

Bill Glovin: Hi, and welcome to *The Communicating Brain Science* Podcast, where we focus on research and issues that have to do with neuroscience. I'm Dana Foundation Executive Editor, Bill Glovin, and today the topic is improvisation, which is, in simple terms, how we spontaneously make things up as we go along. The more precise definition is: to compose and perform and deliver without previous preparation.

We have two very special guests in to help us, first, understand how your brain improvises, and, second, how one goes about doing improvising at a very high level. Joining us in The Dana Studios in midtown Manhattan to talk about this most fascinating subject are Professor Heather Berlin and standup comedian Chuck Nice. Heather is a neuropsychologist at The Icahn School of Medicine at Mount Sinai. Her research focuses on such things as consciousness, creativity, and behavior. I first saw Heather on stage with her husband, Baba Brinkman, following his show at the SoHo Playhouse, *A Rap Guide to Consciousness*. She very impressively explained her husband and his amazing show, "There is still a few performances left and I couldn't more highly recommend it."

Chuck hosts various radio and TV gigs and his website says that he is seen regularly on *The Today Show*, has guest hosted Joy Behar's *Say Anything!* And co-hosted *The View*. I didn't know a male could even do that, but I guess they make exceptions. What also caught my eye was that he's a co-host of *Star Talk Radio* with Neil deGrasse Tyson where he, and I quote, "provides humorous commentary on one of his favorite subjects: science." Welcome to both of you.

Chuck Nice: Yes. By the way, I just love the way you said that my website says... It's not verified. According to Chuck's sources, which is Chuck, he does these various things. I can't say if that's true or not...

Bill Glovin: Anyway, Chuck, your affinity for science is probably one of the reasons Heather thought you would be good for this podcast. What do you like about science?

Chuck Nice: Science is magic, and I'm not a person who believes in magic. I've never been. As a kid, I hated magic and magicians, because I saw them as tricks. I didn't see it as wonder. I didn't see it as something to marvel, or awe-inspiring. I was like, "Why are you trying to trick me?" All I wanted to do was figure out the trick. What I realized, because no one had actually encouraged that in me, that that is called scientific discovery. You ask a question, and now you want to find the answer. Why does this happen? And I will not rest until I find out why! As I discovered science, I discovered that there is wonder and there are awe-inspiring things in the world and in the universe, and the universe itself is awe-inspiring and full of wonder and therein is the magic. That's my relationship with science.

Bill Glovin: How does a neuroscientist and a comedian come to meet and even work together?

Chuck Nice: Wow, good question!

Heather Berlin: Actually, I met Chuck on *Star Talk*. I was brought in on, this is the show with Neil deGrasse Tyson, and started out as a podcast, now it's a Nat Geo TV show as well. I was brought on as the scientist, and Chuck was the comedy relief, but as I started working with him, I realized, wait a second, he's not just the comedian. He really knows a lot about science. He asks great questions to illicit scientists to give their best information out to the public, and I think he's just one of these people who's at the great intersection between comedy and entertainment, and really trying to understand the world and how it works.

Chuck Nice: Yeah, absolutely, and neuroscience is probably one of my favorite scientific disciplines, if not my favorite. And it's simply because...

Heather Berlin: It's the best!

Chuck Nice: That's exactly what I was going to say! How did you know? No, but, you think about it, who doesn't want to know more about themselves? You are your brain, you are this thing that sits up in your skull, in your cranium, and basically runs everything about you and every thought that you have while simultaneously running every system function in your body. That is your brain! And then it is capable of things outside of just calculation. It's capable of allowing us to think about who we are and our existence and all of these great philosophical questions, all that stuff, comes from your brain! It's pretty cool.

Heather Berlin: So this is basically, Chuck is taking my lines, right? That's normally something that I would say!

Bill Glovin: Don't worry, there's enough room for everybody!

Okay, let me get back to you Heather with some people can be very creative but completely lack the ability to improvise. Why is that?

