S2E4: Transcript
Animal Cognition
with Dr. Brian Hare

Tavia Gilbert: Welcome to Stories of Impact. I'm producer Tavia Gilbert, and in every episode of this podcast, journalist Richard Sergay and I bring you a conversation about the newest scientific research on human flourishing, and how those discoveries can be translated into practical tools.

In every episode of this season of the Stories of Impact podcast, we're asking the questions: What are diverse intelligences, what do we learn by studying them, and how can those revelations support human virtue?

Meet Dr. Brian Hare. He's a core member of the Center of Cognitive Neuroscience and Professor in Evolutionary Anthropology and Psychology and Neuroscience at Duke University. Not only is he an expert in diverse animal intelligences and a canine specialist, along with co-author Vanessa Woods, he's the writer of *The Genius of Dogs* and *Survival of the Friendliest: Understanding Our Origins and Rediscovering Our Common Humanity*.

In today's episode, Dr. Hare shares how investigating diverse intelligences offers human beings insight into our own psychology. He'll also describe the powerful new online tool he's building to spark the acceleration of our understanding about animal — and human — cognition. And he'll reveal why he is so drawn to study dogs and their particular genius.

Brian Hare: So why dogs as a species? Why would you focus on dogs? For several reasons. One is they share an evolutionary history with us for the last 25,000-40,000 years. Their evolutionary story I think in many ways tells us about our own story. Another reason is that they're domesticated and we can look at how domestication shapes psychology behavior. And the third reason is, that dogs have jobs! And they have more jobs than ever.

You'd think in the era of AI and the Internet, that, I mean, what could a dog possibly do? Well, more than ever!

There are dogs that are helping to detect endangered animals, there are dogs that are helping people with mental and physical disabilities, there are dogs that are checking for bed bugs, finding cancers, anything that involves detecting some kind of olfactory signal. All of those things put together: understanding our evolution, understanding the effect of domestication and the fact that they have jobs makes dogs really one of the most interesting and important species to study.

So, are those different cognitive skills that are important for different jobs that dogs do, is that something they just learn and are trained or is it something that they are born with? Bred for? And it's going to be both.

There's tremendous debate about where dogs evolved, whether it was multiple events, but we do know that it was before there was agriculture. So it was interactions with hunter-gatherers that led to the evolution of dogs, which is fascinating because the normal story we tell — let's take some wolf puppies and turn ‘em into dogs — I mean that just doesn't make any sense anymore, if you're talking about hunter-gatherers. Cuz wolves and humans were in direct competition for the same food. Not to mention when you're hunting and gathering, you're going to leave wolves with your children? Like that doesn't make much sense. So it had to be something else.

Imagine that as humans start living at higher density...what do we do amazingly well is create garbage. And the garbage that we create is a new ecological niche. So if you're a wolf that can sneak in and get close and take advantage of the resources that humans are producing as we start living at higher density, ooh! You no longer have to get kicked in the face and chase whatever you eat! It's going to be a reliable, sustainable source of food. The selection though, that's going to be acting on you, is you're no longer *afraid of* humans, you're *attracted to* humans! So what we think happened is, over many generations, there was this really strong selection for attraction to humans, and friendliness and a lack of aggression. That's the hypothesis.

Probably the reason I study animal psychology is ‘cuz of my pet dog growing up, his name was Oreo and, you know, just like every dog owner, he looked deeply into your eyes and you'd look deeply into his eyes and you’d want to know what he was thinkin’. This is my guy now, his name is Congo. Same thing. What's going on through his mind? And how does he think about us? And how does he solve problems? That's what endlessly fascinates me.

I think a lot of people think about, um, intelligence as something you either have or you don't have or you've got a lot or a little of. And this guy's got a diverse form of intelligence and so do people. There are diverse forms of intelligence!

Most people when they think about dog intelligence, they're going to immediately go to breed differences, they're going to say oh, breeds! You know, different groups of dogs that we call breeds are gonna tell us a lot about dog intelligence! Actually it tells you almost nothing. It tells you what they look like and very little else. To demonstrate what I mean by that is, when we've compared Labrador retrievers that are service dogs to Labrador retrievers that are bomb detection dogs, their cognitive profiles, how they perform on an array of cognitive tests, is as different as we see in some species!

