiness the Dalai Lama is a great example of that. Probably everyone can see that kind of gentleness, humility, fluidity. So it's not a crazy idea to assume that there's something about the practice that would cause this.

(00:33:20) And then the question is, how does this work? So in 2015, at the Mind & Life meeting at Sera Monastery, actually, we started a research project to think about, "How can we study this practice?" And we wanted to do this, not in a sort of neocolonialistic way, that we would just come up with experiments and the monks would be our participants, and then we take away the data and be done with it. No, we really wanted to go into this very collaborative research.

(00:33:52) So we partnered with Science for Monks and Nuns—this organization that's been organizing science education for monks and nuns for many years, and so they're very well grounded into the Tibetan community. And they really helped us to have equal conversations where the monks weren't just our subjects, but they were equal partners. And they were also helping us figure out how to talk so that the monks could understand. And also how to encourage the monks to really speak up and find out where we're missing connections with each other.

(00:34:27) So this was a really fascinating process, because how often do you get to be almost at the beginning of a new scientific field, and really be figuring out things as you go? Because nobody knew how this analytical meditation works on a psychological or cognitive level, how you should study it. And then on the other hand, also this collaborative doing research together... I mean, citizen science on steroids, you could say, because now it's citizen science in the sense that these citizens, the monks in this case, are helping us to collect the data. But also, they are helping us form the hypothesis, interpret the data, and also learn about what science is along the way. So it was really meant to be a two-way process, so we're also figuring that out.

(00:35:17) So it's been a very exciting project, and I mean, we're still going strong. We've published a couple of papers. But we're still meeting every few weeks on Zoom, and then every so often we meet in-person as well.

Wendy Hasenkamp (00:35:31): That's fantastic. Have you had any findings yet about how this process might be working?

Marieke Van Vugt (00:35:38): Yeah. So, of course, it's also slow science, but we have published a couple of papers. One of the papers showed, for example, that during monastic debates, you tend to see an increase in what's called frontal midline theta. So theta waves are certain brainwaves—they're between four and nine hertz. And then "frontal" means they're in the forward part of the brain, in the frontal part of the brain. And basically this is a kind of brain signal that you also tend to see in other kinds of meditation practices. So this was suggesting that maybe they're, in that sense, also kind of an attention training. And actually we found that more experienced monks had more of this. And this was also quite consistent with our own observation that especially experienced monks, when they're practicing this form of debate, they

kind of forget everything around them, whereas the beginners are way more still distractible. So there's really also some sense of an attention training going on. So that's been a major finding so far.

(00:36:48) Right now we're also working on more of the affective side of things, and looking at self-reported emotion data. And one of the more consistent findings seems to be that negative emotions go down for more experienced monks, which is also quite consistent with the sort of first-person observation of interacting with these individuals. But I mean, it's much more subtle than that, but the details are still being worked out. So those are, I'd say at this point, the main findings.

(00:37:23) And then, actually, another interesting thing that has come out of the research that we've just submitted is... I've been working in cognitive science basically my whole scientific career, but all of these tasks are really assuming that you've had a certain type of education that really values abstraction, and taking things in a certain context, and applying them in a different context. It doesn't really matter exactly how a person says things or how it fits in any individual context—really generalizing across contexts. So this is why in our cognitive task, we very often use abstract stimuli like letters or isolated words.

(00:38:04) When we presented monks with these tasks, they were already a little bit confused, like, "It doesn't make sense to us." And even if they were willing to help us, sometimes they found it quite distracting. They were confused by it. And then also, if we looked at the pattern of results, they didn't do particularly well. And actually, most of the time, less experienced monks tended to do better. And what was relevant about these less experienced monks, is that the education that they had received was a bit more like our modern education. Whereas the more experienced monks were more often monks that had come straight from Tibet, that had been nomads until that time, so not really received any modern education, and really just received the education in the monastery, which is much more like philosophical, memorizing texts, really focusing on the details of texts in context, and subtleties of how words are being used in this context, in this sense.

(00:39:02) So the cognitive tasks that we had been using really were intended for people that had been trained with a modern Western style education, and not so much for these other types of education. So I think it raises a lot of questions also about the biases in our Western cognitive science and probably even affective science as well, that's probably suffering from similar biases. So yeah, we're also working on some very exciting processes of trying to develop tasks that are a little bit more geared towards the kind of training that the monks are getting, that makes a little bit more sense to them. So those have also been really interesting discussions that we've been having, that make you really question even the very foundations of science.

