Transcript of Cerebrum podcast with Roger E. Beaty, author of “The Creative Brain”

Guest: Roger E. Beaty, Ph.D., is an assistant professor of psychology at The Pennsylvania State University, where he directs the Cognitive Neuroscience of Creativity Lab. His lab studies the psychology and neuroscience of creativity, using brain imaging and behavioral experiments to examine how creative thinking works in different contexts and domains, from the arts to the sciences to everyday life. His research has been supported by grants from the John Templeton Foundation and the National Science Foundation. He received his Ph.D. at the University of North Carolina at Greensboro and completed postdoctoral training at Harvard University.

Host: Bill Glovin serves as editor of Cerebrum and as executive editor of the Dana Foundation. He was formerly senior editor of Rutgers Magazine, managing editor of New Jersey Success, editor of New Jersey Business magazine, and a staff writer at The Record newspaper in Hackensack, NJ. Glovin has won 20 writing awards from the Society of Professional Journalists of New Jersey and the Council for Advancement and Support of Education. He has a B.A. in Journalism from George Washington University.

Bill Glovin: So, when you really get down to thinking about creativity, you realize that without it, we wouldn't have come up with fire or the wheel, not to mention music, art, or even humor. You wouldn't be able to hear this podcast because no one would have thought to invent the concept of electricity, or the phone, and a recording device and finally, a computer.

Hi and welcome to the Cerebrum podcast. I'm executive editor, Bill Glovin and today on the phone with us is Roger Beaty, author of “The Creative Brain,” the cover story and our new Cerebrum magazine, which launched last week. You can find Roger's article and sign up for a free subscription to our new magazine at dana.org.

Dr. Beaty is an assistant professor of psychology at Penn State, where he directs the Cognitive Neuroscience Creativity Lab. This lab uses brain imaging and behavioral experiments to examine how creative thinking works. Last summer he was the co-recipient of a $1.1 million grant and the National Science Foundation aimed at understanding and measuring creativity in the context of science. Welcome Roger and thanks for joining us.

Roger Beaty: Thank you so much for having me, Bill. It's great to be here.

Bill Glovin: I've got to start off with letting you know that people seem to be drawn to reading about creativity. Our analytics tell us your article is attracting far more readers than our other features in the magazine.

Roger Beaty: Thanks. I'm glad to hear that.
Bill Glovin: Let's start with something pretty fundamental. Why is the study of creativity important?

Roger Beaty: I think creativity really cuts across all areas of life. We often think about creativity as something that artists do, but it's really something that everyone does in different ways in our daily lives and as you mentioned, it's important to innovation and scientific discovery. But it's also important to just solving everyday problems that we don't have an obvious answer for it. So understanding how it works, how creativity works, I think is really important to kind of being able to potentially be cultivated and promoted in our own lives.

Bill Glovin: Is there a particular reason you decided to specialize in creativity?

Roger Beaty: Yeah, actually I think it dates back to my undergraduate years when I had a really fascinating course on the topic by Robert Weisbecker, who was my first mentor. He had a course in the psychology of creativity and innovation and that was when I first discovered myself that this was actually a branch of science that could be pursued. I was really excited about that and I volunteered as a research assistant back then when I was at Temple working with Dr. Weisbecker and since then I have just been continuously fascinated by the field and have developed even more questions.

Bill Glovin: Do you pursue any creative endeavors?

Roger Beaty: Yes, I do. I guess you could call research a creative endeavor, but I also play piano on the side. I play jazz piano and guitar a little bit, just mostly for fun. I was in a few bands before, but it's mostly just kind of something I do for fun now in my downtime.

Bill Glovin: In reading about the grant you received, you said you would hope to develop a tool that helps teachers. Can you explain how this tool would work?

