**Your Mind on Motivation, Perception & Biases with Dr. Yuan Chang Leong**

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0:00:00.7 Beth Fisher: Welcome back to Minds Matter, I'm Beth.

0:00:03.4 Ava Ma De Sousa: And I'm Ava.

0:00:05.3 Beth Fisher: And this week, I had a chat with Dr. YC Leong, he's an Assistant Professor of Psychology at the University of Chicago, and he's a Lab Director of the Motivation and Cognition Neuroscience Lab.

0:00:16.8 Dr. Yuan Chang Leong: My name is YC Leong, I'm an Assistant Professor in the Department of Psychology at the University of Chicago. I study how our goals, desires and beliefs affect how we see, how we think and how we make decisions. In my research, I use computational tools such as computational modeling and statistics and machine learning, and in some cases, deep learning and artificial intelligence. I also use neuroscience techniques such as functional magnetic resonance imaging or fMRI, and also functional near-infrared spectroscopy or fNIRS. And I use behavioral experiments to basically understand how people make decisions and how their prior beliefs, goals and desires affect those decisions and processes involved.

0:01:00.6 Beth Fisher: Because your work involves cognitive biases, could you just explain what that actually means and what they are?

0:01:07.1 Dr. Yuan Chang Leong: Sure. The way I see it, I think of them as systematic biases and how people think. The analogy I like to use is a bit like optical illusions. You know how with an optical illusion, you know it's an illusion, yet you still can't help but see it. I tend to think of cognitive biases as somewhat similar to that, in a sense that even though you're biased to think in a certain way, for example, you're biased to confirm your beliefs or you're biased to see the way in the world that you wanna see it, you nevertheless can't help but to almost fall prey to it. You might try to convince yourself it's not the case and you might succeed, but the initial impulse of having the tendency to be biased by a particular set of cognitive biases is usually pretty automatic. I tend to think of them as optical illusions, but for the mind.

0:01:58.0 Beth Fisher: And are there reasons why we would have these biases or do they help us in some way? Or, yeah, why would we have developed to have these?

0:02:08.9 Dr. Yuan Chang Leong: I think that's a very good question. From an evolutionary perspective, I can think of a couple of reasons why we would develop these biases. One of them is that sometimes it's a way of saving time, saving efforts and saving mental resources and being able to make decisions quickly, even though the decisions might not be fully optimal, if you will, 'cause thinking and deliberating might take too long, so we wanna jump into it. From a perspective of making decisions quickly and being efficient with our resources, that's not a bad thing. Another reason is that, with regard to some of the motivational biases, such as seeing things you wanna see, the stuff that I study, I would say that another reason is that basically, seeing the world in a way that you want to see it or feeling good about yourself, these are things that make you motivated to work harder, work towards your goals.

0:03:01.0 Dr. Yuan Chang Leong: For example, a well-known bias is that we tend to think of ourselves as more likely to experience positive events in life and less likely to experience negative events. That's called unrealistic optimism. Why we'll be unrealistically optimistic. One of the reasons is that, if we were optimistic, it gives us hope, it gives us energy, it gives us motivation and we work harder, we fulfill the things that we want to achieve. And that has an advantage. And if the bias is not so detrimental that it causes us to lose grip of reality, that additional push, the additional energy can be very powerful.

0:03:38.4 Beth Fisher: Your work also looks at how... You briefly mentioned, how motivation biases perception. Could you explain a bit about that and some of the work you've done in that area?

0:03:50.0 Dr. Yuan Chang Leong: Of course. It's a broad topic area, I can only focus on, I would say, a snippet of it. But one of the things that I study, another way of referring to it is wishful seeing, how people see what they want to see. The idea being that we don't always see the world as it is, we see it as how we want it to be or wish it to be. And for a long time people have debated, "Do people actually see what they want to see or are they just saying that?" The example I'd like to give is imagine playing tennis, and then you hit a ball that may or may not have just grazed the sideline, was it in or out? Would your motivation to win the point make you more likely to see the ball as having gone in, if it's your shot? And we know from experience that we've seen this in sporting arenas and in sport games and such, people are biased to support the team that they want to support, but are they just saying that? Or do they really see the outcome as different? Or do they just remember it differently? There are many possible explanations for the phenomenon. And one thing that my research tries to do is to really understand the nature of these biases as they are implemented in the brain. In some of my experiments, I show composite images of faces and scenes that I averaged together, such like this morphed average image of one superimposed on the other as a kind of part face, part scene.

0:05:07.2 Dr. Yuan Chang Leong: I have people tell me whether they see a face or a scene, but I also motivate them to see the face or the scene based on financial, monetary incentives. And what I then do is to see if that motivation changes what they say they saw, but also what they represent and how they respond to the image in their brains. And the reason why I use faces and scenes is because, we know that faces and scenes are encoded in different areas of the brain or rather in different patterns of activity in the brain, and so we can actually decode what the brain is representing as they are seeing these images. We can go beyond just what they say they saw, but also how their brains are representing the image. And what we found was that motivation not only biases people's perceptual judgements, what people say, their perceptual reports, but also biases the new representation of the image that they are seeing. When they want to see more scene, there is more scene-related activity in the brain, suggesting that it's truly a bias in the sensory representations in the brain, and it's not just a simple response bias. That's one of the projects that we've been doing for a while.