Heather Berlin: That's interesting, because there are different types of creativity so, in general, I would say, roughly speaking, creativity is being able to make connections between divergent ideas, or putting things together that nobody has ever thought of before.

So that can either come via very, sort of, conscious methodical thought over the course of time, which is to say, for example, if you're working on a project. Let's say you're writing a book. You're going back, you're revising, you're editing. It's a creative endeavor, but it's not that in-the-moment spontaneous creativity. Maybe the inspiration for the book, let's say, was spontaneous, it came from your unconscious, but then the process of actually creating it is different than what occurs in people who are really good at improvising, which is making those sort of connections between divergent ideas in the moment, without a lot of actually conscious thought. A lot of it is an unconscious process that we're discovering in the brain.

Heather Berlin: I think it is possible to be a sort of creative person and not be good at improvising, but they tend to go hand in hand. The people who are more creative tend to be high in a personality trait called openness to experience, and those people tend to be able to let go more easily, and that's what you need to do to get into those improv states is let go of your ego, turn off the prefrontal cortex, to be able to improvise. So I think people who are creative in general tend to be better at doing that, but they don't always necessarily correlate.

Chuck Nice: That's a great answer.

Heather Berlin: Why thank you, Chuck.

Bill Glovin: Chuck, some of our most successful entertainers have come out of Second City in Chicago, The Groundlings in LA, and Upright Citizens Brigade in New York City. Have you ever considered improv as a career?

Chuck Nice: No. I am a stand-up comedian, we look down on improv artists, even though they are often far more successful than we will ever be. No, we do not look down upon them. There is a particular mindset of being a standup, and it requires you to be that lone wolf type person, to like to live and die on your own. Your success is found in you, and provided by you. That means your failure is exactly the same. When you have success, it seems so much more sweet because you did it. When you fail, it seems so much bigger because you did it. That is the excitement of being a standup. You do it by yourself.

When you're an improv artist, you have the support of all your other players. Everybody in the troop. They're all supporting one another, they're helping one another, they're looking out for each other. That's cool, too, it's just not as exciting to me.

Heather Berlin: Can I just ask a follow up question? The way I kind of see it, the ability to improvise is about letting go of control, right? You don't know what's going to happen; it's spontaneous. Do you want to be more in control? You write your set beforehand, you have a better handle on it, rather than just walking into a situation, you don't know what's going to happen, it could be funny, maybe it's not funny.

Chuck Nice: The thing is that, the control thing, you're right about. I want the control for me. I don't want to rely on you for my control, do you understand? The great thing about standup is you never know it's going to go. Believe it or not, improv people, they have it a little easier. When you know that your improv set works, it's probably going to work. You can be a brilliant standup, and these people can hate you, and it doesn't make a difference how funny that you were the last show. It could all go to crap in this show, and I like that.

As a matter of fact, the most exciting thing about doing standup is not when you're killing. It's when the audience is kind of slipping away and you're like,

"Oh, I'm going to get you back. You watch, you watch what I do, I'm going to get you back." And then you get them and you're just like, "I told you! I told you I was gonna get you, look what I did! Oh, I'm a genius!"

Bill Glovin: Chuck, but standup comedy is a skill that takes precision and timing can be everything, but is there room for improvisation or do you pretty much stick to the script?

Chuck Nice: No, personally, now there are some comedians, you go and you see them, and every night they are doing the exact same jokes with the same timing and the same punchline in the same place. Listen, that's what it's about. It's a craft. It's about honing that crafts, it's about the writing, it's about the joke. Then you have some comedians that work in a more loose set. The jokes may end up in different places in the set, at different times, their delivery may change ever so slightly, and that's more of what I do. I like it because I can't do the same thing over and over again. I'm not sure if my brain doesn't allow me to do that, I'm maybe not smart enough to actually get into a rote thing. I admire people who can actually deliver things the exact same way all the time. I'm not that person.

What I like to do is loosen things up and then allow for whatever to happen, to happen. Sometimes it's an audience interaction, sometimes it's something that pops into my head while I'm saying the joke. Then I will tag that onto the back of the joke, and it will be funnier than the joke, and then I go, "Thank God I recorded because that's actually funnier." You know, it's a combination of doing your act and writing on stage. That's how I do it.

