illustration by VIKTOR MILLER GAUSA

A funny thing happened during this neuroscientist's research: She stumbled on the study of laughter

THE CONVERSATION

Sophie Scott

What makes you laugh? You might have any number of idiosyncratic responses to that question: Mel Brooks movies, your dad's dad jokes, stand-up routines by Tiffany Haddish or John Mulaney, your favorite TikTok creator, funny animal GIFs, your child's laughter.

When researcher Sophie Scott asks the same question — *what makes you laugh?* — she's not looking for a recommendation for a funny book or movie. She's looking to understand what's behind the universal human impulse to laugh.

Scott, a professor of cognitive neuroscience at University College London, studies the neurobiology of speech perception — the brain science behind the way we hear and process spoken language. Her research touches on subjects including dyslexia, aphasia, and auditory processing in people with cochlear implants.

Scott was recently consulted for a news story on the underlying factors of Zoom fatigue, but there's another area of her research that has captured attention beyond academia: the science of laughter. That work has led to a TED Talk, interviews with the BBC, and writing for the *Guardian*. It has even led her to take the stage herself as a stand-up comedian. "I would say it's comfortably the most interesting part of my work," she says. "I never set out to study laughter; it was entirely serendipity that I sort of stumbled across it." Scott spoke with contributor Kris Vire from her home in London.

Is laughter the main focus of your research? Or is it just the facet that garners the most interest?

Most of my work is much more boring stuff about how the brain processes sound and gets different kinds of information out of the human voice — including things like laughter — and about how the brain controls production of the voice, lets you interact with other people. Laughter has become a bigger part of what I do. I've always done work on emotion in the voice, and laughter is now the main part of that.

What was the serendipitous moment that led you to this area of study?

I was working in Cambridge, and I had colleagues who were studying patients who have problems processing information from faces. Particularly information about identity, but also specific kinds of information about emotion. If someone has, for example, a deficit in recognizing what frightened faces look like, you don't know if that's something to do with faces or if it's something to do with emotion. You can only find out when you test for other ways the person might process emotion. So my colleagues wanted to test emotion in the voice, and they asked me, because I worked in speech. That's when I started working on emotion in the voice. So that was pure serendipity.

And then the next step occurred at a talk by Paul Ekman, who's the father of modern studies of how we process emotion, particularly from the face. And he was talking about these emotions that we had all been working with — they are called the basic emotions, the emotions that are recognized all around the world: fear, anger, disgust, sadness, surprise, and happiness. And I asked him, "Why is there only one positive emotion in there? It seems strange." And he said he thought that a smiling face, which is what he was using to test happiness, might actually be split up into more types of positive emotions, some of which might have this characteristic of being universal. But he said you wouldn't get there if you only studied faces, particularly photos of faces; you'd need to look at things like body movements and voices. And I said, "Oh, I study the voice."

He directed me to one of the papers he had written on possible universal positive emotions. One of the positive emotions he talks about was what he calls amusement, which is laughter. And of course, as soon as you start studying laughter, it kind of runs away from you, because it is another basic emotion. It is recognized universally, and the brain processes laughter very robustly. You can mess up most sounds in such a way that people can't recognize the emotional content anymore, but it's really hard to do that with laughter. As long as you've got those kinds of bursts of sound, people will hear laughter.

And you also realize that it's everywhere. We're immersed in it in a way that we're not immersed in other very basic emotional things, like screams or *yuck* sounds. So that was the starting point for me. I stumbled across it, and then it took me on a very interesting journey. It's a nice example of serendipity in science. If I hadn't gone to that talk, and if I hadn't asked that question, I might not have gone down this path. No one studied laughter. There's more laughter research now than there has ever been, but when I started, there was nothing.

You've suggested that there might be two pathways of laughter: one that's social, and the other more uncontrollable.

If you think about the last time you were laughing and you may not have wanted to be — you may have

Kris Vire has written about arts and culture for publications including the *New York Times*, *Chicago* magazine, and *American Theatre*. He is based in Chicago.

been trying to stop yourself from laughing, but you could not stop — that's an example of really spontaneous, involuntary laughter. It's still kind of social, because it doesn't happen randomly; for me, I have to be with someone I know, most likely with my partner and our son, for me to really go. It's probably better to think of it as a spectrum: At one end there's this absolutely helpless laughter, where you can't stop it even if you want to.

At the other end, you have this laughter which primarily is a communicative act. It's something that happens in conversation. If you look at people in conversation, they laugh a lot. And they tend to start laughing together and stop laughing together very quickly, and then move on. And people laugh in a very coordinated way when they laugh in conversations. That looks a lot more like a voluntary motor act, like the speech that they're producing. It's a much more communicative, controlled act, like the way that I'm speaking now is controlled. That doesn't make it bad. It's actually very positive. There are very nice studies from Greg Bryant at UCLA showing that in conversational laughter, you can get a sense of how close the two people are who are talking to each other, because they will laugh differently when they're with someone they know better and like better.

