Stephen Calabria: Right. Now the new focus in a lot of the research has been on positive experiences. So, how do we define positive experiences and how does it manifest in the literature?

Barbara Sahakian: I think the important thing to remember is that we often think about our physical health. Lots of people wear watches and they monitor their steps and physical activity or they monitor their heart rate. They often monitor their sleep. But what people don't do is think about their brain health so much, and brain health is so important both for your cognition and your ability to achieve what you want at university or work, but also it's extremely important for your mental health and well being.

So, I think of positive experiences as, you know, achieving goals is very positive for everybody. Having a good social support system. So, there's many things that can lead to that. Some of them are physical that actually affect the brain, because for instance, sleep is something that's incredibly important.

For adults, it's good to have seven hours of sleep at least, good quality sleep. But seven to nine hours is fine. And, it's a very active thing that we do in our sleep. Most people think of sleep as just being passive. You're asleep, but actually, you know, you're consolidating your memories in your sleep and also, uh, it's important for your immune function and we remove toxic waste byproducts during our sleep.

So those sorts of things are not only good for our physical health, but they're also good for our brain health. And I became really interested in this when I was asked to lead on the UK government foresight project on mental capital and well being, and when the UK government came to me, they actually called it the UK Government Foresight Project on Mental Capital and Happiness, but I asked them to change it to well being because happiness is a sort of state we fluctuate in and out of, and we can sort of think about the number of times we've been happy, you know, maybe when we've fallen in love, when we've got into the university we wanted to go to or got the job we wanted to have.

And so they're very brief periods, but I think we can all, hope to attain a, a level of well being. So, I changed it to that and, and, and that really we, we looked across the lifespan for all the factors which would promote good cognition and good well being across the lifespan.

And we looked at the factors that would detract from good cognition and good well being across the whole lifespan. And so that's where I first got interested in positive aspects and good brain health.

Stephen Calabria: In other words, happiness is fleeting. Negative experiences, negative feelings are a part of life, and you can still feel those when you are at an otherwise great or good level of well being. Is that right?
Barbara Sahakian: Yes, that's right. I mean, you know, we all have days where something not very good has happened to us. You Maybe for me, it might be that paper or a grant got rejected and things like that. And, and, you know, you feel very low for a period of time, but, you know, you quickly because you have resilience, which we can build up through our social contacts and our education.

And that's really helpful for when we have these negative occurrences happen, and it's especially important to have resilience later in life because that's when we often get chronic diseases and we'll have the best possible outcome if we have good resilience and cognitive reserve, as it's called.

Stephen Calabria: Now, your research points to how oftentimes we build resilience as children, we build our base of resilience, our toolkit for resilience in childhood, and the further you get in life, perhaps it's more difficult for you to build that toolkit from scratch if you don't have that positive foundation. Is that right?

Barbara Sahakian: That's absolutely right. So, our brains are still in development right up until late adolescence, early young adulthood. So, people have shown that by the age of about 24, 25, the brains are more or less developed.

So during that period, of course, there's a lot of change in the brain. And so, you know, with the kinds of experiences that you have, what you do, what you read, what you eat, all inputs into the brain function that you'll have, and that really will set you up for later life.

And also, our social development. So, we have a social brain and our social development is very important and that, that starts between the ages of one and five. Obviously that's so important that children have the experiences that they need and interact socially. And social development isn't just good for the social brain.

So I talk about hot and cold cognition. And cold cognition is a kind of rational cognition. The type of thing that you may be doing when you're setting up a program and who you're going to interview and what you're going to ask them and that sort of thing. But we also have hot cognition, and that's the social and emotional cognition.

And that's very important for things like the service industry, or for getting on with other people, for understanding other people's minds, the theory of mind and that kind of thing. So, the social cognition is actually a building block for the cold cognition as well. So, how we become creative, how we plan, how we problem solve in the future.

So all those things are very important, that stage of development, and then into adolescence. So childhood adolescence is an incredibly dynamic time for people, and that's where it sets you up for the rest of your life, really.
Stephen Calabria: Before we get to the study that you recently co-authored on the subject, when we think about resilience generally, what are we learning about how to build better cognitive function and resilience in children of late that we haven't previously known?