If you're going to be a bomb dog, you are going to be incredibly uninhibited, and you're going to have amazing working memory. If you're a dog that's helping people with disabilities, you are going to be incredibly inhibited and your memory not as important, your use of social information is essential.

What dogs are really relying on as well when they communicate with us, is, uh, the tone of our voice. They absolutely are sensitive and attribute meaning to those tones. And that's what makes them such good communicators with humans.

I think when people normally think about language, most people are concentrating on syntax and semantics. So grammar and meaning. But language is much greater than that. It requires a larger, more diverse range of intelligences to operate. And fundamental to language is understanding intentions and that's where dogs are masters. They're really, really skilled

at understanding when we're trying to communicate with them, and we think that they're flexible enough where it seems like they're reading our intentions like young kids do.

When it comes to communication with humans, dogs are remarkable, and in fact if you were to ask me the species that is most like a human infant in its ability to communicate with us, it's not a chimpanzee or a bonobo that are have much larger brains and are obviously closer relatives to us. It's the humble dog that is so good at this.

Tavia Gilbert: So if we have such a close relationship with our best friends, dogs, what does that tell us about what being human is all about? What does it *mean* to be human?

Brian Hare: So that is an easy question: what does it mean to be human? I don't typically ask the question what does it mean to be human. I ask the question what makes us human. You know, of course understanding what it is that makes us human has everything to do with what it means to be human. Animals often have answers for us.

The types of answers may be something about how we develop, it might be because we share an ancestor, it might be that animals can help us answer why natural selection or evolution would have favored the thing that we're interested in explaining. In each of those cases, animals can help us understand all those things.

There are so many questions that animals help us understand about ourselves. It can be everything from how we develop, to when did the thing that we're trying to understand in ourselves first appear? Is it something that's only our species or is in lots of species? How does it work? You know, what's it good for, what's the function? How does it help for survival and reproduction? So animals have something to say about all those questions.

You can take it back to the original discoveries of Jane Goodall. People arguing about "oh well what it is to be human is we make tools and we're the only species that makes tools." Well that's not true.

Once you do figure out what it is that's human, how did it happen? What was the process? The fact that lots of animals use tools is an amazing opportunity because you can look at, what is it that makes all those species that use tools and make tools different from all those that don't? And because it's happened repeatedly it gives you a big chance to test some ideas. But right now we haven't been able to do that, because that requires large numbers of people working together.

Often the first thing I have to do is explain how could animals teach us anything about ourselves? Because we seem so different**.** Darwin obviously played an important role because he's the first to say, listen, I think the distance between human and animal psychology is not what philosophers and others have imagined. There is a bridge between human and non-human psychology.

The Origin of Species really was all about trying to understand you know, humanity, and the evolution of our species. So, obviously, Darwin is the beginning of everything for us. The challenge he had though, for the purpose of the things that we do, is psychology didn't exist as a field. And so he was trying to think about human psychology when there was no psychology. So really he was before his time in many ways. So his first challenge was to say, and I think he really awoke the scientific world in many ways, saying no, the psychology of animals is going to tell us a lot about ourselves.

The first recognition is well, actually, the way we perceive the world is one way to perceive the world. But many animals perceive the world differently and use different senses or even types of information to make decisions. So I would say that's the first step is just the wide diverse range of perceptual abilities that then problem solving and flexibility is built on top of because you have to be able to bring in information to then process it and make decisions with it.

Tavia Gilbert: Once we recognize that understanding the way other species perceive and process information has great value to our own species, what tools do we have that will allow us to explore those cross-species perceptual abilities?

Brian Hare: So thinking about neurobiology is very helpful when you're thinking about diverse intelligences. There are areas of the brain that are in charge of

movement. There are areas of the brain that are more responsible for solving social problems. There's areas of the brain that are responsible for processing emotional stimuli. And so that's not what you would, you know, necessarily think if, you know, oh, there were just sort of one measure of intelligence. Instead, these different parts of our brain, while they form really a gorgeously connected network they can interact and integrate all this different information, there are really different skills and talents of these different regions.

Animals help us, first of all, interpret and discover that different neural architecture, and neurobiology often helps us think of hypotheses that we can then test about why different animals may behave the way that they do.