0:06:14.3 Beth Fisher: 'Cause that was one of the questions we wanted to ask was, how do you untangle this? Are people just reporting the bias or are they actually experiencing the bias? I assume when you see this response pattern in the brain, we can then say that they're experiencing the world with this bias?

0:06:33.5 Dr. Yuan Chang Leong: I think by the end of the day, this is one study and I don't want to...

0:06:35.4 Beth Fisher: Yeah. [chuckle]

0:06:36.7 Dr. Yuan Chang Leong: Claim the conclusion. And of course, we don't really have... This is a philosophical thing, we don't really have direct access to people's perceptual experience, the quality of things, if you will. And I don't know if I can go as far as to say that, but from the perspective as someone interested in decision-making, in how people represent things in the world, I can't say for sure. At least I don't feel comfortable saying that this shows that people are literally seeing something different, but the way that I would frame it is really how they are representing it in their brains, because at the moment of perception, it could be that they didn't see it that way, but the brain represents it. And at the end of the day, it is this representation that then guides people as they make decisions after the fact. I think that representation is very important. And with regards to perception, I would say that this interpretation of seeing something different is consistent with it, so I don't wanna pull back too much, but I do think that it's very consistent with this idea. But when it comes to things like perceptual experience, it's always difficult to make a conclusive statement. But I do think that the work goes a little beyond the behavioral work that we've shown. At least we can show that people aren't just lying...

0:07:53.4 Beth Fisher: Yeah. [chuckle]

0:07:53.5 Dr. Yuan Chang Leong: That people are purely lying. I don't think that you would see this difference, and then your representation, it's literally... They'll be representing a face, for example, and then saying a scene, but they know they're lying. Instead, if anything, it could mean that they trick themselves perhaps, but I would say that at the very least, we've gone beyond the password showing, or the password which can't at all disentangle biases and responses versus biases in sensory encoding.

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0:08:25.9 Ava Ma De Sousa: Because YC does work on motivated reasoning and specifically, how goals and beliefs influence perception, base level perception, this makes him part of a long-standing debate in social psychology. And this debate started in the '50s when, I think for us, maybe now it seems... I actually don't know. I'm curious if it seems obvious, if you're listening to this and you think it's very normal and you wouldn't think it any other way that your goals might influence the way that you see the world, in the way that you view the world, or whether you think that makes no sense and that you see what... And then you reason about it differently, or you interpret it differently. But I think if you think about optical illusions, that dress that broke the internet a few years ago, that was blue and black or white and gold and people really saw it as one or the other, and it was crazy. I think the first time I saw it, I think I was with someone and I showed them the dress and I didn't understand what the post was even talking about, because I saw it as clearly white and gold. And the person next to me was like, "What are you talking about?"

0:09:35.6 Ava Ma De Sousa: So that makes it feel like we're really actually seeing something different, our brains are seeing something different, not just interpreting it in a different way. But essentially, this has been a very long-standing debate of, are these top-down "processes"? Which just mean your goals, your beliefs, higher level things than just sensory perception, the light bouncing off of the environment that you're taking in? There's top level and lower level, that lower level is perception, so basic perception, and top level is goals and things like that. Whether those goals actually influence what you're actually seeing or just the interpretation or just the response. I think it's just good for us to contextualize where he is in this debate, because he is one of the people who's continuing on this discussion. And I think from what he said in the episode, I don't know how hard he falls on either line, but I do think that his research, I think it does show evidence for both of these types of answers. And I think that also came out in some of what he was saying about how it's often a mix of all of those potential responses.

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0:10:47.6 Beth Fisher: Another one of you studies found that liberals and conservatives had different brain responses when watching the same videos. Could you explain that study?

0:10:58.4 Dr. Yuan Chang Leong: Sure. In that study, we recruited conservatives and liberals in America, in the American political context, and we brought them into the lab and use fMRI to measure their neural responses as they watched 24 videos on immigration policy. For context, this was around the time when immigration was the particularly hot topic issue in America, when there were discussions of whether we want to build a wall along the Mexican-American border, who we choose to ban from coming into the country. It was a hotly contested topic. That was the context or atmosphere in which we did this experiment. And essentially, the experiment was very straightforward, all we told the participants to do is to just sit back in the scanner and just watch these videos as you would watch the news, or maybe a video on Facebook or Twitter, which is what most people do nowadays [chuckle] instead of the news. Each video was about two minutes long, it's something that they could see in their daily lives, and they just watched it. And what we were interested in is to see how brain activity diverged between groups, between conservatives and liberals as they watched these videos.

