How Neuroscience and Philosophy Combine to Illuminate the Nature of Consciousness

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Robert J. Marks:

Greetings and welcome to Mind Matters News. I'm your co-host, Robert J. Marks. My other co-host today and doing the heavy lifting is the always effervescent, bagpipe playing, barbecue master chef, known to his friends as Sourdough Krouse. What do you think, Brian?

Brian Krouse:

As long as I keep giving them bread, yeah.

Robert J. Marks:

Giving him bread, that's right. Brian Krouse. And together with Angus Menuge, we co-edited a book called Minding the Brain. And our guest today is the author of one of the chapters in there. And this is the third installment of our discussion with him. And it's a fascinating chapter and I've learned so much on this interview with him. The chapter is On the Limitations of Cutting-Edge Neuroscience. And the author is Dr. Joseph Green and he's our guest today. And we're going to talk to him and find out more of what happens between our ears. So, with that, I'll give the questioning over to Brian Krouse.

Brian Krouse:

Okay. Glad to be back at it. I'm really enjoying this conversation. In the first part, we talked about neuroscience topics. In the second part, we talked about some philosophy topics. So, why don't we talk about a little bit more about what you cover at the end of your chapter, which is specific ways in which you could see there maybe bridging the conversation between the neuroscience and the philosophy. And you brought up three areas that just seemed like we could just go through each of those and talk about those, that are good candidates to function as this bridge, specifically self-consciousness, intentionality, and the binding problem. So, maybe you can walk us through. Well, let's just start with self-consciousness. What do you mean by that? Why is this helpful? How could you see this being a bridge between the two?

Joseph Green:

Yeah. Self-consciousness is a very interesting concept, I believe. And it's something that is extremely important that is defining us. And what that is about, I think, is the fact that we think of ourselves with introspective mechanisms as well. It's not just there is pain, but it's like, I am in pain. It's not just something that is what is happening, but it's the state in which I am. I am experiencing this, I'm internalizing it, and I feel it.

Brian Krouse:

And you're aware of yourself having those experiences?

Joseph Green:

Exactly, yes. It's this awareness in a way. Where does it come from? Which animals do have this awareness? Is it specific to us in some forms or not? And it's a very defining properties of ourselves. And

I think from a neuroscientist perspective, there are some questions that come about this property of awareness or self-consciousness, that it can be defined in different ways depending on the system. Some specific can be also defined as proprioception, the idea that you perceive yourself doing something, but it has also specific philosophical counterparts. When we speak again, what is the defining properties of human compared to animals in the way we're aware of ourselves? The Cartesian, maybe calling it, I think, therefore I am. What is that thing or that thing, that aboutness, if you want to use other terms, that makes us special, if we are?

So, self-consciousness I think is one of these defining properties that are important and that might help us in general to abridge the debate. We spoke a bit last time about the difficulties in defining consciousness per se, in a more operative way, in a medical setting compared to a more philosophical way. And this language definition is extremely difficult, but that language is also helpful in abridging a way to worlds, from the awareness of neuroscience to the more philosophically minded questions.

Brian Krouse:

Yeah. So, how do you approach a topic like self-consciousness from a neuroscience perspective?

Joseph Green:

I think in neuroscience there are several questions that are becoming more and more important, that go about the idea of having a self-model, if you want. Whenever we approach doing something, we think of some, we call it latent variables. Meaning, at times we call it like a world model, meaning that captures what we are doing in that specific moment. Right now, I'm talking to you right now. So, all of my actions are geared and tailored towards our conversation. And that requires a model of the conversation, but also model of myself. A self-model that integrates several parts, it needs to integrate interception, like my understanding of myself. It needs to integrate my memory, my actions, the social feedback, and not just the raw sensation.

Needs to integrate so many components into one. And defines my experience in an integrative way, in a way that I'm conscious of myself and the situation. So, the more neuro scientific differences is a bit awareness, times or attention. So, these are words that are closed in a way to operative definition of self-consciousness. And they're different than what you may think as consciousness, because you can't just go about consciousness easily in neuroscience.

Brian Krouse:

So, in the neuroscience, when you're using this word like awareness or these models, is it that you're looking for some kind of neural signal dynamics or representation somewhere that is playing that function?

Joseph Green:

Yes. Thank you.

Brian Krouse:

So, maybe you have the signals that are representing the sensory input or motor control output, or something like that. And then you have separately from those signals, you have some kind of a model that's referencing those. Is that the idea?

Joseph Green:

Yes. Essentially, I think the way it is... one of the approach that is exploited is the fact that you try to split and conquer different aspects of what you would call self-consciousness and understand how that is computed in the brain. And it's not very satisfying to some degree, because in the moment at which you split it, you lose its essence to some degree or its beauty from a philosophical perspective. But it's still very helpful in understanding how those elements come about. So, proprioception, like your understanding of where you are and what you're doing, what is the circuit that allows you to do that? And this is well studied these days more and more, because these are questions that you can go about both in humans and animals to some degree. So, you can define the develop experiments and perturbations that allow for these studies.