When people began comparing animals to humans, the assumption was sort of, if you're bigger than if you're, look more like a human you're probably going to be more intelligent. The comparisons that were made were not guided by thinking about how species make their living in the world.

The best example and I love to say this to people when they, you know, how can you say that an animal can be more intelligent than a human. And I always say well how did you do on the echolocation test? Obviously you'd be hopeless. We don't have the ability to echolocate.

There's different types of intelligence, some of which our species doesn't even possess. There has been discovery after discovery where animals that people would not have thought could do anything particularly interesting have amazing types of intelligence. And often you know, challenge even our greatest abilities. In terms of diverse intelligence, obviously the observation and discovery of echolocation, of the fact that some animals use electricity to perceive the world. Some animals perceive the world using types of energy, light, sound, that we can't perceive. Elephants have ultrasonic frequencies of communication that we can't hear. Dogs can hear frequencies that we can't hear. Bees that are foraging, flowers are presenting themselves in UV. We can't see it but animals that are pollinating those flowers do.

What that paints in stark relief is there are diverse intelligences. There are different forms of intelligence on this planet and if you study evolution, now you have the fun task of trying to explain why. Why is it that there are these different types of intelligence?

Even in humans we know that it's not just that there's this one thing that we can call intelligence. We think there's intelligence for empathy or intelligence for deceiving others or trying to remember where things are in space. And then of course things we normally think about: mathematical ability or abstraction, creativity. When you study animals it makes it difficult to settle on this concept of general intelligence, as a diverse intelligence is a natural fit.

Intelligence is solving problems that are gonna help you survive and reproduce, and storing and processing information you're taking in.

Tavia Gilbert: Dr. Hare doesn't just use the lens of neurobiology in order to better understand diverse animal intelligences. Like Darwin, he's fascinated by evolution — the evolution of diverse species' cognition.

Brian Hare: So cognitive evolution is just like any other type of evolution. It's a biological process. It means that there's changes in the brain that lead to changes in how animals solve problems. But those changes in the brain would be heritable, they wouldn't be changes in the brain that you acquire during your life. So cognitive evolution would be between two species, there are sort of heritable changes that have occurred in two different organism's brains, that lead them to behave, solve problems, interact with one another in really different ways. And the study of cognitive evolution is trying to understand well why do those changes happen? What are the forces that drive those changes?

Friendliness was not on top of my mind as something that drove cognitive evolution. It certainly was the animals that taught *me* that.

When I went to Siberia to study the foxes that had been selected for decades by the Russians to be friendly towards people, I personally did not think that that selection regime was going to make them better at communicating with humans. The Russians, when they began the experiment in 1959, cognitive psychology didn't exist. They just selected

the foxes based on their willingness to approach and be excited to interact with a human, be friendly! What happened was, over you know now it's been 50 plus years, they were able to cause evolution in the population of foxes they selected to be friendly. And not only did it change their morphology — they have floppy ears and curly tails and they have piebald coats and white spots on their forehead at a very high frequency — but it also changed their psychology.

You know, I would have said well if you want to breed a smarter fox you take two smart foxes and breed them together. But what we've found is if you want a smarter fox you breed friendly foxes together. And that's a surprise. If you want a clever fox you breed friendly foxes!? But that's what we got! And that was the first big hint, together with the importance of friendliness in leading chimpanzees to solve cooperative problems we couldn't get them to solve otherwise.

Chimpanzees tend to be more aggressive, especially male chimpanzees. Bonobos are definitely, have aggression, but the severity is much reduced. What we've found in bonobos is that they are actually attracted to strangers. They actually have a preference for strangers, whereas chimpanzees are very fearful of strangers, and that really is the psychology that's leading to a lot of these behavioral differences in aggression.

Comparing those two species, what we've discovered is that in many ways bonobos are sort of like the domesticated dog of our ape family, chimpanzees would be more wolf-like. Why is that? Why is it that you have these two distantly related pair of species that have become so similar in the way that they've changed from one to another. What was the process that drove it? We think the same evolutionary force has shaped dogs from wolves and shaped bonobos from a chimpanzee-like ancestor. And we think that force is selection for friendliness.