Roger Beaty: What we have in mind for this is really an instrument or a measurement, so basically an assessment tool. So some kind of test or a series of tasks that teachers can use to assess their students creative thinking in terms of science in different scientific domains. And coming up with good tools that are valid and reliable, they're measurable, we think that measuring is important when teachers go to try to teach students to be more creative. They want to be able to give a test to be able to see how they're doing and if what they, the different educational interventions they use in the classroom are actually effective at improving their student's creative thinking. So we're trying to come up with new tests of that at the moment.

Bill Glovin: I think people might want to know from a scientific standpoint, what makes someone more creative than another? Is it cultural, tied to socioeconomic status, genetic, all of the above? Do we really know?
Roger Beaty: That is a really important question and I can't say it all boils down to one factor or another, it's a very complicated story and it also depends on what type of creativity we're talking about. I think there's some evidence that there is some kind of a different traits that people are born with that can be, of course interacts with the environment and different opportunities that are afforded to people. But of course if we think education is doing anything then that's going to be an environmental influence that could promote someone's creativity. So there's, as with many things in science there's no simple answer. It's a combination of nature and nurture as far as we know at the moment and [inaudible 00:00:04:54]. The evidence that we have right now is correlational, but we're working to get more experimental and causal with our questions. But I think there's a lot of cognitive and personality and neural factors that could be explaining some of the variants and what makes some people more creative than others.

Bill Glovin: What parts of the brain are involved in creativity?

Roger Beaty: Many parts of the brain are involved in creativity. The whole right brain versus left brain idea of people who are more creative are right-brained [inaudible 00:05:24]. Those who are left brain is really been debunked and it's really, creativity seems to be more of a whole brain process, but there's certainly certain regions that seem to be more associated with, I'm completing a creative task than others, one of which is the hippocampus and this is the region that's involved in a lot of different things such as memory and imagination. Kind of piecing things together in our minds that require us to draw on our memories and kind of to solve problems and imagine things. And so imagination is definitely important for creativity and hippocampus plays an important role in that process.

Bill Glovin: Is there any tie between intelligence and creativity?

Roger Beaty: Yes, I think we're seeing some evidence that there is at least at the cognitive level, so there's less evidence that people who are artists for example, are far more intelligent than those who are not. This is more of just in terms of those who are a little bit better at just general creative thinking. So if we give people different creative thinking tasks and then measure their intelligence, there does seem to be a correlation between the two. And so just in terms of a general cognitive process, to the extent that there is one. So just the general capacity to think flexibly and come up with a lot of different ideas. There is evidence that that ability is linked with intelligence.

Bill Glovin: Has there been any tie to sort of treating mental health disorders such as depression, anxiety or stress?

Roger Beaty: There's been a little work in this area. I think there's a much more that can be done and should be done, especially if you think about depression and for example, as being associated with rumination, which is kind of getting stuck on a certain line of thought. It's not very productive and that's kind of how we think
about creativity being the opposite of that. Right? So being able to think flexibly and not get stuck on a certain topic or another and jump around from different topics as it is beneficial to us. I think that ability is diminished in depression and as expressed by rumination. So I think that yeah, there's room for interventions that try to target back cognitive flexibility and that ability to kind of come up with various different solutions to our daily problems instead of just kind of getting fixated on one thing.

Bill Glovin: What makes someone be able to sort of focus on something? I think that would be important to the creative process. Being able to concentrate on a single task and to get to an end point; where you want to go.

Roger Beaty: Yeah. That's something that we study to some extent in our lab and it's kind of this family of cognitive processes known as executive functions and it's called executive cause it's just kind of this control center, our centers in our, in our brains that allow us to focus our attention on tasks and stimuli and so forth. So there is evidence that some aspects at least of the creative process, particularly when we need to evaluate and kind of refine and edit our ideas and kind of persist in a way is associated with that without ability. However, there might be times where we don't want to be super focused and have our kind of filters on our minds, really like what we want to let more information in and an earlier stage of being more generative and flexible and letting things enter our minds so that we can then kind of more deliberately focus in and hone-in on things.

