

Episode 15 - Peter Kok

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SUMMARY KEYWORDS

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Steve Flemming 01:22

So perhaps we could start by maybe you could say in your own words, a bit about the focus of your research and what you've been working on recently.



01:31

Yeah, sure. Yeah. So what I'm really interested in at heart is how does the brain determine what we see what we experience, you know, our visual awareness of the world. And what we've been trying to do, as you say, is kind of, to get at the neural circuit on the line that so the high field work helps there. Because usually with with newer imaging, human neuroimaging, we've treated the brain as kind of a two dimensional sheet. But as we know, it's much more than that there's a three dimensional structure where the depth is really important as well, the cortical layers, and the high field imaging helps us dissect the circuit, because we can now try to dissect signals, signals that flow in different directions. So signals that flow from the eyes up to the visual cortex up to visual hierarchy to other regions, versus signals that flow the other way around signals coming from memory, for instance, reflecting prior knowledge that influence visual cortical processing, if you treat the brain as a 2d sheet, you cannot detect the Dissectors. But you can if you look into cortical depth. So that's one of the things that we're very excited about, trying to figure out how the brain combined these different signals coming from the eyes and coming from memory and prior knowledge, have combines those and then ends up with the precepts of the world. Another important argument that research is looking at the temporal dynamics of how these signals are combined using methods like MEG, to get a fine temporal resolution. And looking at memory structures, as well as visual cortex to see where these prior knowledge signals coming from. Roughly those are kind of the three main kind of wishes lines in a lab.

Steve Flemming 03:21

Fantastic.

~~Setina Wray~~ 03:23

It's really exciting. And on a on a kind of practical level. I wonder if you could describe a bit for listeners, what did these experiments look like? Presumably you are working with human participants in the scanner and did that you're showing them a variety of of image I

I think it's fascinating and I was going to mention the example of Parkinson's disease actually, will our audios our understanding of how these hallucinations occur? Does that give us any insights into how people living with these conditions can better manage those hallucinations? Presumably, sometimes they're quite disruptive to the individuals.



08:26

Yeah. So I think it might do, again, I don't have much personal experience from working with these patients, from what I understand from colleagues who do, for instance, a postdoc in my lab, who does a lot of this work. Yost has Maya is has worked with psychosis patients before and is very interested in this. I think, the way that some people including yose, I think look at it is that giving patients and understanding of that this is kind of a combination of ink memories and incoming signals is something that happens with everyone. And the balance might just be a bit, you know, different in some than others. Maybe take some of the stigma away from it being something completely alien that's occurring in our brain. So I think the way that he looks at it is that it makes it seem more like that everyone's kind of on some point on the spectrum. And, you know, but but the basic mechanism is there and everyone and hopefully, knowing that will take some of the give some comfort, I guess,

Selina Wray 09:38

would this be and this may be a really naive question, and so forgive me if so, but would when you say this mechanism is there in everyone? Would this then also be the same pathways that play with thinking of the famous dress that was doing the rounds a few years ago where some people saw it as blue some people saw it as gold Old? Idhat wor i w ld ?

Selina Wray 22:52

So a

courses. And that really kind of latched on to my guess the question I had I already had, how does this clump of cells in our skull lead to consciousness? How is it possible that we can have an experience of colour blue or something, something so subjective, from a clump of cells, It's unfathomable kind of courses, talking about the the hard problem, versus the easy problems, etc. So I found all of that. Very interesting. And then I had to decide at the end of that, which way do I want to go? Do I want to go this one's for like, the philosophy route? Do I want to do pursue that? Or a science? What do I want to do? Like a research Master, I knew I wanted to go for either one quite like seriously, I'm either gonna go for it for a good, there was a two year research Master programme that I was considering or this two year philosophy master. And in the end, I chose the science obviously, given where I end up now, because I felt like that would be a way where I might be able to contribute some new knowledge, whereas I didn't have as much confidence that we'll be able to do that down the philosophy route. And that, from then on things getting more linear or smooth, I guess I would say in my because then, I really enjoyed that Master, I got to two neuroscience projects during the master where I got a lot of free rein as well, which was maybe not the best for the projects themselves, but really learn a lot and get a lot of experience with EEG and first year, TMS a second year. And there was a lot of a lot of fun, I learned, I learned a lot. So from then on, I really was hooked in, like the cognitive neuroscience programme.

Steve Flemming 28:22

And the philosophy. In k, I hadn't realised this heavy despite sharing a building with you for a few years, I hadn't realised your your choice point with philosophy before. So I'm intrigued now, whether you still feel like there's a hard problem, are you still do you still feel the pole of that problem? Now, do you know about the way the visual system works? And so on?



28:52

Yeah, I do. Yeah. So it's, again, something where I wish I would have kept track of the philosophy more but I kind of made this destroys for science. And then I went went for that. And o

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actually see two

