



MINDFUL IN MAY

Dr. Elise Bialylew, founder of Mindful in May (mindfulinmay.org) and The Mind Life Project (www.mindlifeproject.com) and author of The Happiness Plan, interviews Sarah Mackay

Sarah Mackay

Dr Sarah McKay is a neuroscientist and science communicator who specialises in translating brain science research into simple, actionable strategies for peak performance, creativity, health and well-being. She is the author of The Women's Brain: the neuroscience of health, hormones and happiness which explores the female lifespan through the lens of neurobiology. Sarah hosted an episode of ABC's Catalyst exploring brain health, biohacking and longevity and is the director of The Neuroscience Academy, which offers professional development program in applied neuroscience and brain health. She features in the media regularly, including the Wall Street Journal, The Guardian, Sydney Morning Herald, The Age, and Body & Soul.

Elise: Sarah, what a delight to have you on the program. I have to say, we've been chatting a lot offline, and we've had, already, quite a few laughs. I want to bring some of what we've been talking about into the on-record conversation. Your book, *The Women's Brain: The Neuroscience of Health, Hormones and Happiness*, was an extraordinary read. I really recommend everyone that has a brain needs to read this book. Not just women.

Sarah Mackay: Women and the men who love them.

Elise: It really takes us from preconception, and pre-birth, to old age. Takes you on this incredible journey. It's all evidence based. It is really an extraordinary thing and you told me that you wrote it in a year, which just astounded me. Today, I'm really looking forward to having this conversation. This is a meditation campaign and although we're looking at how to create a meditation habit, it's really about having conversations about the things we can do to support our mental health, our brain health, and our well-being. That's why I'd love to dig deep into this. Also, explore some of what you were talking about around meditation because there were some interesting things there.

Perhaps we could just start, for the listeners that are not aware of your book or your background, with asking you how you ended up here? Give us a little bit of background of your professional life.

Sarah Mackay: I completed a degree course in neuroscience. I was very fortunate. I went over to the UK to travel and work in pubs, as Kiwis and Aussies do. I was very fortunate to apply and get a scholarship to Oxford University to study neuroscience there. It's an incredibly rich, deep, and broad subject, and we still don't know most of it about the brain. It's just always fascinated me. I did my PhD developmental neuroscience. I was really interested in these questions back then. A bit of an old-fashioned question: is it

nature, or is it nurture that determines how neurons in the brain do their little developmental dance, and who they partner up with? That's really not how we understand that now. It's really nature and nurture intertwined and deeply influencing each other. My PhD, "It's a bit of both," was the result. I've always been very, very interested in this idea of, how does the world around us sculpt and shape our brains and who we are?

If I was going to write a book, I had to really be interested in the topic. I didn't think I had any ideas. I was asked some questions about menopause and brain fog. I had written some articles on that which had a really good response but I was like, "I don't want to write about menopause because I'm 40." Well, that's then. I'm now 45. Closer now. We started talking about things like baby brain, and puberty, and why more women are vulnerable to anxiety and depression. What happens in the brain when you go through pregnancy? What happens in the ageing brain? What about HRT? I was like, "Wow! Wouldn't it be fascinating to take a look into the female lifespan? What is this nature-nurture dance that's playing out through the female lifespan?" That's how the book idea was born, I suppose.

Elise: What stands out to me about this book that's so brilliant is that you have this rigorous scientific background in neuroscience, but you're also great at communicating these scientific bits of research in a way that's really accessible for people. I wonder if you'd share some of the science. This is a bit of a broad question, so go with whatever comes up in the moment, but if you could share some of the science that has most inspired you about brain health that comes to mind, that has perhaps led you to change your own behaviours, the science you discovered through writing the book.

Sarah Mackay: I thought that it was going to be very much looking at puberty, and that hormones would be the driving influence in terms of whether girls

perhaps develop anxiety or depression. I was very curious to look at how we've got this monthly neuroscience experiment going on, those of us between puberty and menopause. We're having a menstrual cycle. We know the hormones our ovaries produce into the brain, and there are receptors for them in the brain that allow the hormones to act. I thought that there would be very clear evidence that hormones are driving how we think and feel across the menstrual cycle. I thought during pregnancy, this massive rise in hormones that we see would strongly influence how we think and feel, and again, during menopause, but the biggest surprise when I started looking at the very careful research that was done was that hormones were not always the loudest voice in the crowd. It turns out it's the experiences we have of people around us.