Reading some of your work about the social aspect of laughter made me realize how much more likely I am to laugh out loud watching a movie, for instance, when someone is watching with me than if I'm watching by myself.

Yes. There's a very well-established finding that you're much more likely to laugh if there's somebody else with you than if you're on your own. Robert Provine [a professor of neurobiology and psychology at the University of Maryland known for his research on laughter] argues that you're 30 times more likely to laugh with someone else present. We've comfortably replicated that. And there's some evidence that the closer you are with those people, the more you'll laugh.

But it can spread even among strangers, too, can't it? I think of the way that people in a theater audience can sort of give each other permission to laugh. Sometimes you just need one big laugher to get the whole house going.

Yes! It even helps just giving people an indication that this is meant to be funny, this is a funny thing that's happening. It's a very nuanced cue. It's fascinating.

That's why TV sitcoms had laugh tracks for so many years, right?

Absolutely. And if you look at the roots of that — TV, when it started, was hot on the heels of radio, and radio is where you find the first comedy broadcast. Many of the initial comedy broadcasts were just comedians in the studio, and the reason they started using [live] audiences is that the comedians didn't like doing comedy without an audience's responses. And audiences at home frequently didn't understand that it was supposed to be funny, because they were used to hearing comedy in a theater. So it then became the norm to record comedy in front of an audience.

And it makes things funnier! We have found that if you add laughter to the ends of jokes, people think the jokes are funnier. When I told a comedian that finding, his first reaction was, "Well, of course. If I can hear the audience laughing, I become funnier."

What's something you've discovered in your work that's surprised you?

When I first started working with these positive emotions, among them amusement, if you'd asked me, "What's this sound? *Ha-ha-ha*," I'd have said: That's amusement. That's the sound you make when you find something funny. Robert Provine has always argued that, actually, although we do laugh at jokes, laughter has this bigger world within social behavior. And I thought, obviously, he's wrong. But for our study comparing spontaneous laughter with more communicative laughter, when we tried to get people to laugh in the lab, we found that we couldn't just get people into the lab and get them laughing spontaneously. It just didn't happen. All sorts of things had to be right to do that. And the more I did it, the more I realized he's right.

It's not enough for stuff to be funny. People have to be with people, and they have to be with certain

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sorts of people, and you have to do a lot of work to make people feel comfortable before this behavior starts to appear. So when people laugh together, laughter's more like an index of how those people feel about each other and where they're at and what's going on, than it is, "Oh, we saw something funny." It's telling you about the people and how they feel about each other, and what the bigger mood is, and where they are, more than it's telling you there was a funny thing. And I was really surprised by that, because I thought it was such a no-brainer: Laughter's what you do when something's funny, obviously. I mean, that's common sense. And it's what most people will tell you if you ask them, "When do you laugh?" They'll tell you they laugh at jokes and comedy. If you ask people, "What *makes* you laugh?" they will start to talk about people. It's quite interesting.

Your research has led you to trying your hand at stand-up comedy yourself. How did you find yourself onstage?

The university where I'm based started a new public engagement unit in 2008. University College London is a very famous university that is known on the world stage for research, but interestingly, it's not as well known within London. I live just around the corner from University College, but if I say to my neighbors that I work at the university, they think I mean King's College or Imperial College. So as part of an effort to raise our visibility, they started running comedy nights where the performers were UCL academics and research students. There would be a headline act and an emcee who were proper comedians, so you were in professional hands.

In academia, you have to get used to being in front of an audience, because you have to give lectures and do seminars and conferences. As an academic, I had always made jokes in my talks, mainly to know whether the audience were still listening. Do I still have them, and if I lost them, are they furious? You know that if they're laughing, they're at least listening.

But when it came to doing stand-up, I thought, no way am I doing that! I had worked really hard and I had just been made a professor, and I didn't want to go into a pub full of strangers and die onstage. Then one of my colleagues did it, and I decided I had to do it. The first night I was booked in for a gig doing stand-up, I was locked in the toilet at the pub thinking, what have I done? I've made a terrible mistake! And then I did it and I loved it, and I came offstage and thought, I want to do that again, and I want to do it better. It was a revelation in a couple of ways. I was 44 when I did it for the first time. You sort of think, that's it, this is how things are, this is the person you are. It never occurred to me that I could learn a new skill. So now I've done a lot of gigs. No one is fooled into thinking that I'm a professional comedian, but it's a very fascinating skill to learn, and it helps me in a number of other ways in terms of communication skills and things like confidence. And it's fed back into my science. I would definitely recommend it to anybody. You can teach an old dog new tricks, I guess. ■

To hear Sophie Scott's TED Talk on her research into laughter, go to **ted.com/talks/sophie_scott_why_we_laugh.**

Paul Wilkinson