Wendy Hasenkamp (00:39:53): Yeah. Oh, that's always a good thing to do. I love that that's coming out of this engagement. Have you studied anything about... Well, first of all, it's kind of a feat, I think. Usually when you study brain waves or do any brain imaging, the person is sitting very still, and there's all sorts of motion artifacts that can happen. And of course, as we were saying, debate is a really active process. So kudos to you for figuring out how to measure all this in the process of constant motion. And I'm wondering too, is there a time when the brains between the two... So maybe we should say a little bit about how it's set up. And it's two people kind of going back and forth, and one person is questioning the other person, who's answering. And, as you say, it appears adversarial, but it's actually a collaborative experience. So there's two people, and have you looked at all about brain synchrony between the two? I think that's just a fascinating area of research in general. So yeah, what have you seen there?

Marieke Van Vugt (00:40:52): Yeah, absolutely. So yeah, this was also one of the things we set out to do. So we brought a special kind of EEG system that's much more resistant to motion. The signal always has to be

amplified in EEG, because our brainwaves are so incredibly weak. (Obviously, otherwise, whenever you touch your brain, you'll probably feel like an electric shock, or something. So thankfully this doesn't happen, it's very weak.) But that means that if we record it, we have to amplify it. And normally this is done in a separate kind of little box, and then it has to travel through wires, and when these wires move, this creates a lot of interference. So we had special electrodes that did the amplification already on the electrode itself, so then you have much less motion artifacts.

(00:41:42) So then we also recorded the EEG from the two debaters at the same time. And we were also curious about the synchrony between the two brains. And we did find that when the debaters were sort of agreeing, when they were thinking probably along similar kind of lines, their brains were more synchronized with each other than when they were disagreeing. But I didn't mention this so far in my report of the results of our study, because we didn't really find a difference between less and more experienced monks. So I don't think that this is really... Well, at least we didn't find evidence that this was modulated by training. So maybe the development took place in the first six years of training, and we got the monks once they had become quite proficient in debate, so maybe this doesn't change anymore. I don't know. But yeah, that's so far our findings.

(00:42:35) And I also find that... I've been doing more research on interbrain synchrony in a variety of contexts, ranging from dancers in some very wild studies to more controlled lab studies. And the more you control it, the less interbrain synchrony we find, at least. So this seems like a very fragile signal, so this is why I'm not so confident about those results.

Wendy Hasenkamp (00:42:59): Yeah. No, that's really interesting. It's an area that I know is quite new in cognitive science, looking at two brains at once and understanding if they sync up and what that correlates with in the experience of the people.

Marieke Van Vugt (00:43:12): Exactly. And it seems like it's in large part, at the least in our hands, really driven by people sort of looking at the same thing and getting the same input, then their brains tend to be synchronized, when they have the same kind of stimulation. But in this more free-flowing, kind of really understanding each other and the social process, a bit less.

(00:43:34) Although, I mean, our study with dancers was also really interesting, where we really worked with dancers to try to understand how to connect to each other through movement. And the reason we wanted to do this was exactly because we wanted to find out, is this interbrain synchrony, is this driven by moving together, and especially moving synchronously? Because that's also part of what we do in debate. So there's these descriptions of monks really moving kind of in sync, and one moves forward and the other moves back, and there's sort of this real kind of "dialogue."

(00:44:09) So we wanted to explore that dimension a little bit more with dancers. And it became a whole adventure in itself to collaborate with dancers, because we also were applying the same kind of method, that we really wanted to make this an equal dialogue. And that made it really exciting but also really difficult, because especially artists, they have been trained to never do the same thing. And as scientists, we want to repeat something a million times the same way *[laughter]*, so we'll get enough data that we can also see what's consistent over all these iterations. So there's a little bit of a mismatch in methods here.

(00:44:49) But we actually learned from all these explorations, some really surprising, in my mind, things. Which is that, initially I went into the project thinking the way that people connect through movement is moving synchronously. But then, actually through working with the dancers, we found that really moving synchronously, I mean it does make people feel a bit more connected, and also their brains synchronized a

little bit more. But really, the much more powerful way to connect to other people is moving as if you're in a dialogue. I think a reason is that then you really have to pay attention to what's going to happen. It's not so predictable. Whereas with synchrony, you can predict what's going to happen. There's no surprise, so it's not so engaging. And also, another way that was very powerful, subjectively and also objectively, in the brain activity was if they moved as if they had a single body. Because there you have to also very precisely, constantly check what the other person is doing. So it's very interesting findings, I think.

