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Discovering Face Blindness: An Expert's Perspective on Prosopagnosia

Dr. Wilner:

Prosopagnosia is a rare condition in which patients lack the ability to recognize faces. This neurological disorder, also known as face blindness, can be challenging to recognize and understand. What do we know about the mechanisms behind this condition? Welcome to *NeuroFrontiers* on ReachMD. I'm Dr. Andrew Wilner, and I'm joined by Dr. Jason Barton, to help us better understand prosopagnosia. Dr. Barton is a Professor of Neurology, Ophthalmology and Visual Sciences, and Psychology at the University of British Columbia in Vancouver, Canada. Dr. Barton, welcome to the program.

Dr. Barton:

Thank you.

Dr. Wilner:

Well, let's begin with some background on prosopagnosia. Dr. Barton, you've been researching and publishing papers on this rare disorder for at least a couple of decades, so we're really pleased to have you on this show as an expert. Let's start with the symptoms of this neurologic disorder.

Dr. Barton:

Right, so the hallmark of prosopagnosia essentially is the inability to recognize that a face you've seen is familiar, that you've seen it before. Okay. When we're talking about the identity of faces specifically. So, as a result of that, you can't recognize this person's face as being something you've seen before, you also don't recognize that person. So, these people often complain that when they're in a room, it looks like a roomful of strangers. I had one subject on the internet who came up with an interesting analogy. You think of the stones on a stony beach. Right, we all can recognize stones. But we're not really very good at recognizing individual stones, and for him that's what it felt like. Looking at faces in a crowd was like looking at the pebbles on a beach.

Dr. Wilner:

So, two questions. One – how common is this, and two – what causes it?

Dr. Barton:

Well, there's two main forms. There's an acquired form, and a developmental form. So, the acquired form is the one we've known about since the mid-1800s, or at least well-studied since the middle 1940s. But it's extremely rare, and in fact, you know, to study this, I had to get a grant that allowed me to bring people from anywhere in North America to study, and that got me a group of 15 people. So, it's not super, super common. And that may speak to the kind of brain problems that you need to have to be able to manifest this. On the other hand, the developmental form – this is where you're born with a problem recognizing faces, which often will take you a little time to figure out that you can't do something that everybody else can.

Dr. Wilner:

Is there anything you can see on an MRI scan, for example, with someone who has the developmental form?

Dr. Barton:

No, that's part of the definition. So, if you have something on the MRI scan that I can see maybe there was an in-utero stroke or, you know, a perinatal problem, then that by definition is early onset acquired prosopagnosia.

Whereas developmental prosopagnosia essentially is something about the way the brain developed that's not really easy to see on a standard MRI scan, anyway, to betray the issue. If you do special research scans, there's also some talk about, well, maybe the cortex in the part of the brain is a little thin, or the white matter connections are a little sparse. But that's still something that's ongoing research.

Dr. Wilner:

It sounds like it almost falls into the category, you know, there are people that see colors, and numbers that are kind of mixed up, and then there are, well there are people who have perfect pitch, for example, they know notes, you know, they have a highly developed sense of hearing. Then there are people who don't hear tones. You know, it's sort of this very high-level sensory discrimination area of the brain.

Dr. Barton:

Yeah, you know, and like all human abilities – things that exist on a spectrum, right? There are, you know, there are people who are very clumsy, and there's people who are very adept at manual skills. And perception is no different, that if you take face perception, there are indeed high, what they call super-recognizers, people who can recognize a face that they haven't seen for ten years, you know, and can recognize thousands. On average, we think that the average person can recognize about 5,000 faces. Some of these people can do much better, and there's been a lot of interest in police forces in recruiting these people.

Dr. Wilner:

Hmm. It sounds like the parietal lobe would be sort of a high suspect for pro. Do we know where this is located?

Dr. Barton:

Yeah, one of the great things that we've had over the last 30 years is functional MRI. Right. So, I can put you in a scanner, and show you faces, and try to figure out what parts of your brain are activated when you are doing that. And now we also have techniques to see how these things are connected functionally or with white matter or structural connections. Right? So, we know that in the brain, there's not just one part that's active when you see faces, but a real network. And a lot of this network lies in the occipital temporal lobe. So, on the inferior part of the brain. And it spreads from the occipital lobe all the way out to the anterior temporal lobe. And one of the big challenges we have is trying to figure out all these different areas of this network. What do they each contribute to the process of face perception and face recognition?

Dr. Wilner:

Now, in addition to developmental and acquired, there's another way to categorize these, right?