Barbara Sahakian: Well, I think one thing is that resilience is a little bit about having a challenge and overcoming it successfully, because if you have the experience and the confidence that you can have a problem or a challenge but you can overcome it in and be successful and reach a goal or do whatever you want to do that sets you up for the next problem or challenge that you meet.

So some people originally thought that perhaps having children avoid making any errors or making any mistakes or failing would be a way to instill resilience, but that really isn't the way, because you have to have the experience of being able to cope with not being successful, but coming back from that.

And, that's so important in anything that we do, whether it be sport or work or anything that we have, because you're never going to be always successful. So you have to have the confidence and the resilience to think, okay, well, I should use this as a learning experience because I'll take out the information that I can use, but I'm not going to let this affect me personally and make me feel as though I can't do the next thing successfully.

Stephen Calabria: Now, you recently co authored a study that dealt with reading to children and the effects that that has both on cognition and resilience. What did it cover specifically?

Barbara Sahakian: Yeah, so that was a really exciting study, and what it showed is that if you learn to read early on in childhood, it sets you up for your adolescent years.

You have better brain health, you have better cognition, you have, , better school attainment, you have less symptoms of anxiety and depression and stress, and, , it also means that you spend less screen time as well.

Stephen Calabria: How did you gather that data?

Barbara Sahakian: So that data came from the ABCD study, which is a fantastic study in America where they're collecting data from all over America and it's longitudinal and it starts with the sort of 9 to 10 year olds and carries on.

And it's got brain imaging data and all sorts of behavioral data, cognitive data, so that you can really follow up the different effects on how things will impact on children later on into adolescence. And I hope very much that they carry on into adulthood because we need this kind of data to be able to analyze it.
Stephen Calabria: What actually takes place in the brain when a child is being read to, and do we see those same effects when adults are being read to?

Barbara Sahakian: So it's, it's a very social experience, obviously, because when you're first learning to read yourself, obviously you're with a parent or a guardian or an older sibling, and they're sort of pointing out words to you and having you repeat words and you're looking at pictures and you're discussing the picture and you might be discussing like what do you think might happen next or something like that.

So it's a very interactive thing. So you've got that reciprocal discussion and interaction, which is very important for stimulating the social brain. And you also get to hear what the other person's thinking. So it starts to give you insights into, well, I had this idea, but they had that idea. So you're developing that kind of thing as well.

But in addition to that, it gives you a sort of creativity because you start to, you know, you start to talk about, oh, this, maybe the picture of the cow in the book isn't like a black and white cow or brown cow like we normally see. Maybe it's a purple cow.

And then you can start to talk about, well, You know, this, this is funny because it's a purple cow and you can start to think creatively about what other animals could we change to different colors or things like that.

So there's an element of the creativity about it as well. And then, because you're sort of thinking ahead, maybe, to what the next bit of the story might be, you start to actually affect the cold cognition, too. Maybe the more frontal type of cognition. Of course, we don't have our frontal lobes.

They're the last bit to develop, so they don't fully develop till we're in late adolescence, early young adulthood. But nonetheless, you start to think ahead about what might be happening in the future in the story, which gives you a bit of planning, or maybe even problem solving.

Stephen Calabria: And that differs, I imagine, from reading to an adult, because by the time we reach adulthood, a lot of these things in the brain that have already been developed.

Barbara Sahakian: No, that's right. But it's it is a different experience. But nonetheless, I think most people find it very pleasurable. I mean, it doesn't go on that that often. I think most people as adults read to themselves But, sometimes people listen to books as well and

Stephen Calabria: Or podcasts, for example.

Barbara Sahakian: Or podcasts, exactly. And that's very enjoyable and they share the information on the podcast and maybe discuss it afterwards. So that could be incredibly
stimulating too. And again, it’s a good social experience. It’s really important for adults. One of our studies we published in Neurology, showed that being socially isolated actually increases, you know, your risk of having dementia later on.

[00:14:27] So, it's really important to be able to stay socially connected. And one way you can do that is through reading. Reading to each other or sharing a podcast and then having a discussion over it and other other ways, too, of course.

[00:14:41] Stephen Calabria: Amen to that. When we’re talking about the study that you co authored on reading to children, how if at all did the results break down along socio economic lines?