0:12:06.9 Dr. Yuan Chang Leong: What we found was the activity was more similar among liberal participants watching the same set of videos and conservative participants watching the same set of videos, but they were different between the two groups. It's almost as new activity consistently diverged between the two groups such that each group responded to the videos in a distinct way, suggesting that they were in fact processing these videos differently. We call these neuro-divergence or neuro-polarization. We didn't find evidence of neuro-polarization in early sensory areas of the brain suggesting that in this case, there is very little evidence that they're literally seeing something differently, because there is no difference in how the visual areas of the brain or the auditory areas of the brain responded to this video. Instead, what we found was that only activity in the dorsal medial prefrontal cortex, which is a higher order brain region that cares about interpretation and semantic content, that was the only region in the brain where we saw neuro-polarization, suggesting that these differences had to do with something about the actual meaning of the message. And so we wanted to look at, "Okay. So what about the messages that's driving this divergence?"

0:13:19.8 Dr. Yuan Chang Leong: What we did was then to basically go back to the videos and examine what type of semantic content or what type of language is more likely to drive greater divergence in the dorsal medial prefrontal cortex, and we found that segments of the videos that contained more emotional words, or threateningly the words were more likely to drive stronger divergence, suggesting that these words related to morality and emotion and what's related to threat, are more likely to induce stronger differences in how conservatives and liberals responded to the video. And then the last part of the study was, "Okay. Does this matter? Does this mean anything?" And what we found was that the degree of neuro-polarization or the degree in which your brain activity was more similar to a particular group, liberal or conservative, predicted your attitude change after watching the video. If your brain activity was more similar to a liberal, the average liberal participant, while watching the video, after the video you're like, "I'm supporting the liberal position a little bit more." Suggesting that having a different interpretation, responding differently to these videos, can actually predict policy attitude positions, if you will. I would say that's the core three findings of that particular study.

0:14:32.6 Beth Fisher: Yeah, that's super interesting. What does that mean for then, if we want just say a conservative person to take on a liberal perspective, but they're gonna represent the information in this way, would that change how we should communicate information, because if people are already gonna have this bias processing, how then do people who have these very strong views learn new perspective? Is this possible? Or is this something that's very difficult to achieve?

0:15:01.3 Dr. Yuan Chang Leong: I would like to think that it's possible. I think that's a very important question. I would say that there isn't enough research on that, or at least the conclusions, we don't know enough about it yet. But I would like to think it's possible. And so that would be my first response to it. My perspective, and again, this is all speculation, is that we actually do have the ability to take on the perspective of another group. We know enough about the other group that we could reasonably adopt it. Perspective-taking exercises have been shown to improve or integrate relationships, including in political context, suggesting that if we were to instruct, and not just instruct but also motivate, I think that's the important part. If we can motivate people to take the other side's perspective, merely you would find that their brain responses might become more similar to the other side, but also because they've taken their exercise and considered that the other perspective, I would like to think that creates both empathy and ability to connect with the other side and would aid in achieving middle ground and consensus.

0:16:03.1 Dr. Yuan Chang Leong: That would be my first response to that question. The second response to that question actually is that two groups really have different perspectives, understanding that perspective might allow you to pitch a particular policy or a particular issue in certain words and certain very particular viewpoints that might be very persuasive to the other group. And that would be the other way of trying to bridge it, where it's not just that you're taking perspective and understanding their position, and therefore, maybe getting convinced by that, but also if your aim is to convince, taking a perspective can also be helpful. That's how I think about when it comes to interventions of political issues.

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0:16:51.8 Ava Ma De Sousa: Especially with the intervention that, Beth, you were asking about, I thought it was interesting because there is some work that has shown, as YC was hinting at, that liberals and conservatives do care about different things, so we have these fundamentally different moral values. And so this work is from the 2000s, from Jonathan Haidt and a lot of his colleagues, that basically showed time and time again that liberals have these core values of care and protection and equality and fairness, among other things. And that for conservatives, the values are more about loyalty and purity and patriotism and respecting authority, those are really different values. And you might have had this experience in your own life, whatever side of the aisle that you're on, trying to convince someone who's on the other side of the political spectrum about a certain policy or something like that, that you might try to be convincing them based on your moral values.

0:17:49.7 Ava Ma De Sousa: There's this cool work that's been done by Robb Willer, who's a sociologist and social psychologist, I think at Stanford. And they basically asked liberals and conservatives to write these letters trying to convince the other side of something. For the liberals, I think they were trying to convince the conservatives of marriage equality. I think this was before marriage equality was achieved in the US. But basically he found that 80% of the liberals were saying things like, "Everyone should have equal rights," trying to use this moral value of equality, that's actually their own moral value, and that only about 9% of the liberals were using the conservatives' moral values of loyalty and purity. And so we're just really bad at basically trying to explain our side to another person and that's why we often tend to talk... Pass each other rather than talk to each other.