Dr. Barton:

So, this is something that we know better for acquired prosopagnosia, though I suspect there's probably something like this with developmental as well. But with acquired because, again, like many complex tasks, there are many cognitive operations that you need. They're both perceptual and memory functions, to recognize who this is, or that you've seen them before. So, if you have an apperceptive form, that means that central processes that you need to create the representation of the face in your brain is faulty. So, you do not see faces accurately. They do kinda look all the same. And that's commonly associated with damage to the occipital temporal lobe in the fusiform gyrus, at the back part. On the other hand, there are people who have anterior temporal damage, who have no problem seeing the difference between faces. What they struggle with is trying to match what they're seeing with what they

remember. And so, these people, if I give them a quiz where I say, "Don't worry about looking at faces; I'm going to give you a couple names. Barbra Streisand and Meryl Streep. I want you to tell me, who's got the bigger nose?" Right? They can't do that, because they can't bring up in their mind the image, the memory of what these faces look like, to be able to make that kind of judgment. So that's the amnesic form, okay? And then there's an associative form, which is where yes, you can see what faces look like. Yes, you do have some facial memories. But you can't link them together.

Dr. Wilner:

Well, prosopagnosia has been in the news lately, because Brad Pitt announced that he has it, and it's caused him a lot of social awkwardness to the point he says he doesn't even want to go out, because he sees people, and of course they recognize him, but, you know, he's at a loss because he doesn't recognize them. Of course, we don't know his medical history and we're not his physicians, but he's 58 years old, according to Wikipedia, and he seems to be in pretty good health. You know, how could that happen?

Dr. Barton:

Well, I guess there's a couple questions. Is this a new problem for him or is this an old problem that he's become suddenly aware of? Right? Because after all, the people with developmental prosopagnosia, they often start off blissfully unaware of this issue until the penny drops one day, that they're having a problem that other people don't seem to have a problem with. So, that's one possibility. Maybe he's someone who's had the developmental problems, just kinda figured it out.

Dr. Barton:

But on the other hand, yes, could it be an acquired form. Well, you know, as a neurologist, as physicians, you know, how quickly something happens often is a big clue as to what's going on. If you wake up with this one day, maybe it's a stroke. By sudden onset, right? So common causes for this, for example, are herpes encephalitis, which can damage both temporal lobes. You know, and prosopagnosia in some ways is more common in people who have bilateral damage, right and left side. Things that can creep up on you.

Dr. Wilner:

For those just tuning in, you're listening to *NeuroFrontiers* on ReachMD. I'm Dr. Andrew Wilner, and I'm speaking with Dr. Jason Barton about the different types of prosopagnosia. Dr. Barton, let's turn our attention to the results of your research. So, what is it that you're figuring out?

Dr. Barton:

Well, the first thing was trying to clarify the structural basis of that functional difference between the different subtypes. That's something that we were interested in at the beginning, and we did a lot of work with functional MRI, and structural scans and trying to map out what part of the face network would some people have lost, and how did that correlate with the kind of prosopagnosia that they had. Some of the things that I've been kinda curious about recently, also is what other kind of things do they struggle with? Is it really just about faces? And so, one of the things that I and some of my colleagues have done recently is try to survey this in a larger sample, and with many more object tests. Right now, I will say that I find that most of these subjects do struggle with other object recognition tasks, if they are subtle enough and if you test them in enough detail.

Dr. Wilner:

Let me ask you one other. There's a group of patients that I'm very familiar with. I used to be the Medical Director of the Carolinas Epilepsy Center, and we saw a lot of patients with mesiotemporal lobe epilepsy and sometimes we would do resections of the injured part. Now sometimes the damage would be bilateral, so it sounds like they might be a setup for this. Have you looked into that population?

Dr. Barton:

We have had a few subjects who became prosopagnosic after temporal lobe surgery for epilepsy control. So yes, that can happen. Now

most of the time, I think, you know, people do temporal lobes surgery on just one side. You don't want to create a problem like HM again.

Dr. Wilner:

Dr. Barton, this has been fascinating. But before we close, do you have any final thoughts or takeaways to share with our audience?

Dr. Barton:

Well, I think this is a condition that is rare, but when it's acquired, people usually realize that something's wrong. Although sometimes they attribute it to other things, like saying, "This must be my hemianopia that's causing that, right?" No, it's not, okay? So, ask about that. If they have a problem with it, check with them. If they're in the room with you, take their family member's phone and show them the pictures on that phone and see if they can tell which ones are familiar and which ones are not. That's a really good test for trying to do this, with faces that are personally known to them. And if they have this, yeah, it's a problem. They're going to need to come to grips with it, but most of them are very resourceful in learning how to use other cues, which often helps, but not always. We're hoping that in the future, there may be things that we can do to make this a little easier. We have done some perceptual learning/rehabilitation programs that are promising, but they're not a cure yet. But we can improve people's face recognition skills by about 35 percent with some of these training methods. And there's gonna be a lot more work from this from some of my former students in the coming years.

Dr. Wilner:

Well, that's very encouraging, and with those thoughts in mind, I want to thank my guest, Dr. Jason Barton, for shedding light on this important topic. Dr. Barton, it was a pleasure speaking with you today.

Dr. Barton:

Oh, you're welcome. I enjoyed it very much.

Dr. Wilner:

For ReachMD, I'm Dr. Andrew Wilner. To access this and other episodes in our series, visit reachmd.com/neurofrontiers, where you can be part of the knowledge. Thanks for listening.