Brian Krouse:

Now, do you think these models or this approach is necessarily materialist reductive? Or could it also be that compatible with something more like a dualist view, where you're taking the conceptual components of something like awareness and maybe what you're doing is you're identifying some physical substrate underneath that? But perhaps it's in the immaterial mind that these things come together. I don't know, some notion like that. I guess my question is, is this necessarily a physicalist project?

Joseph Green:

Yeah. I don't think it is. I don't think it is. I think it's to some degree reductionist, but not in the sense that you flatten it. In the sense that you split this idea of consciousness or self-consciousness into multiple, elements is not a precise word, but facets. And you just study one, because you study one, you are compatible with many other things that are happening in the old domain of consciousness. But it doesn't mean that you're not finding anything about this one property that you're studying.

Brian Krouse:

That makes sense.

Joseph Green:

So, I think it's not a sterile way to go about it. It's meaningful, but it's limited. And we should recognize that it's both.

Brian Krouse:

I could see, let's say... Did I understand right? Proprioception might be one of those example components you could focus on?

Joseph Green:

Yes. Or even I think a lot... something that is becoming more and more common these days are questions about social interactions. For many reasons now we can do much better experiments about social interactions. And there are big questions of whether or not we define ourselves more with respect to others or not. Is our identity given to us by ourselves, by our mind, by others? How does our brain also change whenever we interact with others? This may seem like silly questions to some degree, but it's not. There are studies these days that are showing, for example... They're contested studies, but they're interesting. I find them interesting. The fact that there are some phenomena of synchronization spoken of in terms of synchronicity between different brains. So, if you speak with someone else or if

you interact socially with someone else, there's some level of synchronicity that is developed maybe across the two systems.

Brian Krouse:

Is this the same idea as mirror neurons or is this a different sort of thing?

Joseph Green:

It's a different thing, yeah. Mirror neurons is the idea that if you perform an action, I would have a representation of that action in my brain, and I would be able to replicate and copy it. The idea of synchronicity is really the fact that there might be two brains, two people interacting or then you look at the brains of these two people that are interacting. And during the interaction, they develop some level of synchronization. And there are even studies that claim, honestly, I don't know if they're true, but the claim is that there are phenomena of synchronization even between people that are far away, far from each other in different buildings. When there are specific events, they're seeing for the other, thinking of the other. And these have been more and more studied in recent years as well, and quantified to some degree.

In one of these studied, I heard about it. I would have double-checked it, but just to give you an idea of the type of study that people have performed. They would take an intercessor, a tribal kind of intercessor. And the person that is interceded for in a way. Sorry, some sort of tribal prayer, if you like. And they found that there were specific synchronization between the signaling of the two brains while this intersection was happening. These are the kind of studies that can be performed now at the neural level. You can put devices on the brain and verify whether or not this synchronicity happen. Now, is this true or not? I think it will take time to verify whether this is true or possible at all.

But just the fact that this is investigated these days, I think speaks of the idea that there might be some defining character beyond just ourselves, that is the interaction with others and the interaction with the environment that defines our mental state. And this is very true. Our mental state and how we see ourselves is defined with respect to what we are doing, how we're interacting with the world, and others. And this is a very important part of consciousness, of how we perceive ourselves.

Brian Krouse:

Yeah. So, I guess, zooming out, thinking about this as some examples of a bridge between the neuroscience and philosophy, you have language about social interactions that's connected to our own self-consciousness. And then you're having some investigations that are taking that language and maybe decomposing it to a finer degree. And then looking for measurements like this synchronicity across two people who are interacting. I could see that being like, man, just the very baby first step. You see that it happens, and then you have to make sense of why it happens and the causality. But I guess it does seem like it's moving the neuroscience towards this philosophical idea of self-consciousness.

Joseph Green:

At times they speak of social consciousness like a construct that is above the single individual.

Brian Krouse:

Social consciousness, yeah. Interesting.

Joseph Green:

And these are, I would say, new concepts that are emerging to capture phenomena that are at the fringe of science in this moment. But these fringe is still very important. The times we speak of the forefront of science. We spoke maybe in our first episode about the technological developments that are leading neuroscience, but they're also fringes. And these fringes are weird at times, but also important, because they speak of the character of science that is developing and the things that we can do now that we couldn't do before.