Bill Glovin: Can you will yourself to become a more creative person?

Roger Beaty: I think that you can certainly engage in certain practices. You can kind of study different creative domains. I don't know. I don't think someone can necessarily flip a switch and make themselves creative. Although there's some evidence that training and having a certain mindset can make someone in the moment a little bit more or less creative. But I don't know if it's as simple as just simply willing yourself to be creative.

Bill Glovin: For somebody like me, I have no ability in art. I've always thought it would be an amazing experience to be able to draw and that just seems that right out of my purview. So it's not anything sort of, either you have it or you don't kind of thing?

Roger Beaty: I don't know. I think there's evidence that a lot of, certain people maybe have some predisposed positions or some interest that would draw them to want to focus on being a painter or a graphic designer and then investing the time into actually being really good at that. So when we talk about abilities, that's all I'm going to get you so far and especially when you're talking about creative domain. So if you want to be a scientist or musician, that's going to be kind of at a higher level.
There's this idea of a 10,000-hour rule or 10 years of 10,000 hours of practice to become an expert. You really sit down with it with the teacher and push yourself to structure lessons for a long period of time. There's some evidence that a lot of people can do a lot of different things that might not have looked like it could kind of go into it. But with a lot of practice and with the right kind of mentorship there is a lot of evidence coming from the expertise literature that people can do a lot of different things that they just have the right kind of training.

Bill Glovin: Does experience, which I guess involves memory, make you a more creative person?

Roger Beaty: Yeah, I think so. I think that's when we talk about memory, there's the distinction between the accumulation of knowledge or information. So how much we have in our memories versus the access to that information. So what we're seeing in a lot of our research is that it has more to do about the latter, the access part. Cause certainly knowing information is important but being ability to recall that information and to put it together in new ways seems to be more important to maybe relatively to just having a lot of information in mind. Although, that is certainly part of the equation too. That's how I think about it and some of the others that we're seeing is that the retrieval of that information, the ability to pick out certain pieces of information, put them together in new ways, does seem to be important for creativity in different domains.

Bill Glovin: One skill that it's always amazed me is people who can improvise. How does spontaneity factor in?

Roger Beaty: I think that goes back to an earlier part of our conversation we were talking about the filters that we can apply in our minds and more. Trying to be more focused or not. So I think that with improvisation it's a kind of a delicate dance with that focus part of our brain and our cognitive systems where we want to be open to do information, new kind of the interaction from a trio for example, if you're playing in a group a song, you want to be kind of maybe not super focused on what you're doing, but also, open letting your perceptual systems entertain stimuli from the environment and react to that. Without thinking too much.

So with improvisation, you don't really have a lot of time to think through things. It's the spontaneity aspect of it. We couldn't kind of sit there and just think through a few seconds what we want to play in next. It's very much real time in the moment. So I think spontaneity does play a really important role, but that doesn't mean that the control focus part of our brains is totally out the window and maybe it's less involved, but it's at certain stages or it's redirected. In general, I think that the ability to be spontaneous or to react to things in the moment, it's definitely important for improvisation.
Bill Glovin: Have you found it? In other words, if I’m a comedian and I get up there and people are laughing, I’m going to feel maybe involved in by the idea that whatever I’m saying is working and sort of be able to create at a higher level. Same with music. Is feedback ever measured when you’re looking at creativity?

Roger Beaty: It certainly has been in some other studies. I actually haven’t looked at this so much in our lab. I think it’s an important factor but there is some evidence to suggest that feedback from an audience or feedback from a teacher or a mentor or somebody that’s giving you some sense of how you’re doing does play some role, at least in the creative process. It’s going to depend on the domain. I think that that element definitely that may play some role in the process.

Bill Glovin: Is this area of research even possible without brain imaging?