0:18:44.5 Ava Ma De Sousa: And that the conservatives did the same thing, they were also only using the values that the liberals would respond to when they were trying to convince them, I think of English being the official language of the US, which I didn't know that wasn't. But they were only using liberal moral values about also 5% to 10% of the time. And so, they then did these studies on so-called moral reframing, where they had a message about climate change being reframed for conservatives as not that we should be protecting and caring about our planet and creating a quality through climate protections, but they had said reframed it as "We should be keeping our environment pure and reducing pollution will lead to our environment staying beautiful and pristine." This type of argument. And so for conservatives, when they got this moral reframing, this did make an influence on their support for policies, so they were actually more supportive of climate change policy. And even crazier, they were more likely to say in general that they believed in climate change and that they thought that global warming was something that you needed to do something about, to the same degree as the liberals in the study. In that condition where they got this purity reframing, they actually cared about global warming the same amount, which was not the issue at hand necessarily.

[overlapping conversation]

0:20:01.7 Ava Ma De Sousa: I thought that was a really interesting insight and demonstration of what YC was talking about, where he was saying that you really need to understand the phenomenon first. Where, first with this research from Jonathan Haidt, they were looking at "What are the moral values and the differences between liberals and conservatives?" And then this work by Robb Willer really looked at, "Okay. How can we apply that and actually create interventions?" I think that was just some cool examples of what YC was hinting at in the work that I guess ultimately he's looking to do as well, with I think a little bit more fancier method.

[chuckle]

0:20:31.0 Beth Fisher: I think it's super interesting. 'Cause another thing with that study, what I think is really interesting, when does this difference in how they are interpreting the information, when does that start? I don't think, and I may be wrong, but I'm pretty sure we're not born with that. That's probably a product of our environment and our experiences and what we're exposed to, but at what stage is it the sticky thing? Does it become sticky when we're in college? Does it become the sticky thing when we're in primary school? Yeah, at what stage does it become something that's "No, this is how I'm interpreting this" that's in our conscious decision, but when is that formed?

0:21:12.9 Ava Ma De Sousa: Yeah, I don't know. That's a good question. I wonder if it's a developmental stage or if it's just a point at which maybe people cement certain kinds of values. And I think there's at least colloquially stories of people who, when they were younger, maybe were very liberal and then become conservative or vice versa, or people who were raised in more conservative homes, I think there's this narrative a lot that they were raised in these conservative homes and that then they go to college. Also conservatives people say this stuff that these liberal colleges turn their children into left-wing demon type things. But where I'm sure that people go through this transformation at some point, where they're seeing things from one side and then flip to the other side. But, yeah, I think the question you asked about how do we use this knowledge to then bring people to the middle, is a really good question, and I'm not sure when that happens, but maybe it would be cool to study people. I don't know how you would find them, but people who are on the brink...

0:22:12.6 Beth Fisher: Yeah. Of switching...

0:22:14.3 Ava Ma De Sousa: Changing how they're interpreting the world.

0:22:16.6 Beth Fisher: I think it's also something you have to think about, the education as well. Maybe the education is also forming us one way or the other. And because we did grow up in liberal families and went to liberal colleges, which obviously we feel very strongly about, but then are we in this sticky position too, so we can't understand the other point of view? And that probably isn't the best way to be either. I think also, in terms of interventions, it's nice to think about what could education look like when we're developing, so we can have these more, yeah, understanding points of view?

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0:22:56.5 Beth Fisher: You have used the reinforcement learning framework in your work, could you just explain a bit what that is and what that can tell us about the brain and behavior?

0:23:07.1 Dr. Yuan Chang Leong: That is... That could be an entire podcast on its own...

[laughter]

0:23:10.5 Dr. Yuan Chang Leong: [0:23:10.5] \_\_\_\_ so I apologize...

[laughter]

0:23:13.6 Dr. Yuan Chang Leong: If I go off tangent, 'cause there's so much in there. I would say briefly speaking, reinforcement learning is both the feel, the class of models and the type of problems, that's classically how I represented that. The basic premise of it is really this idea, "How can we learn from feedback of good and bad to change and update the way that we do things?" I would say that's a very layperson way of explaining it, that captures most of the essence of it. The key component is reinforcement, which is good or bad, and that's the only signal you get, whether something is better than expected or worse than expected or good or bad. And also, what do you learn from it? How do you adapt decision-making strategies to better achieve increased reward, if you will? And there is a lot of evidence that the brain does this, in the sense that, the models that have come up from reinforcement learning have been shown to track activity patterns, activity profiles, if you will, of particular types of brain areas and particular types of the roles of particular neurotransmitters.

0:24:15.8 Dr. Yuan Chang Leong: And I'm trying to do this without going to a specific detail, but the basic idea is that it seems that the brain does reinforcement learning, or at least some similar version of it that can be emulated by these computational models that we have. And so, there is this really nice synergy between reinforcement learning, which is... I'm hesitating here because I was about to say a field in computer science. But really, if you think about the history of reinforcement learning, which is really cool, it's something that came from computer science that drew inspiration from psychology, and then now it's coming back into psychology and neuroscience from computer science. There is that history of intertwined-ness and it's continuing to be the case. But the broader point that I was trying to make was that, there is this cross-fertilisation and synergy of the work that people are doing and deep learning, which is essentially the combination of reinforcement learning with neural networks and what we are trying to study in the brain.