(00:45:52) – *musical interlude* –

Wendy Hasenkamp (00:46:29): That's fascinating. And it transitions us into this final area I wanted to chat with you about, is your experience as a dancer. And I love that you've been able to bring that in to the research as well. So I'm just curious, your reflections. Of course, in this domain of cognitive science and contemplative science, we view the mind as very embodied, and that's a big part of how we think about mind. And, of course, in dance, I'm sure that is very apparent. So I'm just wondering if you have examples of your experience in dance, how it has informed the way you think about the mind? Or, I don't know, just any reflections of that synthesis. I think it's such an interesting bringing together of worlds.

Marieke Van Vugt (00:47:09): Yeah. I mean, for me it's been fascinating as well. I think, at the same time, I'd say that even in the science of meditation, people don't necessarily think of the mind as embodied. I'd say in many contexts, often they forget about that dimension. Especially a lot of the earlier research on meditation was almost like, there's the mind and we're just going to focus on the mind and the brain. And, of course, the brain is part of the body. And even the fact that people, in a way, talk about the brain as if it's separate from the body, is kind of funny, I think. So there's that.

(00:47:44) And also, from the dance perspective, I would say that not necessarily all dancers are that conscious or embodied. I think a lot of dancers learn to almost turn off the signals of their body so they can do all the amazing stuff they do, and push past their physical limits. So it's not necessarily a connection, but there can be a very strong connection.

(00:48:10) So I've been really trying to also experiment a lot with bringing these together, because somehow for me, it makes a lot of sense to bring them together. So in my own experience with ballet, I found it's a fantastic attention training, because if you're practicing ballet and you think about other stuff, then you're lost. You have to remember the steps, trying to sense into all the parts of your body and what they're doing, and whether they're doing the right thing. And you have to be aware of what the other people are doing, so you're in the right configuration with all the other people and you're not in anyone else's way.

(00:48:49) So there are so many dimensions to it. And then there's the emotions that you may be expressing, and the music that you have to be connected to as well. So it's constantly connecting to all these different levels of experience. It's a very rich way of connecting to your experience. And really, when I do it, I forget about everything else most of the time. That's maybe one reason I love it too. *[laughter]* And in that sense, it can be a fantastic training of this awareness of trying to really be aware of everything, both internally in your own body as well as externally.

(00:49:26) And, at the same time, especially ballet is quite challenging because it has this very strong evaluative dimension to it—that there's a right shape and a wrong shape. And so it's also a beautiful challenge to try to work with that. And how do I hold myself to that? How do I relate to that self-evaluative dimension and not get too wrapped up in hopes and fears about, "Am I doing it well enough? Am I totally

making a fool of myself?" And those are the kind of thoughts, especially maybe as an amateur dancer, I get a lot, and I think other people too, from my conversations.

(00:50:07) But, at the same time, when you're really touching in with all these different aspects of your experience and your awareness, then you don't even have the time to think about all these self-evaluations. That's when the magic happens. So yeah, that's for me the connection.

(00:50:20) And then, I think, also touching into your body... In the last maybe two years, I got involved in a project about what's called embodied critical thinking, where it's a collaboration with researchers from different universities in Europe, Iceland, and Aarhus, and the Technion in Israel, and so on. And it is a project where we're trying to explore the root of thinking in the body, and maybe also using the body to connect more to our experience. Because, especially in the academia, we're very much trained to think only in these abstract terms, but then we might be leaving out our intuition, which is very often more rooted in the body, and we don't pay attention to it. We almost learn to ignore it.

(00:51:11) So with these methods, and we're using a variety of methods... So one is called Thinking at the Edge, which was developed by a philosopher called Eugene Gendlin. The other is microphenomenology, and we're also using meditation. And we're also using cognitive science to understand what's going on here, and even to think about the mind in these other ways. And then, we're also using dance. So I got to teach dance and movement in these kinds of summer schools as well.

(00:51:42) So yeah, it's been very interesting to consider dance also more from that perspective, as a tool to explore sort of the roots of thinking. Because I mean, it's a constant interaction between our body and our thought process. And our thought process influences how we form our body. So in some sense also, your body can never really lie. You can see it in people's body language, how they feel. And on the other hand, the way we move our body and the way we hold our body also has a profound influence on how we feel and how we think.