People might be going, "I'm not sure what she's saying." There are, perhaps, two studies which really shifted my thinking about this. Firstly I was really interested, as I said, at looking at how our mood changes over the month, how our thinking, our cognitive skills change perhaps over the course of the month, and the role hormones play in that and our emotions.

I'm pleased to tell every human out there that hormones play absolutely no role in women's capacity to make clear cognitive decisions and judgments, and plan, and think, and reason. That's why the country I grew up in can have a female prime minister who has had a baby in charge. Finland is doing great things as well with some of those women in charge. Hormones have got nothing to do with our abilities to be fully functioning, contributing members of society. But most women know that anyway.

Emotions were a bit of a different thing. I went in thinking, "Well, everyone's always talking about how they're very hormonal. This word hormonal almost gets used interchangeably with emotional." The literature I looked at didn't really seem to support that. So I thought, I'd look at a very common experience

many women have of this idea of PMS, or premenstrual syndrome, or premenstrual tension. It's feeling cranky and irritable in the week before your period. I thought, "Well, that's pretty clear-cut."

A fascinating meta-analysis I uncovered. A meta-analysis, for those who don't know, is when you pull together lots of data from lots of different studies, and you've got power in numbers. The more data you have, the more certainty you can make a claim based on that data. Fascinating look at reports of PMS.

Women who put their hands up and say, "I get PMS", in different countries around the world. For example, in France and Switzerland, about 10 or 12 percent of women say yes, they get PMS. Just over the road in Spain, right next to France, about 75 to 80 percent of women say, "Yeah. I get PMS." In Iran, a bit further around the globe about 98 percent of women do. So, we've got this massive variation, somewhere between 10 and 98 percent, so hardly anyone and almost everyone. It depended widely, massively, on the country, and society, and culture you lived in, which to me was a huge surprise. Because if it's purely driven by hormones, why does it vary so much based on where you live? For me, that was like, "How curious!"

Elise: I wanted to bring up a study that you reference in the book quite a bit, the Dunedin study. Can you share a little bit about that? Perhaps, the biggest takeaway that we can apply to our own lives from the study?

Sarah Mackay: The Dunedin longitudinal study started in about 1973-4. All the children that were born in New Zealand at that time (there were just over a 1,000 of them) have been studied in absolute micro detail throughout their lifespan; every year or so when they were younger, and then spread out to every five years or so in their 20s. It's been an amazing study because they've been able to retain all of these people in the study. They're all in their mid-40s now. They get flown in from overseas if necessary and a few of them are in gaol.

They're brought in from gaol. They have everything done to them, from psychological testing to an MRI of their brain. The dentist looks at their teeth. They get assessed by a mental health worker. Their children are now being interviewed. When they were young, they were looking at their exam results.

The beauty of this kind of study is that it has been so diligently done. There are no gaps for the data to fall into. We can get this very clear picture of this nature-nurture discussion. What are the determinants of a flourishing, contributing member of society versus someone who's perhaps, a bit more troubled or taking up a lot of resources in terms of social support services or the healthcare system?

It turns out, and this is a bit worrying, that a lot of the people's outcomes are predicted from very early on in childhood. That children who grow up in a loving, nurturing, stable home are far more likely to go on to succeed in life than kids who grew up in chaos. We understand that.

Elise: When you say chaos, is there a level? Is it like you're looking at quite severe chaos?

Sarah Mackay: That's a really interesting point. I guess we could talk about the kinds of stress that children may experience in their early life. You can have a positive stressful experience, perhaps separating from a parent, or perhaps starting day-care or school, or making new friends. That's stressful, but it's positive stress, and it's required as part of the development of your stress response system.