0:25:12.0 Dr. Yuan Chang Leong: The reinforcement learning, if you will, provides a form of architecture and algorithm for us to be able to understand, or at least partially understand what's going on in the brain. As I said, I tried... [0:25:26.3] \_\_\_\_ and there's a lot in a couple of sentences, it's a lot more nuanced than that. But in my view, what has been really valuable, is this ability to describe the brain in very quantitative and mathematical terms that allows us to make predictions and doing it in the way that suits biology, because reinforcement learning, ultimately, in my opinion at least, is about how do we optimize things to get better rewards? And from the perspective of biology, that really is, in my view, the ultimate goal and purpose... The ultimate goal of how biological machines are designed.

0:26:00.5 Beth Fisher: Some of your work has shown that attention shapes learning.

0:26:04.5 Dr. Yuan Chang Leong: Yeah. The way that I would frame that line of work is, how do we really know what to attend to at any given moment? How do we choose what to learn about? The world is very complex, when something happens, there's so much information, what do you choose to take away from it? And so we have to figure out a way to be able to focus and to decide that, "Oh, this is the cause of that. This is the cause of that. And I'm gonna learn about this particular thing because my attention is limited and I can only choose to focus on a particular subset of the information that I have. How do I do that?" One way is to learn about it. You have this dynamic interaction, if you will, between learning on one hand and attention on one hand. You learn what to attend, but because your attention is constrained to a subset of the environment, you're also only learning about that part of the environment. What this means, and this is related to the second part of your question, I think, is that on one hand, you can learn what is worthy of being attended to. But that also might mean as a result, you become a little bit more narrow-minded or at least narrow-focused in your attention, and you might lose the bigger picture or lose the ability to learn about things that are more peripheral, which might not be a good thing.

0:27:17.5 Dr. Yuan Chang Leong: It's always a balance between how broad you want your attention to be, versus how quickly you want to learn, because once you defuse your attention, suddenly you're like, "Ah, it's too much, I can't learn all that at the same time." There is this delicate balance between how much to attend versus how much to learn. And ultimately, I do think that we can learn to attend the good stuff, if you will. I think, because attention guides so much of learning and decision-making, being able to reward your mind to attend to certain aspects of the world is probably evolutionally adaptive thing to do, and it's something the brain does and people do it automatically. What is problematic is when we find our attention drawn to things that aren't good, but somehow other mechanisms have kept in the play to block us there, and then we can't zone out because we're so kept into it already. That itself is an entire area of research that has to do with psychopathology that I'm not an expert on, but I would say that is a big part of how can we learn to attend to what is good, and disengage from the bad, if you will?

0:28:24.1 Beth Fisher: Yeah, 'cause I was gonna ask, how do we learn what we should attend to? And I'm thinking that from your perspective, it would be, our motivations would shape how we learn what we should attend to.

0:28:35.2 Dr. Yuan Chang Leong: Yeah, I would agree with that. It's almost as a motivation, it's the person behind the car driving where we decide to attend, so being able to understand motivation, why do we do the things we do is a big part of understanding the eventual focus of our attention. And having the appropriate motivations, being drawn to the good, if you will, versus being anxious and being very motivated to avoid the pain, for example, might actually make you focus on the negative stuff. And so what I'm trying to get at is, you're totally right, that a big part of what we attend to depends on our goals, and having the right goals can often be very adaptive in healthy functioning.

0:29:15.2 Beth Fisher: Could you explain what unrealistic optimism bias in advice taking actually is?

0:29:20.4 Dr. Yuan Chang Leong: I think there are two parts of it. The first part is, what is unrealistic optimism? And I think we should address that first and then we can talk about it, particularly in the context of advice taking. The way I think about unrealistic optimism is really the fact that people are overly optimistic about the probability of positive things happening. And it's part of the larger phenomenon of people think they're better than they are, that they think they're smarter, and they think they're all... As a result, they think that good things might happen to them. It's an entire set of phenomenon of which unrealistic optimism is a part where people are just optimistic, in a way that is somewhat counter to the evidence that they see. That's the second part of it. That it's not just that people are optimistic, but they're optimistic in the way that doesn't really jive with the evidence that they have, that their optimism is somewhat misplaced, it's more than it should be. In the context of advice taking, we wanted to extend it to a interpersonal context where people aren't just optimistic about themselves, but they can also be overly optimistic about the people that they take advice from.