(00:52:23) So I think it's a very interesting, and also under-explored dimension of thinking. And it's really also very healthy, for me at least, to bring these wider dimensions of experience more into my research. Because connecting to the body and also becoming more aware of these influences of the environment, sort of takes the focus a little bit away from the just "me" and "myself" to the much broader environment—becoming much more aware of how I'm constantly co-constructing the environment with my thoughts. And the environment, and my body as well, they're also constantly influencing my self.

(00:53:11) And, of course, then this is a bit challenging to figure out how to relate that to this academic work, which is really mostly focused on trying to abstract away all of these layers of the environment, which at the same time, that's why it's helpful to go into these explorations and to realize that this is what we're doing in science. I mean, I'm not a proponent of just saying, "Okay, we're then throwing away all these methods." No, they are very useful and very powerful. But we have to then remember that whatever we are finding in this very abstracted world that we have in our lab, does not always necessarily generalize to the way more complex world out there.

Wendy Hasenkamp (00:53:54): That's such an important takeaway. Yeah. I love what you just described, that collaborative investigation that you're doing about thinking. And the way you described your experience of dance and ballet, really, there's so many overlaps... I mean, I wouldn't even say overlaps, I'd say it *is* a meditative practice, or contemplative practice, in the way you described it. So that is fascinating.

Marieke Van Vugt (00:54:16): Yeah. Well, I'm about to go to ballet camp in two days again. So I went there last year. And that was such a powerful experience, because basically what we do there is we get together with a bunch of amateur dancers from around the world, and we learn a ballet and we put it on stage. We perform it in a week, which is crazy.

Wendy Hasenkamp (00:54:38): Oh, my goodness.

Marieke Van Vugt (00:54:39): So we basically have every day from nine to six that we're working on it, and then we put it on stage. But the only way you can really do that is to be... Well, at least for me, it was some mixture between, or oscillation between anxiety, but also pure awareness of being there, being in this state of being, as much as possible, aware of everything that was going on in the stage. Because nobody really knows the ballet very well because it's been too short, and we're all only amateur dancers. So you have to be so aware of what everyone else is doing, and that's why you're really in this, you could call it, an enactive process in its purest sense. You're constantly co-creating this new thing that you put on the stage as best as possible for the audience, as sort of a gift.

(00:55:33) I think that's one of the powerful things that dancing, and especially performing, can give you, as it can put you in this state that you're not so concerned with your own mental things. I actually had that experience too when I was performing a few weeks ago. And for the first performance, I was really still in a very self-evaluative state, and I noticed that I couldn't really connect so much with what the others were doing. And the moment you're really tuning much more into what the others are doing, this self-evaluative process is gone. And it is so liberating.

Wendy Hasenkamp (00:56:14): Yeah. Oh, I love that.

Marieke Van Vugt (00:56:14): And then it's also quite connected to these things like compassion, quite naturally, because you're... Yeah, I mean, in this very simple sense. It's not like I'm actively trying to be compassionate, but it's just like you're just constantly being open and naturally sort of responsive to the needs of the others and what the others are doing. And it's almost the barrier between myself and others disappears a little bit. So, yeah.

Wendy Hasenkamp (00:56:41): Beautiful. I feel like, at least traditionally, ballet is considered to be a very rigid and sometimes almost harsh form of training. Like you said, there's the perfection, and the right way or the wrong way of doing things. And I wonder, from the way you described it, this more sense of trying to not do that self-evaluative [mode], and actually tune into your body in times even when there may be pain or things like that (which I think, traditionally in ballet, you're taught to ignore that). So I wonder just about that kind of dissonance, and if you've run into issues in training or just even in your own self, about those two ways of approaching it, butting heads or anything?

Marieke Van Vugt (00:57:25): Yeah, absolutely. I mean, I think it's almost like a constant challenge. But I've been trying to find teachers that help me develop this more adaptive process where... Actually, one of my teachers, Julie Gill, she runs this amazing online ballet studio for adults only, and she really calls this "aggressive curiosity," which I think has a lot of overlap with what we're trying to cultivate, in at least a lot of the awareness meditation practices. So constantly trying to practice curiosity rather than, "Okay, no, I suck. This is the wrong line again, and I've made this mistake again," because that's not helpful. It just takes you away from what you're trying to do.

(00:58:11) You know, there is a perfection, but at the same time, we are human. So it's almost, life is all about trying to figure out ways to just be curious about, "How do I get closer to this perfection?" But also

be okay with wherever you are at this point, because there is no use in getting frustrated in all kinds of hopes and fears, and even worrying where you are in this level.