Bill Glovin: Heather, brain plasticity, which is the brain's ability to change or adapt to experience seems to be different with everyone. I know you've studied creativity through imaging. What has that showed you?

Heather Berlin: In terms of neuroplasticity? We haven't really looked much at neuroplasticity in creativity. We've looked at basically what's happening in the brain when people are in these creative states. It's not just my research, as well, there's research that's been done with Charles Lin with jazz improvisers, and others, that look at what's happening in these states. What we do know over the course of these research studies is that you see a very similar pattern of brain activation when people are in these improvising states. Whether it has long term changes in terms of neuroplasticity, we don't know, we haven't really looked at.

Heather Berlin: That's difficult to look at, but we do see that there's a unique pattern of brain activation within the prefrontal cortex when they're in these states, where you get decreased dorsolateral prefrontal cortex activation and increased medial prefrontal cortex activation, which is to say, basically your filter system is turned down, your sense of self is turned down, and it allows for ... how what's turned on is the default mode network in the brain. It's just internal generation of ideas, and it's allowed to form connections between things without there being this filter on it in terms of what's socially appropriate or not.

Heather Berlin: That's why it's very interesting. I watch my husband when he does freestyle rap, which is an improvisation, interesting things can come up from his unconscious because it's no longer being filtered. Some of the research I've done looks at what's happening in the brain when you're suppressing things, and you actually get increased activation of the dorsolateral prefrontal cortex to keep things at bay. And then when you lower that activation in these improvising states things come up. So, Freud had it right when he was looking at free association and ways to access the unconscious when the filter is turned down. We also see that during certain times of meditation or hypnosis, where you turn that filter down and it allows you to access these unconscious things.

I don't know what that says in terms of long term affects and how the brain, in terms of neuroplasticity. I just think it's a different pattern of activation.

Chuck Nice: It's super cool what you just said, because that is--what you just said is kind of how you write comedy. All of my comedy comes out of thought. Then that thought, you sit and you soak in that thought and then things bubble up. These things that bubble up become associations, and then you start connecting them, and then boom that's how you get the jokes. So it's like you said, but that process wouldn't happen if you told yourself, "Well I can't do this," or, "I can't say that."

That's why comedians get into a lot of trouble with what they say, because they're in the moment, and what bubbles up comes out, and somebody says, "How could you say that? You're an awful person." It's like, "No. It's a joke." That's what the experimentation is about, but most people don't understand that, because what you said was socially inappropriate and offensive and now you have to pay.

Bill Glovin: Along those lines, in the art section of *The Times* today, there was an article about Louis C.K. and this whole movement of comedians making people leave their cell phones at the door, and restricting the ability to transmit, versus social media, the content of their act, or taking things out of context and then tweeting them, because not only does it get stolen, but it gets them in big trouble. Not that he doesn't deserve to be in big trouble for a lot of other stuff. A lot of other comedians are doing this as well, the article pointed out, so that seems to be a big movement in that directions.

I'm a little off the track now, let me get back on it. My daughter Sam is an actress. She was taking some classes in improv at UCB, and she says one of the principles is that you're not supposed to think, and to turn off your brain. What do you both think of that concept?

Chuck Nice: I think that that's a bad concept to tell somebody, because you never turn off your brain. As a matter of fact, my brain is hyperactive when I'm on stage. I am aware of everything, it almost feels like spider senses. It's like I can almost hear the person stirring their drink with a straw. That's how hyped up I am on stage. I

think it's just the opposite of turning your brain off. I think it's opening your brain up. Instead of shutting it down, you turn on every part of your brain.

Heather Berlin: Well, I'm just going to say, it's turning down certain parts of the brain, and turning up others.

Bill Glovin: I think that's what is probably meant.