We could have tolerable stress, where you could have something terrible happen, like a natural disaster or a parent die, but if there is stability, warmth, love, and support around that child, an incredibly stressful event could be tolerable. Or, you perhaps would have what we might call toxic stress, whereby a child is growing up in extreme poverty and deprivation, or neglect, or

violence, or abuse. Where this is happening and they're constantly being challenged and stressed without the warmth, and stability, and support around them. Whilst that's not the only predictor, there are a lot of genetic predictors as well. You've got nature in there as well, determining people's life course outcomes. But it's pretty easy, they reckon, to predict from looking at people in childhood, who were the ones who would go on to – what we might call in society – to succeed versus those who would be more troubled. Interestingly, this is playing out in terms of the people's health, as they're aging slowly versus those who are aging quickly. The predictors are there from quite early on in childhood.

I said to Richie at one point, “This is a bit worrying. What about kids who do have a bad start in life?” He said, “Well, you're asking me if they're stuffed for life. Well, not necessarily. The key here is this social infrastructure.” He said he's seen some remarkable changes come about in people who had a tough start to life. He said, “But the key was the love of someone else.” He said, “Maybe that was a grandmother figure or an aunty who came.” He said, “Sometimes even a therapist? It's that love of someone who comes in and then nurtures, pets someone who had that troubled beginning in life.”

Elise: I think it might be a nice moment to bring up the conversation we were having offline, which was about meditation because I think it was a great point that you raised. Obviously, having studied the science myself and been in psychiatry, etcetera, I think the mindfulness research is there. It really is very helpful. It's been shown through the research that for some people it's as effective as antidepressants when they're suffering depression; it can help with anxiety symptoms. It's certainly not the be-all and end-all and for most people who start it's really hard.

Do you want to share what happened for you? Because I said to you, “What’s your relationship to meditation?” before we went on record. Do you want to just share what we were talking about? Because I think it’s great. I think it’s really important.

Sarah Mackay: I have a rocky relationship. I suppose you’re probably far more qualified to talk about the nuances of whether you use the word mindfulness or meditation because apparently, I’ve got that wrong too in some of the conversations that I’ve had. But I have done an MBSR course, and obviously, I’m very, very familiar with the research. For me, it was something like it is for many, many people a big struggle to master. I don’t have any deep-seated mental health issues but I’m a bit of a type A stress-head. Instead of downing a couple of glasses of wine a night, maybe I should look at some other solutions so I thought, “I’ll look into this as a way of reducing my stress levels.”

In terms of things like ability to attend and whatnot during the day, I’ve got that wrapped up. I need to reduce my stress because I have a massive monkey mind and as I said to you, if I have a problem information gathering is my natural way to solve a problem and find a solution, rather than taking a bit of a step back and calming down first. I’m like, “Right. I’m going to get as much information and research around this as I can.”

I really hugely struggled with that quiet, seated, breathing meditation. My mind would wander and I had all of the problems that people have. I was like, “I’d just rather go for a walk because I don’t feel like I’m having to learn how to do that and bring myself back to doing it right. I can just go for a walk and feel calm, or I can immerse myself in a fiction book. I was feeling like there were other ways for me that were easier where I was getting a similar relaxation response.

I'd go to pump classes at the gym as well and it was almost like that rhythmic muscle movement.... Then I would have the same outcome and I thought, "Well, is there anything wrong with having these different paths up the same mountain?" So, I wrote a blog post: Maybe the title was slightly provocative. It was something like "Mindfulness meditation doesn't work for me. Here's what I do instead." I talked about my struggles. I was very open about it. I said, "I know the research is great and works for many people but I struggled. So, I've tried some other things instead, which have a pretty good outcome." I had more comments on it than anything else I'd ever written on my blog. The vast majority of people telling me what I've done wrong, how I haven't done the course, how I completely misunderstand the philosophy and language around this, that I'm trying to be provocative, and I'm basically pointing out all of my failings around this. I was like, "Crikey!" It felt like I'd questioned an evangelical movement.

In a way I experimented a little bit with this idea. I have, at various points in time, various talks I've given, thrown out that idea that it doesn't work for me and I've tried other stuff instead. I get two kinds of people coming up to me in the coffee break afterwards. One group of people: "This didn't work for me either, but I've been too scared to say because I thought there was something wrong with me." Then the people come up to save me and tell me what I've done wrong, how I must meet their guru, and pointing out my misunderstandings. I'm thinking, "If it was exercise, I didn't really like doing CrossFit, but I really liked ocean swimming instead- I feel that I wouldn't get the same massive response.