Brian Krouse:

It actually ties into... that topic of social consciousness ties into a subject two chapters down from yours in the book. It's the chapter by Eric Jones, which is titled, A Case for the Relational Person. And in that chapter, he talks about how you have two competing concepts of the person. One is more of an atomic individual doing its thing through life. And the other one is more of a relational person, where both through the developmental stages and even the way that we flourish as adults, it can't really be understood apart from our, I guess I could call it our social consciousness, the connections with others. So, that's interesting. I mean, that's a study coming at it from the social psychology perspective, but who knows? Maybe there's some overlap there with the neuroscience study, too.

Joseph Green:

Yeah. Another scenario which I think is extremely prominent and developing in a beautiful way recently is this, I would call it agency, but it goes under different words as well. And what I mean with agency is the fact that in neuroscience, we are understanding more and more the circuit that performs decisions at the neural level. And whether or not these decisions can... I mentioned it before in previous episode, can be perturbed or not. So, there are questions that are coming our way of which type of decisions can be perturbed, what can be perturbed? Is it the actual decision? Is it effects of the decision? Can we make someone do something that he doesn't want? Can you force a person to grab something or to hurt himself, or to say something that he doesn't want to?

So, to which degree are we in charge of ourselves? In a different context we see this every day. We speak of it at times as a addiction. Addiction is a specific problem that people, almost everybody has to some degree, that can be addicted to many things. I'm addicted to sugar or coffee. And that addiction is essentially expressed in our neural systems in a specific way, the specific chemical substrate that forces you to do and take specific actions and decisions. I always want to eat an ice cream, for example, because I'm addicted to sugar. So, even if the ice cream is there, I'm thinking of the ice cream. And my brain responds to the idea of ice cream with the release of dopamine or other chemical signaling that gives me pleasure, even just the idea of it.

So, these mental associations are way more powerful in their chemical substrate than we think of, and that's why drugs are so powerful. They force us to do things that we don't want to. So, to which degree a drug addict is in charge of its own decisions and actions? It's a very difficult law, like legal question as well. Now, in the philosophical debate, this is also very important and prominent question that has developed more and more. What is agency? Are we in charge of ourselves? What are the sort of questions and decisions that we go about that define ourselves, in which case I would be actually free agents or constrained agents?

And I think this is a very interesting... it's a very, very powerful sweet spot for exchange of ideas that are not in the ordinary domain, like what I just mentioned. There are many states of the brain that can be taught as states of the mind as well, like addiction or perturbed states, coerced states. And this, they speak to the idea of agency and what does it mean to have even a free will, to be freely able to take decisions.

Brian Krouse:

This topic seems to connect to another chapter in the book, too. Dr. Christy Cooper wrote a chapter on the Benjamin Libet cure.

Joseph Green:

The Libet Experiment.

Brian Krouse:

Okay. Libet studies, yeah, which were done, I don't know, some time ago, decades ago. I can't remember the exact date. But has been basically a set of experiments that I won't go into detail here, but basically have led people to ask these philosophical questions about, do we have free will or don't we, or is the brain deciding for us? And it's just an interesting example on how neuro-scientific findings definitely cause people to ask these philosophical questions.

Robert J. Marks:

Libet's Experiment was very, very interesting, because he coined the word free-won't, which is really interesting. Joseph, you are addicted to sugar. And I'll let you know it isn't addictive if you eat some every day. That's a joke. I used to be addicted. Thank you. Notice I had to tell them it was a joke before they laughed. That's okay. I used to be addicted to cigarettes. And so, according to Libet, it says, "Bob, you want a cigarette?" So, I smoke. "Bob, you want a cigarette?" So, I smoke. So, my wife told me, no kids while you're smoking. So, I exercised this idea of free-won't. So, have a cigarette? No, I'm not going to have one. Have a cigarette? No. I don't want to have one. And the little bit I understand about neuroplasticity is that connection between my triggers and my desires began to rewire itself. Hebb's law, neurons that fire together, wire together. And today, I have no inclination about smoking. I have no way of doing it.

Brian Krouse:

That seems to be an example of how mental choices shaped your physical brain substrate. I mean, I know I'm jumping to lots of conclusions in that, but at least possible.

Joseph Green:

Yeah. It totally does. There is this old field that I got very much interested in maybe three years ago of cognitive behavioral therapy, which is something that many people know about these days. And a lot of the exercises that people are asked to do when they go in cognitive behavioral therapy is really about partly this rewiring of your, as Bob said, desires or associations and so on, so that you can essentially partly change your thinking patterns. And they're very effective and I think that speaks of the power of our mental abilities.

Brian Krouse:

Yeah. It's similar to... What is that? Is it Jeffrey Schwartz? Do you know this book? The Mining, the Mind and... I forget the title of the book, but he's an OCD researcher. It's the same kind of thing. Through this cognitive therapy, they're actually able to take brain scans of people who had OCD before, and after this therapy, and see that they were able to resist their OCD impulses by going through this therapy. And it actually resulted in physical changes to pathways in the brain dynamics.