0:30:24.7 Dr. Yuan Chang Leong: The way that we started this was a financial decision-making type context, with the idea being that people might place too much trust in the opinions of experts, which in itself may not be a bad problem if they can learn from those. And I think the reason why this is unrealistic or this is a sub-optimal bias, is the fact that despite continuous feedback that an expert advisor is not as expert as you think they are, you continue to take their advice because it's not bad enough that it's so obvious it's wrong, but it's just in the gray area of being uninformative, but yet you are just like, "Yeah, they got it right enough. I think they're still an expert, I'm still gonna take their advice." Even when they're advised by design, by experiment, the manipulation, carries absolutely no information. And people have 300 trials with this advisor, and then they're still like, "Oh, I'm gonna still trust your advice." In the second study we actually wonder if they would pass down these expectations to other people that they interact with, so we asked them to rate the advisors on a scale of 1-5. Obviously there was one really good advisor that's almost always correct, that's rated very highly, one advisor that's pretty much always wrong, that was rated very badly. And then there was one advisor that was in the middle or rather uninformative, which is completely useless advice.

0:31:49.0 Dr. Yuan Chang Leong: And people still rated their advisor as essentially above average, if you will, suggesting that they think that there's some information in this advisor's advice. And then what happens is that we pass those ratings to a second group of participants and then exaggerated the biases that people have, such that the second generation of participants who saw these ratings are more biased because they're like, "Oh yeah, this person said this advice was pretty good, or at least above average, I can trust this advice," and then they get stuck with it. And so, the way that I think about unrealistic optimism bias in advice taking is really a daily phenomenon where we find ourselves trusting experts more than we should, in the case where they actually provide no information. And I do want to say a big caveat about this, which is that sometimes experts do have information. The key thing isn't to not trust an expert, that is not my message. But rather be able to discern it in an objective way. And I think that's a big message there, which is that you might not be able to tell when people are pretty much at chance, so you want to be discerning, but don't take away from it, that experts are horrible and I can't trust them. That's not what I'm saying, so I wanna be very clear about that.

0:33:00.3 Beth Fisher: Yeah. What would be the benefits of this unrealistic optimism bias in trusting experts? Why would we continue to trust them even when they're giving us poor information or chance information?

0:33:12.4 Dr. Yuan Chang Leong: I have a few responses to that, one, as someone with a stronger background in social psychology, and one is someone with a background in cognitive neuroscience and reinforcement learning. I'll start the psychology one first, which is that I think there are many reasons for this, one of them is the fact that we want to place our faith in others so that we can avoid some of the responsibilities of if things don't go right. And if things go, we benefit anyway, but if things don't go right we can say, "No, that wasn't me, it was the advisor, they led me astray." I think cognitively and psychologically, there are some benefits for that personally. Another reason is that we might feel compelled to agree with people, and conformity is a powerful social force that we are susceptible to and we think that other people might have more information than us and there's so much we're suggesting that we tend to conform. Advice taking is just an extreme version of that, where instead of just following what people do, you follow what they say they do, but very similar psychological processes at play. I think that there are reasons of avoiding blame, but also reasons for thinking that the other person has superior private information and also conformity, essentially.

0:34:25.0 Dr. Yuan Chang Leong: As a reinforcement learning person, I have to say that there is also consistent work that people just generally learn better from positive information. It's just a quirk of the brain, if you will. We can talk about why that's there, but essentially, this could just be a more high-level implementation or high-level manifestation of the fact that people just learn more from positive information than negative information. If an advisor is 50-50, we up-weight the positive 50 and down-weight the negative 50 and suddenly we're at chance, we're at [0:35:01.2] \_\_\_\_ inflated belief. I would say that my perspective on psychology and neuroscience and a lot of this is that, usually the answer is somewhere in between where it's a bit of everything, and I suspect all of these forces are at play. And there's a bit of intrinsic machinery of the brain, there's a little bit of the social factors of conformity, and it's a little bit about the self, where it's just, "I wanna push away the blame." I think all of this comes together to contribute to a consistent phenomenon. If it was one thing, it wouldn't be that consistent actually.

0:35:32.4 Beth Fisher: Yeah. [chuckle]

0:35:32.9 Dr. Yuan Chang Leong: And the fact that there are so many things coming together at the same time, is likely the reason why some of these phenomenon are particularly pervasive. And you mentioned that you study rats. I will say that I am curious to what extent do rats have these high-level cognitions? Maybe not, maybe. There's also these cross-species differences that can help us tease apart exactly what it is. But, hey, maybe rats also don't like to self-blame, so who knows?

0:35:58.4 Ava Ma De Sousa: Yes. [laughter]

0:35:58.4 Beth Fisher: You may not have an answer to this, but I'm just curious. Recently, obviously, there's been a lot of distrust of experts, vaccines, all of these kinds of things. It's the opposite really of what we've just been speaking about. Do you have any ideas about what might be going on in those situations?

0:36:17.6 Dr. Yuan Chang Leong: Yeah. I think, again, there's always a confluence of factors. And I'm a big fan of Kurt Lewin, who believes in this idea of dynamic force fields, that everything is pushing at us at different directions, and where we are in time is just a result of all these influences. But there's a huge preamble to saying that I do think that there are a couple of things at play, and one of them is that now, in this particular context, another powerful force has come into play and that has to do with group processes, the field of group processes where it's about how we affiliate and identify with groups. And I think part of this is what is driving the distrust of experts, which is there's another group of people who claim to be experts that my in-group believe as experts. It's not that people distrust experts, they just distrust experts that they don't agree with. What I'm saying is that, I think... 'Cause I could have flipped that question in a different way, it's not that people don't trust experts, they just don't trust your experts. They still trust experts.