[00:14:51] Barbara Sahakian: Yeah, so we were really pleased to see that they were successful regardless of the socio economic status of the family. So that’s really important because, obviously, this may be a way to counteract some of the effects of poverty on the brain.

[00:15:07] I've just written an article for The Conversation and also it's in Scientific American, which shows the effects of poverty on the brain and then, you know, the suggestion that maybe we could counteract some of that if children started reading early.

[00:15:23] And that's so important for basically for stimulating way into adolescence, that they have a much better mental health outcome and also that their cognitive outcome is better and the school attainment is better. So that was a very important finding.

[00:15:40] And the other important thing we did in that study was to, you know, look at, make sure that it wasn't confounded by parents' IQs, by intelligence level of the parent, because of course you can't measure in a very young child accurately what the intelligence level is.

[00:15:57] So the best indicator would be the parents' level. So the reading for pleasure actually has these beneficial effects in adolescence, whether you are from a lower socioeconomic status or whether it's controlled iQ.

[00:16:11] Stephen Calabria: Before we drop that thread, what are the effects of poverty on the brain?

[00:16:17] Barbara Sahakian: Well, we know that, you know, basically you don't have the same structural volume as you would have if you came from a, a wealthier family. So it actually affects the volumes in the brain. And we know also that, cognitively, you don't have such a good outcome as you would if you came from a higher socioeconomic status.

[00:16:37] So there's a lot of different impacts and there are even impacts on the way that you would behave in certain situations to do with risk or other things. So it’s really
important that everybody has a opportunity to develop their potential and to do that, you know, we, we need to think holistically about how that might done.

[00:16:59] And reading for pleasure at an early age is just a part of that, but it's probably an important part that could help counteract that.

[00:17:05] **Stephen Calabria:** Now, if we were to combine the results of these two studies, could we assume that, these kinds of small, positive experiences, like reading to children, can help mitigate and even perhaps reverse the effects of high adversity, including poverty level.

[00:17:23] **Barbara Sahakian:** Yeah, I mean, definitely it would improve the situation, for sure. So, I think that's definite. So, doing that would help a lot. Now, in itself, it probably isn't the total answer, so there's other things that would need to be done, but, in the absence of a economic or political answer to this problem, then this is something that's fairly inexpensive and could be done globally, really, so it's a, a really excellent thing to do.

[00:17:53] **Stephen Calabria:** Let's talk about COVID. Now you are the expert, but children, according to some measures and statistics, bore the brunt of COVID. COVID lockdowns, social isolation. What do we know about the effects of COVID on children and how children can exercise resilience as far as powering through it?

[00:18:14] **Barbara Sahakian:** Yeah, that's a great question. It did have a big impact. I mean, looking at the UK data, I know that teachers reported that children coming to school, so the reception classes as they call them in, in primary school, they found that the children weren't as socialized as they normally would be.

[00:18:32] So they didn't interact as well with other children. So in terms of like sharing toys or engaging in conversation, it wasn't the typical kind of pattern that they would have seen. It was quite different and marked by COVID. And, I think that obviously during the lockdowns, if children weren't interacting with other children, they didn't have the opportunity to experience and develop that social brain.

[00:18:58] And as we chatted about earlier, the years one to five are so critically important for that. So if you're losing out on, you know, months. During that time, it can be really devastating to some extent. And so the teachers notice that, but the other thing that is also important is that, in adolescence, the sort of symptoms of depression and anxiety have gone up.

[00:19:24] And that's partially due to the fact that obviously they weren't seeing their peers. And adolescence is a critical period because you're, you're no longer a child, but you're not an adult. So you're trying to actually, your peers become incredibly important, seeing them, interacting with them, exchanging ideas with them is, is really critical, and they're the ones that you look to.
So if you're kind of deprived of seeing them for months, and you know, you don't have the same school experience either, trying to catch up academically, trying to catch up socially becomes quite difficult, and people don't have the same optimism about the future that um, maybe we were lucky to have because we didn't have any experience like COVID and lockdowns during that time.

Stephen Calabria: COVID is just one variable. Social media use and the use of technology in general has skyrocketed in the past generation. Social media use is quite new in the course of human history. What do we know about how it affects brain development in children, particularly in the prefrontal cortex?

