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The Social Brain in Schizophrenia

Announcer:
You're listening to *On the Frontlines of Schizophrenia* on ReachMD. And now, here's your host, Dr. Shelina Ramnarine.

Dr. Ramnarine:
This is *On the Frontlines of Schizophrenia* on ReachMD. I'm Dr. Shelina Ramnarine, and joining me to discuss social processes and social neuroscience in schizophrenia is Dr. Michael Green. He's a Distinguished Professor in the Department of Psychiatry and Behavioral Sciences at the UCLA David Geffen School of Medicine, where he is also the Director of the Green Lab.

Dr. Green, welcome to the program.

Dr. Green:
Thank you. It's a pleasure to be here.

Dr. Ramnarine:
So I'd like to start off with some background, Dr. Green. What exactly do you mean by social processes in schizophrenia and why are they considered central to this disorder?

Dr. Green:
Yeah, it's a pretty broad term, and it can refer to a few different things. So let me list how the term is used. First of all, it can refer to social functioning: just how well people with schizophrenia function socially in the world and how easy it is for them to make contact with friends or with family or to handle social interactions. And that's all part of the characteristics of the diagnosis. There's an impairment in some sort of community or social functioning at some point in the illness. So social processes can refer to social functioning.

But when we study social processes, we mean something a little different. We mean, typically, the types of cognition that goes on when we're trying to understand our social world—so, for example, understanding the emotion in faces that we see, voices that we hear, or even gestures that we see. That would be an example of social cognition: of making sense of our social world.

We also do that when we try to make inferences or guesses at what other people are thinking or feeling. We do some detective work and try to understand what other people might be thinking about us or thinking about other things. We try to put ourselves in other people's shoes.

These are all examples of social cognitive processes—even just how we modulate our own emotions, like trying to reduce negative emotions or increase positive emotions and the kind of strategies that we go through to help us even that out. That would be another social cognitive process.

Separate from these cognitive processes, it's often common to divide it into motivational processes. By that I mean, aside from how well someone can understand their social environment, there's this question of how much someone wants to join that social environment, or how much desire or interest they have to embark on social interactions or reach out socially. So that would be a separate example of a social process, which would be social motivation.

Dr. Ramnarine:
So, building off of that, how do impairments in these processes show up clinically, and how early do they tend to appear in the course of illness?

Dr. Green:

Well, the connections are ones that you might predict, which is that if people don't have a desire to socially interact, they might be more isolated. And, in fact, those relationships are very strong, they're consistent, and they're not surprising.

In addition, if you have trouble understanding your social environment and making sense of what people are saying or what's in their faces, that also affects the daily functioning. You can imagine for yourself that if you were having trouble interpreting social cues in your environment, that might give you pause before engaging people. It might make you feel more cautious, and might lead to some pulling back on the social interactions.

So one of the ways that you see the effects most clearly are in the social functional effects—in other words, with reduced social cognition and reduced social motivation. You simply just have less social interactions and more social isolation.

In terms of how early they appear, we have a fair amount of data now on individuals at clinical high risk for schizophrenia or for psychosis more generally. So these would be individuals that do not have schizophrenia, typically younger, who are showing mild, subclinical signs of problems that might resemble psychotic symptoms. There might be some social interaction problems. And so if we look at the both social interactions or social cognition, we can see that impairments relative to a comparison group are observable in this high-risk—sometimes called prodromal—phase. It's observable when someone has their first episode, and it's observable when someone has a recurring chronic course of the illness. So you see it throughout the course of illness, even in the prodromal stage before it actually has emerged or been diagnosed.

Dr. Ramnarine:
Now, from a neuroscience perspective, which brain regions or systems are most involved in social processing, and how are they disrupted in schizophrenia?

Dr. Green:
So this is an area of a lot of interest right now, and we have tools at our disposal to look at this. So if we were to, for example, take the social cognitive components that we talked about—perceiving emotion in faces, for example—that has its own brain system or neural system associated with it. We see a system for hearing emotion in voices in another region of the brain. We have an entire network that's devoted to making good inferences. That's often called mentalizing and sometimes called theory of mind. There is a network of regions that work together as we form those kinds of inferences.