[laughter]

0:37:12.4 Dr. Yuan Chang Leong: It's just that the experts happen to be the experts that in their in-group consider experts. I think what you have here is an interaction to the fact where, on one hand the group processes "Define who the experts are." And then the unrealistic optimism in expertise results in them not being able to realize the experts are wrong. It's still there, but there is now a moderation by the higher levels of the social construct of group. It's just one of many possible explanations of what is going on, there's also this idea of individualism, and there's just so many factors at play. But I do think that when it comes to many of the distrust in experts in the modern day, a lot of it might have more to do with the social factors of groups and [0:37:57.7] \_\_\_\_ of groups.

0:37:57.8 Beth Fisher: Yeah, that's true. I guess when I asked that question, I'm assuming that my experts are everyone's experts. [laughter]

0:38:03.4 Dr. Yuan Chang Leong: Right. Yeah.

[laughter]

0:38:05.9 Beth Fisher: And I know the experts. Yeah. [laughter]

0:38:08.0 Dr. Yuan Chang Leong: Which is a vice in itself.

[music]

0:38:17.5 Beth Fisher: One of the studies that we spoke about with YC was his study on unrealistic optimism. My PhD is on [chuckle] optimism bias. One of the things that makes optimism bias so interesting is that, nearly all the other biases we have lead to negative outcomes, they're not biases that help us, these biases with gender, these kind of things are not good. But people with optimism bias, they live longer, they have better relationships, they earn more money, all these kind of things. You end up having a better outcome. And it would be like, wouldn't you think that rather than having a bias to make the best decisions and to come to the best outcomes, you should see the world as it truly is, rather than this biased way. And yet you would initially think to weigh out evidence is better to see the real picture. But the thing is that if you have this optimism bias, you expect things to have a better outcome than reality. They do studies, like they have someone estimate their percentage risk they feel like they are to get cancer, and just say, if you say, "Oh, it's 30%." But someone gives you... They're like, "No, it's actually 10%." You'll update your risk of cancer to 11%, so you really update from that good information. Whereas if you estimate your risk of cancer to be 30%, and then they say "No, it's actually 50%." You may only update it to 33%.

0:39:40.8 Beth Fisher: When it's bad information, you're less likely to update than if it's good information. It'd be, "Okay. Well, if you see the world this way, why would it lead to better outcomes?" And it's because if we think all of these things are better than unexpected, we're way more likely to engage in these good activities. A really good example is marriage, the percent of divorce in marriage is 50%. But if you thought that the chance of your marriage working out was the same as a coin flip, you just wouldn't... You wouldn't... Well, I don't know about you, but you probably wouldn't get married. [chuckle] Or as if you go into marriage, you estimate the chance of divorce 10% or something like this and you truly believe that, you're way more likely to get married. And if you're way more likely to get married, you're way more likely to enter into these relationships that could lead to long-term outcomes, lead to children, these support networks, these kind of things, which overall, okay, even if you end up getting divorced at the end, the things that happened along the way that were good lead to these better life outcomes.

0:40:45.8 Ava Ma De Sousa: Is this a bias that a lot of people have, or is it a particular subset?

0:40:51.5 Beth Fisher: A lot of people have this bias and it's more that we unlearn it if we have things like depression and anxiety. We are born with this bias. Whereas if you have some, say, I'm looking at anxiety and optimism bias. But there's been done a lot on depression and optimism bias, and people who are depressed either see the world as it is, they truly think in their brain that 50% of marriages end in divorce. Or they have a pessimistic bias, so they think 80% of marriages end in divorce. So they're way less likely to engage in all these sorts of activities.

0:41:28.3 Ava Ma De Sousa: That's really interesting because I feel like we also have this idea in psychology, or which I think has been shown that bad is stronger than good type thing.

0:41:36.7 Beth Fisher: Yeah. I was thinking that when... I think you mentioned that on... I don't know. We were talking about that recently. And that's the other thing, yeah, there's still a lot to learn about the optimism bias. It's not like, "Oh, we know everything about it." It's not that people who are optimistic don't learn from bad things, but it could be that maybe they forget these things quicker. So it could be if you're optimistic, you do a talk five times right, and one time it goes really badly, you still learn from that experience, but it may be that because you're optimistic, you don't then have that weighted to all your other times and you still think, "Oh, next time I go it'll be okay." Whereas if you're pessimistic, you're like, "Oh, that fifth one that went badly." Now that's how you see your future talks going.

0:42:26.2 Ava Ma De Sousa: That makes sense. That's interesting. Because also with the research that YC was talking about, because I didn't know that it was this bias that a lot of people have or that we're born with. But that, with what we were saying that people do learn from bad things, but that may be, because with YC's study and how he was saying that people don't really learn that this advisor or this expert is actually not very helpful. I was thinking that also in the context, I don't know who the participants were, but people might think, "Oh, I'm participating in a psych study at this fancy university, and they're telling me something and I probably just don't know. How should I know whether this person is actually good or bad? So I might as well put more weight into the prior of what the other people are telling me versus what I'm actually seeing."