Tavia Gilbert: But what does that tell us? Friendliness is...nice...but is it necessary? Is it objectively better, or preferable, for species to evolve to be friendly?

Brian Hare: Chimpanzees are incredible at making tools and using tools to get food that they couldn't have access to. Bonobos aren't that good at it. And they don't use tools for extractive foraging in the wild. Flipside is that bonobos are incredibly empathic, they're very sensitive to the emotions of others

and get very upset when others are upset and want to hug and console anyone who is upset. Relative to chimpanzees they're sort of masterful at this. And chimpanzees less so. So you have these two close relatives where, oh which one's more intelligent you know, is it a chimp or a bonobo, you might ask me. And what I would suggest is well, that's the wrong question. The question is, what are these different species' cognitive profiles? Because we have diverse intelligence, there's different types of intelligence, they vary independently from one another, and it ends up the bonobos have a profile where they're not reliant on tools the way chimps are, and it's the flip for when you're thinking about empathy.

So having tons of knowledge about how things work, does nothing for you if you aren't tolerant. What did the Bonobos do? Well it ends up the bonobos are far more tolerant than chimpanzees. We gave them the same set of problems but they'd never seen it before. They didn't have any knowledge, and it didn't matter who we paired them with, they solved it spontaneously. We could re-pair them with anybody, they had no knowledge of how it worked, they hadn't done any of the other experiments to teach them, you know, all the vital things that made them successful. So I don't think they understood anything about why they were successful. It didn't matter because they were friends, and they were tolerant, so they could do it together. In direct opposition, knowledge versus tolerance in a cooperative task, tolerance wins every time.

We had two pieces of independent evidence that wow, if you want to have more flexibility and more advanced social cognition you better be more friendly.

Tavia Gilbert: Dr. Hare is not only eager to share his findings, he's even more enthusiastic about learning from other scientists what they have discovered about the species they study. But the long-time barriers to collaboration have created real limitations to how quickly cognitive evolution can advance.

Brian Hare: Now the problem is if you just have two pairs of species, so we just have bonobo-chimp, wolf-dog, that's not a powerful enough test to really look at is it really friendliness that's doing this. We need to have dozens of pairs of species like this that are sort of independent measures of evolution, so that we can look at ok, so every time we have sort of these traits that look like domestication in a variety of different species, ok, it really is that

friendliness is what's driving this. Then we know, okay. So when you have selection for friendliness you get the set of traits that we see in bonobos and dogs.

Every university has zero to one people who studies animal psychology. So it's very hard if you're doing comparative cognition, you're comparing different species to one another, but you're the only person there! Who are you going to compare with?

So the second problem is, where are the animals to test? Most people aren't doing comparisons because they have no animals to compare. So that's why the study of cognitive evolution really has not advanced as rapidly as other areas of evolutionary study.

So we had this group, we brought them together, and we're going to solve this problem. So we're going to link up everybody all over the world so that we can work together and compare animals. We're going to make a community.

The goal is to bring together resources that are all over the planet, that one single researcher never could bring to bear to some of the most interesting questions that we face if we want to understand how intelligence evolves and if we want to identify unique and new types of intelligence.

I don't know why, but we just really haven't done it before in our field, unlike say physics or genetics where lots of people work together on a big project that they could never accomplish on their own. In our field, that really hasn't been the tradition.

Tavia Gilbert: So Dr. Hare is going to build that tradition — creating a space for collaboration in the field cognitive evolution.

Brian Hare: Yeah, so it's going to be an online tool so that people can find each other and collaborate and we're gonna pool people's resources together so we can answer a whole bunch of questions we couldn't otherwise.

It is a multidisciplinary approach because we're going to be able to look at evolutionary questions, psychological questions, potentially even questions that are relevant to culture and language. I think where we know nothing is

how psychology evolves, how cognition evolves in the animal world. There's been so little attention and effort.

If you can get enough people together who have enough resources to study enough different types of animals, well then you don't compare distant relatives that have different appendages to one another. You use what's called a phylogenetic approach. And basically phylogeny is like a pedigree of life, it's the tree of life. It's the understanding of how different species are related to one another, and with that knowledge you can actually compare close relatives to one another. So you've got all these basically close relatives across the tree of life that are really different. And you repeat your test over and over and over and over in these different families. Before, that's not what people were doing. They weren't using a phylogenetic approach. It was just you know, oh, let's just compare animals and see who's smarter comparing their genomes: that has changed everything about how we understand the relationship of life and all the different organisms and the tree of life, but it also sets up this amazing opportunity to look at how different families of animals have evolved relative to one another.