Roger Beaty: That’s a really good question. I think that a lot can be learned without brain imaging. We don’t—there’s a lot of progress that was made in the field before in cognitive psychology and a lot of different aspects of human cognition before imaging was really affordable or widely used. But I think that we can ask other questions that we couldn’t necessarily ask with just behavioral tests and experiments. I think we can also, I mean there’s a study that we did that I talk about in the article at Cerebrum where we show that the connectivity patterns between brain regions, this information that we get from the brain was predictive of someone’s creative test performance. So I think that this neural data can give us something that we wouldn’t otherwise have and trying to predict someone’s creativity score like we did in that study.

Bill Glovin: Well, one thing that is always mystified me is creative period. For example, somebody like Bob Dylan, what a period of about five years in the 1960s when he wrote his most prolific songs. He said in interviews that he doesn’t know why these incredible lyrics build with imagery came to him and then later disappeared. When it comes to this kind of thing, do you have any theories?

Roger Beaty: I don’t know. That’s definitely along the line, it’s definitely a little bit more mysterious elementary or basically the inspiration side of things. Like when did people get inspired, where those kinds of sources of energy and ideas come from. It’s not something that I have really studied that much myself. I think that it’s worth investigating like when one of the certain times that people are really inspired. I feel like they are just kind of have moments of many different ideas coming in and possibilities. I can’t say I have a very clear answer on that, but I think it’s something that we should probably pay more attention to and research on creativity.

Bill Glovin: At the end of your article you write: "Until research has clarified on whether cognitive abilities like intelligence and creativity can actually be improved through neuroscience-based intervention, old fashioned arts education might be our best bet." That seems to suggest that there’s a long way to go before we
know many of the mysteries that are tied to the creative process. Do I have that right?

Roger Beaty: There's really not strong evidence now that creativity can be systematically enhanced, reliably enhanced. When I was talking about the research on brain training and so forth and cognitive training, there's been a lot of high profile matter analysis on one of these brain training programs and showed that a lot of the training that people will do in these studies makes them better at the tasks they're training on and then maybe better on similar tasks, which is something called air transfer. So whatever ability is being trained by doing something that's creative or requires working memory or some other process, you can get a little bit better at that task. There's evidence of that, but whether that actually makes you generally more creative or more intelligent for example, that is far from an unclear and it seems like it's not necessarily at least the status quo of these brain training programs does not seem to be very suggestive of this far transfer of training or working memory and then becoming more intelligent. That seems to be not necessarily the case but moment.

I have the same skepticism about create tree creativity training. There's some evidence that people can be a little bit more creative in the moment with subtle manipulations and there's some evidence that training on certain creative tasks makes people better at those tasks. But the million-dollar question is: Can you make people more creative in general? We don't know that right now and there's not strong evidence that, that's possible but there is evidence that training in the arts can make you at least, I'm coming back to that neural transfer question. If you want to be more creative in a specific domain then studied that domain. If you want to become a painter or you want to learn music and study those fields and really sit down and try and get better at that.

I don't think there's any quick fix right now to just wake up one day and be more creative in general. I think that there is evidence that studying something and giving it a lot of time and working with a teacher and a mentor can make you better at that thing. That's kind of what I was trying to say in the article.

Bill Glovin: I guess when you come right down to it, such monumental problems like climate change come down to finding creative solutions. It seems like the future of the planet could come down to creativity.

Roger Beaty: Yeah, I think that's the case. We have a lot of big problems ahead of us, of course. You mentioned something like climate change, you really need to address those problems and then I think there's some encouraging signs that there's people who are working on it and the tech sector and so forth. You know, whether we have the political leaders to help us make that happen is little less unclear. But yeah, I think the people, a lot of smart and creative people spending their time on these problems is really going to be beneficial for the future of civilization.
Bill Glovin: I think that's a good note to end on. Once again, I'd like to thank Roger Beaty, author of our Cerebrum magazine cover story, “The Creative Brain” for his article and for being a guest today on our podcast. You can find Roger's article and all of our other content at dana.org.

Thanks for listening and have a great day.