Heather Berlin: And, also, what we find is that you have this Default Mode Network, which is the kind of internally focused new generation of ideas, the filter is turned down. It's also on when you're day dreaming and it allows you to access these unconscious things, but then you also have what's called the Executive Control Network which is the flip side of that, when you focus your attention outward.

I think when you're on stage, you flip back and forth between these two states. Let's say you're spontaneously creating something, then you check in with the audience. How are they responding? How are they doing? Now, I'm going to go back and modify what I'm doing. It's kind of like what you said before, if you feel like, "Okay, I'm losing the crowd, I need to do something and switch it up." You're going back and forth between this monitoring the external world, seeing what's happening and then going back internally, to create or transform your performance in a way, to get a better reaction. I think it's about turning down the filter system in your brain. What's also interesting about when these comedians get into trouble is that if anyone could tap into any one of our unconsciousness, there would be stuff in there we don't want to go public, right?

Our dorsolateral prefrontal cortex is kind of like the PR agent, right? When you turn it off, anything goes, so I think comedians, when they get into this state, they get into trouble because they're allowing that all to come through. But really, any one of us... We can do studies in a lab, something called implicit association tasks, where we look at people's unconscious biases. They might say...

Chuck Nice: "I have no problem with black people at all!"

Heather Berlin: Exactly! Then they have a much quicker reaction time or fear response. We can see people's real unconscious biases and we're all privy to it. It's just that comedians are letting it all out. They're letting it all out there and they're getting into trouble for it.

Bill Glovin: Heather mentioned before, Baba is skilled at free association rap. Would that also make him good at, let's say, jazz improvisation? Would he have more aptitude to be able to play music and do freestyle or does it not translate over?

Heather Berlin: This is the thing. People who are good at improvising in one, let's say, specific domain. I would say, in general, they're a certain personality type. They're good

at letting go in different contexts. They usually like new experiences, they're risk takers, right? The thing is, when he's free styling, he's not just saying random words that don't make sense. He's really learning the craft. You have to consciously really learn the craft in order to be really good at letting go and improvising. He can never do jazz improv, because he doesn't know the chords and how to play an instrument, whatever. Or anything, like a professional tennis player, you have to consciously do all the work to learn the craft, and then when you internalize, it becomes implicit, and then you're better at letting go.

I think there's some people who are good at letting go, in general, but they have to learn their particular craft to be good at improvising in that domain.

Chuck Nice:

Absolutely. I think what people should realize is through improvisation, what you're doing is, you have a reservoir of knowledge, phraseology that is already just sitting in a pool up in your brain. Then, you go into a certain mode and you're actually just going in and picking these things out and putting them together.

It just popped into my head, if you've ever seen people who put these little word puzzles on their refrigerator, and it's just a bunch of different words, and then you can come along and create sentences out of the words. What happens for improvisation is you kind of see the sentence in the word cloud itself and you pull it out all at once. That's kind of how it goes down.

Heather Berlin:

It's like you have to take in all the information first, consciously, but then because the unconscious is unlimited, it can do much more calculations on all this information that's in there, and come up with novel things, whereas consciousness has a limited capacity. You kind of need it to take in the information, but once it's in there, let your unconscious play around and do its work.

Bill Glovin:

We've so far focused on entertainment, but improv seems to have a lot of practical benefits like a job interview, for example. I would think the ability to think quickly and respond articulately would be a major benefit. Is that something that can be developed and improved upon?

Heather Berlin:

When you think about it, we're all improvising all the time. The words coming out of my mouth right now. I have a vague idea about what kind of idea I want to get across, and somehow the words come together and they get expressed, right? But I'm not consciously thinking about each thing. We're improvising all the time, but when it comes to something, especially in a high pressure situation, okay, a job interview, you have anxiety. Usually what happens with anxiety is, again, you're turning up those prefrontal cortex areas that have to do with rumination, self-awareness. The more self-aware you are, the worse your performance is going to be.