Barbara Sahakian: Yeah, well, because it is so new, we don't really know a whole lot about it, but what I would say is that, you know, it is very different, and first of all, there's a lot of texting, so you're not actually necessarily looking at somebody. Even if you are looking at somebody, you've got a two dimensions.

It's not a, it's not like face to face where you're watching body language and you're, you know, socially interacting in a different way, as well as with the speech and language. You've got the other cues and you know, and people don't act as naturally, I don't think, when they're Zooming or something else.

So, I know that speaking to some mothers, they've said that their younger children had difficulty with the Zooms and things like that because they don't really feel comfortable seeing somebody in those two dimensions. It's, it's like, very different from interacting when they're with somebody.

And I think we all feel that way. I mean, I think people have noticed on meetings and things like that, that sometimes you don't have the same level of attention. You sort of, switch off the screen and then you don't even see the person. And, and so I think it's affecting a lot of the way we interact.

And for younger people and teenagers, I think it's very important that they have the face to face interaction, social interactions, because they're really a way to connect. And social support systems are a big factor for resilience.

We just did a study, published in eLife, where we showed that in children having five friends was better for your cognition and better for your well being and reduce stress and things like that, and we think that that's because five friends is a good number.

You've got, if you have just a couple of friends, if one of them's busy or ill or something else, then you have nobody to talk to. And if you have more than five friends, either they're probably not very close friends because it's hard to keep up with so many people, or, maybe you're not doing your schoolwork or something else because you're chatting all the time with people.
So, but it does seem to be a very protective factor having, you know, five close friends. And we also showed that in, in the paper that I mentioned in Neurology, that you’re isolated as an older adult, you’ve got a higher risk of dementia. So this interaction is very important and to do it face to face, as well.

Stephen Calabria: Americans are inundated with the idea of the rugged individualist. Make it on your own, you don’t need anybody else, you shouldn’t need anybody else. Does the research suggest that that’s all a fallacy?

Barbara Sahakian: Well, what I would say is that in general, that it is a fallacy. I mean, obviously, when we do large studies, we can’t speak to a, this obviously individual variability, and some people may feel more comfortable on their own, for different reasons, or maybe just that some people are very interested in you know, for instance, some of my colleagues may be very channeled into their work.

And so they find that not only just intellectually stimulating, but they enjoy it a lot. So it’s a very positive experience for them to be doing that. And maybe they do that on their own, although much of science now, as you know, is requires larger groups of people. So we often socially interacting as well as interacting academically and in a scholarly way.

Barbara Sahakian: But I think that, in the UK, there’s been a lot of books about, my own time and alone time and all this sort of thing. I think everybody needs some private quiet time. It’s nice to be reflective. I mean, if you’re going to do mindfulness or something like that, you’re doing it on your own.

And, uh, although things like yoga and other things can often be done in groups or other, other sorts of meditation-types of activities. But at the end of the day, we do have a social brain. We are, tend to be, social animals. I mean, a lot of people think that our brains were developed so that we could interact within social groups.

So I think it really is very important not to lose contact with other people, and I think it puts you at risk for when a negative event occurs, not having a social support system there to fall back on because it’s just yourself, really. So I think it’s critical to, even if you like to be alone some of the time, to make sure that you have a good social support system within your family and your friends.

And to make sure that you get out there and stimulate your brain with social discussion. I mean, this is so exciting if you’re at a, you know, you’re with your friends and you’re, you suddenly bring up some topic and people get locked into it and you’re debating it and everybody has sort of slightly different views on it.

And that is really good for your brain. I mean, you can see how that would stimulate the neural networks in your brain and make you think, Oh, you know, I didn't think of that, that's a really interesting point. So it’s not only just good for the more emotional side of things, but it’s also good for your cognition.
Stephen Calabria: We've been talking mostly about kids so far. Let's talk about the parents. Please correct me if this is in any way incorrect, but you co-authored another study recently that dealt with how, when we account for things like genetic risk, there are certain lifestyle factors that that confirmed a causal relationship between lifestyle and depression. What are those lifestyle factors and what can parents looking to raise resilient children take from that?

Barbara Sahakian: Yeah. So that study was in adults, of course. So we will, we hope to do it in adolescents to see whether the same factors all hold up.