Elise: You wrote this whole chapter on ageing and the ageing brain. I just wanted you to share anything from that topic that stands out around things that either shocked you, or surprised you, or things that you may be more conscious of now that you know some of that research.

Sarah Mackay: I think some of the more surprising findings, if you're not familiar with longevity and ageing research, are around some of the more psychological or cognitive lifestyle measures, one of them being around having purpose and meaning in your life, like you're connected to meaningful work. What you're doing, as you might say, wags your spiritual tail, or you're contributing to something greater than just yourself. What you love doing is meaningful to other people too. That's a really important component of longevity because that obviously leads to more positive emotions, social engagement and stress reduction, again these ideas of having good, strong social connections.

Also, these ideas around intellectual engagement. So we know to build healthy flourishing neural networks in our brain, we need to constantly be challenging our brains. There are no shortcuts to thinking hard. Thinking hard is using our brains in much the same way that working our muscles hard. We've got to keep expecting something, and asking something of our brain, and keep it working, particularly during our younger years. We know that the longer you stay in formal education, for example, the lower your risk of dementia. That doesn't mean if you leave school at 15, as Richie Poulton would say, you're stuffed for life. But it does mean you're going to have to work a bit harder to keep your brain cognitively engaged. Beyond just doing a daily crossword, but really challenging yourself. Those ideas, I think, came out.

I was really interested in just looking at people who lived really long and healthy lives. This isn't from the book, but here in Australia, I did some work with ABC *Catalyst* last year. We filmed an episode looking at brain health and longevity. We looked at this group of exceptionally old people who were still exceptionally healthy. They were all in the 80s. We took them to Melbourne, and we ran them through a hedge maze, and they had to do all these cognitive challenges along the way. They raced against family members who were in

their 30s and 40s. They did it really, really well. They were in their 80s. They were amazing.

The thing that captivated me the most about these people was not even what they got up to every day. They were all very, very busy. I was interested in how they were in life. We were filming a TV documentary which was for all of them the most fascinating, engaging thing. They wanted to know everything about the cameraman, and the sound guy, and the drone that was flying. “Isn’t that interesting?” “Sarah, tell us about yourself and about your life.” “Gosh! There’s the food truck there. Wyatt works in the food truck. Where does the food come from? How are those decisions made? What’s the producer doing?” They were so interested and immersed passionately in every aspect of life. They just were deeply engaged. I’ve never met a group of people like that. You might see that in little kids and toddlers. I do think that’s one of the keys to their good health and longevity, their positive mood, and just the attitude.

Elise: I like to ask this question to all the people I interview. If you could host a dinner party with anyone you liked; alive or not alive; people that you don’t know; people that you found inspiring or fascinating, who would you invite.

Sarah Mackay: This is bringing tears to my eyes.

Elise: Who would you bring to the dinner party? You can pick anyone you like. Obviously, there are thousands. But right now, who comes to mind, the brains, or minds, or hearts that you would like at the table?

Sarah Mackay: That just makes me want to cry. I would have to just have my mum. She’s alive. She just lives in another country. Here am I having a good old cry. My stepdad’s a pretty exceptional man as well. I think I would have my mum and her husband, he’s amazing. Then I’d probably get my husband’s parents over from Ireland because they’re getting older and it’s harder for them to travel. They’re the important people.

Elise. Well, thank you so much for your time. It's been wonderful chatting with you. I really recommend, as I said, anyone with a brain read your book. It's such an incredible offering. So rich in science, which gets me very excited. I'll share a link to your website and your neuroscience academy, where people can come and learn more with you about the brain. Thank you so much.

Sarah Mackay: Thanks for making me cry.

Elise: You can't blame it on hormones.

Sarah Mackay: No, it's not the hormones. It's thinking about the people you love. It was great. Thank you. I'm so honoured to be part of this program. It's been an absolute privilege.

Elise: Thank you.