0:43:17.1 Ava Ma De Sousa: And maybe they think, "Oh, this is a hard task. So if the expert is doing this badly, then this is just really hard, and there's no way I could do any better." I was thinking maybe there's part of the context that people are also not updating as much because they're putting too much trust in the situation maybe. But also maybe they're not learning from it as much because they don't think of it as that bad, it doesn't cross a certain threshold at which it's actually influencing their life.

0:43:40.8 Beth Fisher: Yeah, that's a really good point. And in a lot of the optimism bias studies, there's been modeling with reinforcement learning, and YC gave us a nice overview of what reinforcement learning is. They show that people have a higher learning rates from an outcome that's better than expected than worse and expected, their learning rate for things that are losses is slower than a win. But yet this is a task in a lab, it's not a horrific event that's happened to you. The way I think about it is this attending to the bad to learn. As you said, it meets a certain threshold. But in these other everyday life things, we learn more from these wins or this positive information or we expect this positive information.

[music]

0:44:32.5 Beth Fisher: One last question. If there's any new stuff you're working on or anything exciting you'd like to share.

0:44:38.5 Dr. Yuan Chang Leong: Yeah, I think there are a couple of stuff brewing in the lab. The thing that's occupying my time and brain a lot, is trying to understand what exactly it is that drives divergent interpretations between different political groups because of the timeliness of the issue, but also that I feel like the study that you mentioned, where I show conservatives and liberals having different brain responses to videos is a good starting point, but doesn't really get at what exactly is actually being represented differently. One thing we're doing in the lab right now is to try to build language models of how a conservative would think and how a liberal person would think, and try to use that to explain for a given, where, "How is the representation different? And do these differences predict eventual brain activity?" And just to give you a window into what we're trying to do, is we're building these language models on specific text media. Basically, we build a model that's trained on conservative news sources. You can think of this model as a person who grew up only reading conservative news sources, and we train the same one on liberal news sources.

0:45:44.1 Dr. Yuan Chang Leong: Again, this is a person that grew up only reading liberal news. And if you think about it, what is the outcome? These two types of models, what would they end up having stored in their model weights or how they represent words? That might reflect particular biases and the meaning of a particular word, or meaning of a particular sentence, might then be dependent on what news sources they would trained on. And just to give a very clear, to me at least, example that I think it's relevant to pretty much most left divides across the world, the sentence, "We must keep our communities safe." That sentence, very innocuous, everyone would agree with it, but what it means is completely different depending on your perspective and background. And what we want to understand is, "Can we actually describe it and not just rely on our intuitions?" Because you have an intuition of what the differences are.

0:46:40.2 Dr. Yuan Chang Leong: But that might be more specific to you, it might be specific to a small group of in-groups, but can we actually derive the quantitative and data-driven approach to really tell us when we say the sentence, "This is what it means to the left, and this is what it means to the right." That's something that I'm very excited about. I think there's a lot of promise, but of course, any researcher will know an idea is only at a first 5% of the actual implementation, think that... It's pretty hard. And we're getting there actually, but I do think that something I'm very excited about, though it's because of its implications, in increasingly polarized world, both increasingly globalized and polarized, which is crazy, but... And also, I think a way to connect different branches of psychology and neuroscience in the way that I think that... I won't say that hasn't been done before, no one else is working on, but I do think it's a very exciting frontier of the field.

[music]

0:47:38.6 Beth Fisher: One of the things I really liked about YC's approach was, yeah, understanding that a lot of these biases and things that we have, there probably won't be just one reason why this is the way it is, or just one parameter in the model, or one bit of the brain, or there is probably a lot of factors. And I think that that's a really nice way to think about these kind of problems and approaching them as in, "Oh, we'll find one thing and that will explain this whole bias and that's that."

0:48:11.9 Ava Ma De Sousa: Yeah, I think he was really nuanced. And I think it also speaks to his methods, because his methods actually allow him to be nuanced because he's working with the NLP stuff that he talked about at the end, that's gonna be a lot of big data, but also pairing the neural data with the algorithms, like the decision-making algorithms, I think is also super powerful. It just speaks to how cool this research is, and also how precise you can get and how much you can really answer a lot of questions with linking a whole bunch of methods the way that he does.

[music]

0:48:49.2 Ava Ma De Sousa: Thank you to Dr. Yuan Chang Leong for joining us this episode. Our intro and outro music is "Nobody Stayed for the DJ" by Glassio. Our transition music is "Back for More" also by Glassio. Minds Matter is mixed, edited and created by Beth Fisher, she's the Australian one, and me, Ava Ma de Sousa. We'll be back in two weeks with a brand new episode of Minds Matter. In the meantime, find all our episodes and show notes on mindsmatterpodcast.com.