But, one important factor is don't smoke. And it is an important message really to get across because, if you don't smoke as a teenager, it's been shown that you're highly unlikely to take it up as an adult. And also if you start smoking as a teenager, you're likely to be addicted to nicotine by the age of 18.

So it's really important to avoid that. Sleep is so important. We've discussed that already. We did a study and we thought it seemed to be peaking at seven hours for middle age and older adults. But seven to nine hours is fine. Some people prefer a little bit of sleep or maybe they get a bit disrupted in their sleep.

And, so that's very important. And that was actually, sleep was one of the most important factors and I think we all have experienced jet lag or just not getting a good night's sleep. Maybe when parents have small children and they're up in the night and whatnot, and then they may have to go to work the next day and it, it affects your mood and everything else.

So getting a good night's sleep is good for your cognition. It's good for your brain. It's good for your cognition. It's good for your well being. And then exercise. Exercise is very important. And, again, that, that's one I like a lot because it is an all rounder.

It's good for your physical health, good for your mental health, good for your cognition. And so, that's important. And then not having a sedentary lifestyle was also key because too many of us now spend many hours in front of the computer and that's not good for you. So it's good to get up and about and get your exercise.

So, another important lifestyle factor is of course having a good diet, because that's actually the sort of food for the brain, so to speak, and , we must make sure that we have a good, the optimal BMI for ourselves.

And we don't get obese because obesity carries a lot of risks with it. So type 2 diabetes, for instance, and also heart disease and other, it affects your risk for dementia, as well. So it's really important to have a good diet.
A couple that I recommend are the Mediterranean diet or the MIND diet. And both of those include, you know, leafy vegetables, a lot of fish, and really healthy foods like that. So it's, it's very important that we have a good diet, and that's good for our physical health, but it's also good for our brain health, and will help our cognition as well.

We did a study that we, uh, in Cerebral Cortex, where we looked at cereal, for instance, and we found that cereal was very beneficial to improving your cognitive function on different tests, and also very good in general for your BMI, your height to weight ratio and so forth.

**Stephen Calabria:** Are those findings affected by the sugar content of the cereal?

**Barbara Sahakian:** Yeah, exactly. So, it's important to, for instance, for myself, I use a muesli cereal and it's got no added sugar. So that would be the best thing to, to do. Thank you for asking that question because it's very important not to have a lot of added sugar in your foods, as well as not having a lot of added salt in your food. We also found that drinking excessive amounts of coffee wasn't great for you either. So that's another important message to get across.

**Stephen Calabria:** Well, a great number of our listeners are New Yorkers who have a coffee consumption love. So what constitutes excessive coffee consumption?

**Barbara Sahakian:** Well, we didn't really look into the exact quantity that would be excessive, but we did find that there was a relationship between Those who were drinking a lot of coffee, um, having the opposite effects that people who were taking a lot of cereal had.

So whereas cereal was beneficial for you, the coffee at large quantities was, was not so good for you.

And then social support systems, which we discussed are incredibly important to stay socially connected. And some of these actually, interestingly, were identified in the UK government foresight project on mental capital and wellbeing, but we didn't have this large data set at the time to be able to demonstrate in this very critical way how key these are.

And by keeping this healthy lifestyle, you can reduce your risk of depression by 57%. So, if you can have these healthy lifestyle factors, it will reduce your risk of depression, which is great.

**Stephen Calabria:** Another important aspect of resilience, we talk about it on this show, is facing fear, the effects that that has on a person, confronting problems, you sort of touched upon it earlier as far as children go, the importance of presenting challenges to children and having children overcome those challenges. Is that as important in adults to practice?
Barbara Sahakian: It's very important. The thing is, though, that in adults, I mean, at least with children, you can, when they do achieve and overcome something, and they've managed to gain their resilience and overcome the challenge, and maybe then the second time they do something correct, you can, you know, say, oh, that was very good, or you can encourage them and say, well, don't worry that you didn't do that as if as well as you could do, it didn't quite work out.

You try it again, you know, probably work again. And then when it works again, you can say, Oh, that's great. It's, it's worked this time. And I think, as adults, we don't give enough positive reinforcement to our friends and colleagues and family members. And it's important to do that because that helps a lot with confidence.