In all—everything I'm talking about so far—you see differences in activation. Typically, you have less activation in people with schizophrenia than in the comparison groups. Moreover—and this is work that our lab has been focused on—if you measure the amount of activation, let's say, in identifying emotion and faces or in making these inferences, you can often find that it's correlates with how people with schizophrenia function in daily life. So you can get measures of the activation on, let's say, functional MRI, and in many situations, that correlates with how well someone navigates the world or how interested they are in social interactions.

That's an important point because these changes in activation are pretty subtle. They're small changes. The group differences are also small differences, but they're there. And knowing that those subtle brain differences relate to something in the real world gives us a sense that by studying processes in the brain in this case—social processes—we in fact are learning something meaningful and something relevant to what happens in daily life.

Dr. Ramnarine:
For those just tuning in, you're listening to *On the Frontlines of Schizophrenia* on ReachMD. I'm Dr. Shelina Ramnarine, and I'm speaking with Dr. Michael Green about clinical implications of social neuroscience in schizophrenia care.

So, Dr. Green, let's shift gears now and talk about how this research translates into practice. What kinds of tools or methods are researchers using to study these brain social behavior connections?

Dr. Green:
The primary one, I think, is functional neuroimaging. The example I gave is functional MRI, in which you have these changes in activation. The activation is associated with subtle changes in blood flow. And these are task-based changes, meaning that someone is in the scanner lying down, looking at a screen, and being asked to do things.

So that's one of the key neuroscience methods that's used to look at the social functioning, or you could call it the social brain in schizophrenia. One alternative which is often used is EEG. So these are electrical recordings from the scalp. You don't have to be in a scanner. And these can also occur during a particular task. It could be a reward task, it could be identification of different images, it could be rating the valence or the emotional quality of different images. And then you have characteristic EEG waveforms that you can look at.

These are viewed often as complementary methods, because the fMRI gives you very good indication of where things occur in the

brain, and the EEG happens at a much, much more rapid timeframe, so it helps determine when things happen in the brain. So those would be the two primary neuroscientific methods that are used to study social processes in schizophrenia.

Dr. Ramnarine:
In terms of management, are there any emerging interventions that specifically aim to improve social functioning in schizophrenia?

Dr. Green:
Historically, going back 30 years or more, there have been efforts to enhance social competence, often called social skills training, for people with schizophrenia. This would be to help people just function in daily life: how to make eye contact, how to make conversation, how to order a coffee at a coffee shop, how to smile in a reciprocal manner. This was viewed as increasing social competence. And those are longstanding methods that have been used for years.

More recently, there are training methods to increase this ability to detect social cues. So there are training methods to help people with schizophrenia identify emotion in faces and emotion in voices. There are training methods to help people become better detectives at making inferences at what other people are thinking or feeling.

There are methods to help them moderate their own emotions. So those would be training methods, but those are geared to those social cognitive processes and making sense of your social world.

And the last category of interventions would be interventions that are designed to increase social motivation. Now, that might sound harder, and in some ways, it is harder, but there are psychosocial interventions that increase someone's setting goals. For social goals that they want to achieve, they're identifying steps to achieve those goals. This would often be done under the category of motivational interviewing techniques.

An alternative psychosocial method is cognitive behavioral therapy, which can reinforce working towards those social goals. The new frontier here is that groups, including ours, are starting to also look at psychopharmacological approaches to increase social motivation. But those are the main categories of interventions.

Dr. Ramnarine:
Before we wrap up, Dr. Green, what is one key takeaway you'd like to leave our audience with now?

Dr. Green:
The reduced interest or desire to socially engage is part of schizophrenia. It's not a sort of laziness. It just requires more to overcome that hurdle, and using psychosocial interventions—perhaps in combination with psychopharmacological treatments—might make a huge difference in terms of public health. What will help the individual's daily life, their quality of life, and their connection to other people? The very important aspect of being alive and part of a community is those connections with other people.

And the illness unfortunately saps some of that. And so these interventions, alone or in combination, hopefully will recover some of that ability and help individuals engage more meaningfully in their lives.

Dr. Ramnarine:
With that final comment in mind, I want to thank my guest, Dr. Michael Green, for joining me to discuss how we can better understand and manage social dysfunction in schizophrenia. Dr. Green, it was a pleasure having you on the program.

Dr. Green:
Thank you for including me.

Announcer:
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