So, for anything, whether it's a performance on stage or, let's say, a job interview, if you can get into more of a meditative state, a relaxed state, where you're not so self-conscious/self-aware, it will allow you to be more improvisational, in a way. You're not going to be like, "Oh, did I say that the right way? What should I say next?" You just let go, and the more you can let go, the better you'll be in that flow state at anything. At an interview, or playing tennis, or doing comedy.

Chuck Nice: Yeah, and I guess that goes back to the shutting your brain off, which I don't like the terminology, but I know exactly what they mean. You're not consciously thinking about what you're doing, ever. It just flows.

On the other show that we do, we've spoken to many athletes, and they all have one thing in common that they talk about when it comes to performance and that is: I don't think, I do. I don't think about the foul shot, I just shoot it. The moment I think about it, I'm going to miss it. So, it's that kind of--

Heather Berlin: That's it! It's like your body, your unconscious know how to do things way better than you, once you've trained up. Then at that point, consciousness gets in the way. It can only mess you up, so the best thing you can do is actually let go. I would just call it your dorsolateral prefrontal cortex, but other parts are still on.

Chuck Nice: Right, now I know why they said "shutting your brain off." Because "turning down your dorsolateral prefrontal cortex" doesn't roll off the tongue as easily as just "turn your brain off."

Heather Berlin: If only I could shut my brain off.

Bill Glovin: Some people say you can't truly explain something like love, and that there is no real reason to break it down in scientific terms. Does the same hold true for improv and creativity? Is understanding it important and will it help man and womenkind in any way?

Heather Berlin: Are you dissing my whole field? Let me tell you why it's important. So I think, first of all, just in general, for having a better understanding about how things work and how the world works, a lot of people talk about these creative flow states, because your sense of self is turned on "it's flowing through me, the universe is sending me this information, and I need to let it out."

Chuck Nice: "There's an ancient god living within me!"

Heather Berlin: Right, so there's interesting explanations about where it comes from and I think that having a true scientific understanding is always beneficial for humankind. But, also, I do think that when it comes to actually--because I actually got interested in this because I think it has therapeutic purposes, like if you can get people into these states, it releases their rumination, it's usually associated with

very positive feelings, how can we get them into these states in a therapeutic way?

The more we understand about what the neural signature of that state is, the better we can do things. There's now neurofeedback. We can actually get people in a scanner and they can get feedback from their actual brain activation and try to get into these states, or we can say, "try to turn down that dorsolateral prefrontal cortex just a little bit more, turn it down," or, "turn this part up," and people can do that. I think as we understand these states, that's one example that can have clinical value. Like anything, it doesn't take away the magic of it, love or creativity is still a thing in and of itself, but if we have a different level of understanding of it, we can help people maybe get to these states better or understand when things go wrong, like with love, when it gets crazy, you know?

Chuck Nice: Well, I'm a comedian, so there is no such thing as love, and my heart is as black as space itself.

Bill Glovin: That's great to hear. I think on that note, that's a good place to end, but I will give you a chance to promote anything that you might be doing. This might be a good chance.

Chuck Nice: Look for my new album coming out. I'm recording it on May 17th. It will be out for release in June, the end of June, and it's called *Chuck Nice: Daddy Issues*. It's about me being a father, so I'm the actual issue.

Heather Berlin: What does Chris Rock say? Just keep your daughter off the pole? Well, for me, I'm actually going to be doing a new show that's premiering at the Edinburgh Fringe Festival with my husband, Baba, called *Impulse Control*, and it's all about impulse control, the brain, it's comedy, it's about love and the brain, and it's premiering at the Edinburgh Fringe Festival. If anybody's in town.

Bill Glovin: Yeah, if anybody wants to send along money to help fund any of these projects-

Heather Berlin: We'd be happy to take it.

Chuck Nice: Please, without a doubt, and not even to fund the project, I'll just take your money.

Bill Glovin: Well, that's an absolute great note to end on. Thank you so much for coming in, so appreciated. Really interesting topic, and you guys were tremendous and offered tremendous insights. If you're interested in hearing this, you can go to Dana.org and all our content is up there, and again, Heather Berlin, Chuck Nice, thank you very much, and we'll see you next time.