Self-confidence is partially key to feeling that you can, you are equipped, to overcome this challenge. So resilience is important, but part of resilience is actually this feeling of competence and self confidence that, uh, you can do this, and you will, will do it. And I often tell my students, you have to be confident about what you know.

And when you have a good idea, try to get it out there and the more that you do this, the easier it will become and I often, because I'm an academic woman in a field where there's many men, I frequently in the past have gone to meetings where there's been very few women in the meeting and I always try to say something or ask a question so that if there's younger people who are women in the audience that they will see that it's quite possible to stand up and say something and have it be acknowledged as a good idea.

So I think that it's really important that we, first of all, give positive reinforcement to people when they are trying and doing something and achieving something, but also that we try to instill confidence in young people so that they are well equipped when they come to adulthood to be able to meet these challenges.

Stephen Calabria: If we may, let's touch on that a little bit. Your background in a field that is male-dominated. Has that changed since you began and what were some of the strategies that you employed for yourself being a woman in such a relatively homogenous field?

Barbara Sahakian: It has changed a lot and that's really great. So there are far more women now in the field and that's really nice to see. I think there's still, you know, getting to the very highest positions may still be quite challenging for women, but it's getting better for sure. So that's good too.

I think that probably, again, just having self confidence, I've had good social support too. So there's been some really good people who have, you know, encouraged me and promoted me. And, and most of these have been men because of the field is mostly men. So they, they have also been supportive of me and that's been very helpful.
But I think it's one of those things where when I first I met, some difficult situations where I felt that, maybe it was just because I was a woman that I was having difficulty in this particular situation, I was at first taken aback by it, but then later I decided that I wasn't going to let it bother me.

And I was just going to do my thing and get my ideas out there and, you know, say what I thought and not be intimidated by anything. So, I've kept that up and I've always liked to have challenges because I think that's the way we grow and that's the way we stimulate our brains, actually.

So, I will continue to do that whenever there's a challenge I, I like to, uh, meet it, you know, as best as I can.

Stephen Calabria: Well, that was it for my questions Was there anything else you wanted to say?

Barbara Sahakian: I would just say to young people that, especially these young people at Mount Sinai, Cambridge, all these places that are wonderful universities around the world, my colleagues are from Fudan University, which is also a wonderful, top university.

So what I would say is for these young people, get your ideas out there and you have a lot of great ideas. So, try to bring them to the public. Public engagement is good. Doing podcasts like this is wonderful, getting messages out and writing articles for things like The Conversation, Scientific American, whatever.

It's a good idea. Try to get to the public so they get the benefit of whatever you found and they can use it effectively. And, if you have a good idea, follow it through. Don't let people put you off. You know, it's good to take their advice. It's good to hear what they have to say.

But at the end of the day, if you're convinced that you've got a goal and it's a good goal and it might be difficult, just pursue it. And what I've found is, and this relates to resilience, is that if you're very passionate about what you're doing, have strong motivation, you identify a goal that's reasonable but challenging, you can usually obtain it.

You can usually do that experiment. You can usually find that information that you want. You can usually obtain whatever that goal is, whether it's in your career or in your personal life or whatever. So most of the time you will get it. Nobody gets it a hundred percent of the time. So if you don't get it, just try to learn from it.

And maybe next time with a similar situation comes around, you'll be better equipped to meet that challenge at that point. So keep your resilience, keep your confidence. And if you have a passion for something, go for it. And you'll probably achieve it.
Stephen Calabria: Dr. Barbara Sahakian, thank you so much for being on Road to Resilience.

Barbara Sahakian: Thank you.

Stephen Calabria: Dr. Barbara Sahakian is a professor of Clinical Neuropsychology at the University of Cambridge and most recently the author of “Sex, Lies, & Brain Scans: How fMRI Reveals What Really Goes on in Our Minds.” She is currently co-authoring another book, which is set to be published in 2024.

That's all for this episode of Road to Resilience. If you enjoyed it, please rate, review, and subscribe to our podcast on your favorite podcast platform. Road to Resilience is a production of the Mount Sinai Health System. It's produced by me, Stephen Calabria, and our Executive Producer, Lucia Lee. From all of us here at Mount Sinai, thanks for listening and we'll catch you next time.