(00:58:36) And, at least, I find it helpful for the rest of my work as well, because in science too, there is very much a sense of there's something more right and something more wrong. It's not like you can just do anything and say anything, or whatever. There's definitely also some sense of perfection that you're trying to reach too (and in a way also, you almost never reach). But focusing more on the curiosity aspect of it rather than the hopes and fears, because the more you get into this fearful state of, "Oh, I've made a mistake," the more you want to hide it, and that's not helpful for science either.

(00:59:19) So I think, in my mind, there's a lot of overlap between these practices. And I've been trying to use it also as a kind of training for developing more of this aggressive curiosity. Maybe aggressive is not the best word, but this really open mind. Elizabeth Mattis Namgyel, an amazing Buddhist teacher, also calls it "the mind of an open question." I think that's a very beautiful mind state to try to cultivate. And I think sometimes it's also helpful to try to practice that—especially in these challenging situations, because under your cushion it feels like a very nice theory, but can you apply it in the real practice?

Wendy Hasenkamp (01:00:01): Well, Marieke, this has been so great. I just really appreciate you sharing all these stories. I love how you've been able to weave together your various passions, and it feels very cohesive. And I also really appreciate your bringing that critical lens to the process of science continually as well. I think that's so important. So is there anything that you wanted to chat about that we haven't touched on?

Marieke Van Vugt (01:00:23): Well, maybe in response to the statement that you made of, "It seems like very cohesive." For me, that's actually been a constant challenge. And maybe also, especially if there's younger listeners out there that are thinking about their own careers—a career doesn't have to be cohesive. It definitely is not cohesive in my sense, but it's more like a process. And, for me at least, what's been really important is to just follow and honor these sorts of impulses I have that may not make sense.

(01:01:02) Well, for me to follow my ballet impulses... I wasn't quite sure why I had this impulse, but I just knew I had to follow up with it. And now it starts to somehow merge with my work in science and also my work on meditation. And also similarly with my meditation—initially it was completely disconnected from my work in science, and then somehow they came closer together. And still, as we mentioned in the beginning of the podcast, it was at that time called career suicide and people were saying, "Don't do it. Don't study this." And I felt quite shy about it. I kind of mostly hid it away from other people at the time. But still I knew it was really important to me.

(01:01:42) So if there are these things that you feel deep down that are really important to you, just keep growing them a little bit and keep trusting that somehow they will find a place eventually, when the world is right for it.

(01:01:58) Because also, those kinds of things are not something you can force. The world is constantly developing, and it's not like you're in charge of your career. Maybe that's another thing that I really want to share with especially younger students. Nowadays, very often you get this message that you have to just work hard and then you get an amazing career, but it's not always like that. I think, for me, it feels like my whole career is kind of just a series of coincidences, and things that happen, and weird impulses I follow. And then somehow, eventually, in hindsight, maybe they make sense, but it definitely doesn't feel like that in the middle.

(01:02:43) And I feel like I'm still sort of muddling along and feeling my way around. But I think maybe that's also a very adaptive way to do it because you will just follow your own path, wherever it leads you. And you never know also where it's going to lead you, and that's also exciting. And there's also not one path that you could be following. There are so many different ways that will all have their own challenges, and that will all have their amazing things. So eventually it will all have its own logic, even if it doesn't feel very logical and coherent at the time.

Wendy Hasenkamp (01:03:20): Yeah, thank you for that. It's making me think that there's something so beautiful about the way the mind works... You were talking about holding your interests and pushing them forward, even if they don't feel like they fit together. And then, over time, somehow they start to come together. And I think that I've experienced that in my life too, and I think that's such an interesting thing, that if you keep holding ideas simultaneously, the mind starts to integrate them somehow. And then somehow we're able to manifest that outwardly in the world. But anyway, I think that was really beautiful advice, so thank you for sharing.

Marieke Van Vugt (01:03:55): Thank you. Yeah, I agree.

Wendy Hasenkamp (01:03:57): Yeah, thank you so much for being with us today. It was really fun to chat with you, and thanks for all the great work you're doing.

Marieke Van Vugt (01:04:03): Yeah, likewise. Thanks so much.

Outro – Wendy Hasenkamp (01:04:09): *This episode was edited and produced by me and Phil Walker, and music on the show is from Blue Dot Sessions and Universal. Show notes and resources for this and other episodes can be found at podcasts.mindandlife.org. If you enjoyed this episode, please rate and review us on Apple Podcasts, and share it with a friend. And if something in this conversation sparked insight for you, let us know. You can send an email or voice memo to podcast@mindandlife.org.*

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