Joseph Green:

Yeah, it's amazing.

Brian Krouse:

It's amazing. Yeah.

Joseph Green:

I mean, I'm not a psychologist or a psychotherapist in any capacity. But I think as a neuroscientist, I think these therapies point to leverage in a more precise way, our mental mechanisms and the neuro-scientific underpinnings of our mental mechanisms. So, for example, the fact that our brain exploits a lot associations, way more than we think of. So, if you associate something with something positive, we call it positive conditioning. And this is way more powerful than you would think it would, because it really drives learning and plasticity in the brain. So, if you do know that associations positive and negative drive plasticity, then you can target experiments or exercises, like in the case of cognitive behavioral therapy, so to rewire your brain. But if you don't know that that is what drives plasticity, then it's just another experiment. They're really leveraging more this understanding of leveraging really the mental mechanisms or neural mechanisms underlying our cognition, our mental patterning. And they're effective.

Brian Krouse:

There's another topic that you brought up that you thought could be a good bridge between neuroscience and philosophy, that was this binding problem.

Joseph Green:

Yes.

Brian Krouse:

That's fascinating. So, talk to us about the binding problem. What is that?

Joseph Green:

Yeah. So, the binding problem essentially is a problem that is also traditional problem of neuroscience. It's decades old. And it's the question of how do we perceive different perspectives or senses more in general. It could be color, shapes, sounds, but it could also be a voice and a face together, in a unified way, in principle. So, this is the question about the unity of experience, in a way. Neural activity is not distributed in per se. We hear through the auditory cortex. We see through the visual cortex, that is in the back of the brain. We smile from another cortex. These are all devoted sensory cortices that live in different parts of the brain. How can these sensory experience be unified in a way that we perceive it as in unity, in a cohesive way and coherent.

Brian Krouse:

So, there's no place that the signals come together in the brain or some such?

Joseph Green:

There is eventually a place where they come together, but they're not processed together from the beginning. So, it's not something to take for granted. I would say that in neuroscience, we speak of

cross-modality. Our modality is one of the modals, one of the senses is a modality. So, the auditory modality or the visual modality. When you perceive things in a cross-modal way, why do you see them in a unified way? Our experiences speaks to this. We always perceive things in a unified way. Now, you are seeing and listening to me. You're seeing me and listening to me in a unified way, but philosophically has been an important question, what drives this unity? I think something that is related to this, but it's at times people resonate a bit more with this secondary question, is the issue of attention.

As human beings, we are able to mostly pay attention to one thing at a time. It would be a superpower if you could pay attention to multiple things at a time. But in principle, you could imagine yourself listening to your wife and to your podcast together, but you cannot. Whenever your wife comes to you, you need to stop and listen to her. You can't keep listening to your podcast and to your wife together. And that's called the limitation of attention.

Brian Krouse:

Are you watching me or something? Yeah. How do you know this about me? Anyway, carry on.

Joseph Green:

So, that is tangential to the binding problem, but it's a bit part of the same. The fact that we experience... our experience is in unity, across all senses at once, and it's also specific. It's kind of set on a single thing in that point. And that's more of an attention question, but it's a big part of this. So, what creates these experiences is not fully known in neuroscience. We can understand how the firm modalities are integrated. There are models about it, but these are computational models that don't go necessarily about the philosophical question of unity of experience. And while to most people this may not sound like a huge deal or the problem from a philosophical perspective, this is important.

Also, it's also traditionally important. In the 18th century, there were philosophers that were questioning, like Schopenhauer, I'm thinking, or other philosopher, that we're questioning whether or not everything that we are is what we experience, to put it very simple. So, to which degree our experience is just a mirror of the world, or is our world in and it itself, meaning that are we experiencing something through our lenses? And it's just the way we experience it, it's personal. Is it specific or is it really like the phenomenon itself? There are philosophical distinction there on both our identity and the specificity of our perceptions. And there is cross-talks that is a bit more technical between our findings in neuroscience and I think philosophical debate.

Robert J. Marks:

So, I like the idea that you mentioned that we can only perceive one thing at a time. This is a pushback against big futurist proponents of Neuralink that said, we'll be able to download everything into your brain through these Neuralinks. Well, I don't know. I'm still only going to be able to think of one thing at a time. There's kind of a bottleneck there in terms of my communication with the outside world. So, I don't know how that's going to be overcome.

Announcer:

That's it for this week. We'll be back soon to conclude with a discussion on different models of consciousness. Until then, be of good cheer.

This has been Mind Matters News with your host, Robert J. Marks. Explore more at Mindmatters.ai. That's Mindmatters.ai. Mind Matters News is directed and edited by Austin Egbert. The opinions expressed on this program are solely those of the speakers.