And the big surprise is that these, large, hairy, animals, Bonobo/ Chimpanzee, that look like gorillas, actually are more closely related to us than they are the thing that they look more like.

That's the power of phylogeny, is, we can test these hypotheses about how psychology evolves by looking at lots of sets of close relatives all across the tree of life.

By using this approach we can say all right well I think social complexity was driven by cognitive evolution. I think it is how animals find food is what drives evolution. I think it's the aquatic environment. Oh, I think it's the arboreal environment. People have all sorts of ideas about what shapes psychology. And we can finally put those ideas into competition.

We have to bring lots of scholars together, we have to pool tons of resources and expertise, and we have to use the tree of life to do it. But there hasn't been a way to facilitate that. And that's what this is all about, is we're going to build the tool that's going to change everything. And it's

really going to create the moment and the possibility to really rapidly move forward on our understanding of cognitive evolution.

The thing I'm most excited about with this Diverse Intelligence tool we're going to build is I think we're going to discover new types of intelligence. I think there are species that have been ignored or have never been studied in how they interact with the world psychologically. And when you have the ability to get lots of people excited and working together, I think that's the first thing that becomes possible is, we're going to discover some new types of intelligence either they're they're going to be species that can solve problems we didn't know they could solve or maybe even there's it's like a completely new way to solve problems that we are unaware of.

So if we're talking about where we are in the history of understanding cognitive evolution, to the exclusion of humans, so just the evolution of cognition on this planet? I mean yeah, I mean, we're at the very, I would say we're in an infancy. We're...you know, are we crawling? I'm not sure! And the hope is that you know this effort will get us crawling and maybe even running if we're lucky.

With these phylogenetic comparisons we're going to find intelligence, flexibility, sophistication, where we least expect it. For instance watch out for -- um, I'm pretty sure we're going to find some fish doing some things that even primates are struggling with. I love that! And then even more theoretically, what we're gonna be able to look at for the first time is some competitions between explanations.

So a website like ours, somebody will be able to go in and find the right resource no matter where it is in the world to design their experiment, to do it better and really launch our science forward. With lots of people working together and all crowdsourcing data, what is absolutely possible becomes extremely feasible.

It ends up that the genetics of human friendliness is supported by literally hundreds if not thousands of different genes, so we're going to have to use other strategies for ourselves. I do think that learning this, you know, points to important lessons for our species for sure.

Lessons from dogs um, be nice. Um, don't bite. The thing that everybody loves about dogs of course is that they're so optimistic, just so forgiving, and uh, and you know, loving. So um, you know, I hope I can be the person my dog thinks I am. I think we'd all be better if we could manage it.

Tavia Gilbert: I want to take the liberty of dedicating this episode to Marlin, the best dog that ever was, and to Richard Sergay's beloved goldens, Bert and Ernie, and all of your best dogs, dear listeners, and to all the diverse beings on our beautiful, incredible planet.

Next week we bring you another conversation about Diverse Intelligences, about understanding social cognition in autism. One of the researchers we'll hear from is Dr. Catherine Crompton:

Catherine Crompton: Now, traditionally the clinical diagnosis has been and still is that autism is, is at its core a communication deficit, something that causes real deficits in communication with other people and social interaction. What we've found is that autistic people have just as good interactions with other autistic people as non-autistic people do.

Tavia Gilbert: We look forward to bringing you more from that conversation next week. In the meantime, we hope you've enjoyed today's Story of Impact. If you liked this episode, we'd love it if you would take a moment to subscribe, rate and review, and share our podcast. Your support helps us reach new audiences. And remember, for more stories and videos, please visit storiesofimpact.org.

This has been the Stories of Impact podcast, with Richard Sergay and Tavia Gilbert. This episode written and produced by Talkbox and Tavia Gilbert. Assistant producer Katie Flood. Music by Aleksander Filipiak. Mix and master by Kayla Elrod. Executive Producer Michele Cobb.

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