

by Sue M. Copeland

COOPERATIVE COMMUNICATION SKILLS MAY LINK YOU TO YOUR DOG IN A WAY THAT EXCEEDS THE APE/CHIMP EVOLUTIONARY TIE.

In the bowels of Emory University's psychology lab, Brian Hare's frustration was mounting. It was the mid-1990s. For what seemed the thousandth time, the then 19-year-old anthropology student covered a morsel of food on the linoleum floor with an inverted Solo-type cup. Three feet away, he inverted a second cup without food; it would be the "dummy" cup.

Brian was helping renowned Developmental Psychologist Dr. Michael Tomasello study social cognition in primates, which would help the doctor learn more about human cognition--and what makes humans unique as a species. The cup test would gauge "gestural inference" in primates; also known as gestural communication. The ability to follow gestures, such as a pointed finger, is key to being human. In babies, it forms the basis of skills such as language.

A young chimpanzee was the current primate being humanely studied to answer one of Dr. Tomasello's key questions, "Was gestural inference unique to humans?" Brian quietly brought the animal into the room. He silently pointed to the cup atop the food morsel. The chimp watched him intently, trying to determine what the young man wanted him to do. He slowly moved toward the cup without the food. Brian tried again, and again, as he had with previous primates in the study. Half the time the chimp would go to the dummy cup. The other half, he'd head toward the cup with food. As with other primates, this one's random reactions told Brian that rather than following his pointed finger, the chimp was guessing which cup to go to. Finally, he walked the chimp back



An AKC CHF-funded study showed that dogs follow human gestures (such as the pointed finger in this photo from the study) better than chimps or other apes. "We discovered, thanks to our study, that dogs are performing much more like kids in these kinds of settings, than are chimpanzees," says Dr. MacLean.

into its enclosure and trudged to Dr. Tomasello's office to report the latest failure. "Ah," mused the doctor after hearing Brian speak, "I think it's becoming clear that only humans understand gestural inference."

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An exasperated Brian retorted, "No, it's not-my dog can do that!"

Enter Oreo, Brian's Labrador Retriever. He, with Brian, would help trigger studies that turned anthropology on its ear by proving dogs evolved beside man to become more human-like in some ways than chimps and other apes.

Cognitive Evolution

"My dog, Oreo, loved to chase balls," recalls Brian (now Dr. Brian Hare, Professor of Evolutionary Anthropology at Duke University, and Founder/Co-Director of the Duke Canine Cognition Center). "We had a game: I'd take several balls and keep them in play. He'd run after one, and before he brought it back, I'd throw another one. That meant he didn't always know where the balls were," he continues, "So, he'd stand in front of me and bark. I'd point in their direction, and Oreo'd run that way to find them."

You're probably saying to yourself, "Of course, he did—that's what dogs do!" But, according to Dr. Hare, the ability of dogs to read and respond to human gestures has turned out to be remark-

BUILDING ON THE BOND

n addition to sharing an evolutionary bond, canines and humans share a hormonal one. Dr. Evan MacLean was part of a study in which it was found that oxytocin, the hormone tied to mother-child and long-term human relational bonding, helps cement your bond with your dog in a way similar to a parent-child connection.

"We and others have done studies that found when dogs and people interact in a friendly way, even if it's only through eye contact, both get an oxytocin release," Dr. MacLean says, "That might enhance human-canine bonding, just as it enhances human-to-human bonding. Our relationships with dogs are quite often like that of a parent and child. There are studies with mothers, in which you put them



in a brain scanner, show them images of their kids, then show them images of their dogs, and you get activity in the same brain areas."

"It suggests, on a broad level, that we think about and process information about our dogs in a way similar to how we process information about our kids," he continues.

This cross-species relationship is unique, at least for now. "Canines are the first species in which we've found this oxytocin connection to humans," Dr. MacLean further explains, "Dogs are the perfect recipe for getting into our brains and triggering parental instincts."



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able. So remarkable that Dr. Tomasello (who was not a dog owner) was skeptical of Oreo's ability to do so.

"He told me, 'All owners think their dog's so smart it can do higher math," Dr. Hare laughed. When Oreo aced the point-to-the cup test for Dr. Tomasello, by repeatedly following Brian's gestures, the doctor became a believer. That simple demonstration by the then 19-year-old assistant and his dog led to some amazing discoveries years later. "We found, several years ago, through a large-scale canine-cognition study funded by the AKC Canine Health Foundation (*akcchf.org*), that was modeled after previous studies with humans and apes, that dogs use cooperative communication in a way not seen in other animals," says Dr. Hare.

"It's not only because we know through those previous studies that chimps and other apes can't solve these same problems using gestures in a cooperative, communicative way," he says, "But we also know this ability is crucial to being human. Babies develop the skill between nine and 12 months of age." He continues, "It's that ability that allows you to start participating in human culture, including learning language."

Dr. Evan McLean, Assistant Professor of the School of Anthropology, Dept. of Psychology, at University of Arizona, and Director of the Arizona Canine Cognition Center, was part of the team that worked on the CHF-funded study. "Developmental psychologists argue that the most important thing human babies do, even before they have language, is use gestural communication to begin to share and experience the world in a social way. For instance, a baby will see something he or she is interested in and point to it. A parent will then say the object's name. That's a very early moment in the way humans cooperate," he explains, "In field studies going back over 50 years, it's never been observed that chimps use pointing to communicate. That's where the dogs come in: We discovered, thanks to our CHF-funded study of dogs, that they are performing much more like kids in these kinds of settings, than are chimpanzees."

Dr. Hare adds, "If someone asked me, 'What animal is most

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like a human kid?' I'd say it's a dog. Because, of all the species on this planet, it turns out the one that has the gift of reading human intentions and understanding what we want is the canine."

It's not just adult dogs. "Our study found that puppies begin solving basic problems by following gestures at about 6 to 8 weeks of age," says Dr. MacLean, "That suggests they might be born 'biologically prepared' with this skill, rather than it being a learned behavior."

Studies also show that wolves and wolf pups lack this intraspecies, cooperative-communication ability. "You can train wolves to follow human gestures," explains Dr. MacLean, "But in our study, we wanted to know what each species brought to the table, rather than what can be taught through operant conditioning."

"As a result, we concluded that canine cooperative communication is likely related to domestication," Dr. Hare says, "But, we lacked a direct link to that." Enter the Siberian foxes.



"Our study showed that dogs' cognitive evolution alongside humans enables them to read the meaning of human gestures and emotions much as human babies do," says Dr. Hare.

Friendly Like a Fox

In 1959, Soviet Union scientists began experimentally domesticating Siberian red foxes. The experiment was designed to replicate the domestication of wolves to dogs. Foxes in the study were bred in three groups: friendly foxes; fearful, aggressive foxes; and a control group.

"In the last 60 years," says Dr. MacLean, "the friendly foxes – selectively bred for a positive emotional response to people – started changing in ways that you see in domesticated dogs. That includes physical changes, such as floppy ears, curly tails, and coat color, even though those traits weren't selected for in the foxes."

"I went to Siberia to see those foxes," Dr. Hare says, "Not only were they friendly, but they also were fabulous at the same games I played with my dog, Oreo. They read my gestures, even though they weren't selected to be smart. What I learned from this experi-



Adult dogs aren't the only ones who can solve basic problems by following human gestures. The AKC Canine Health Foundation-funded study found that puppies begin to do the same at about 6 to 8 weeks of age. Says Dr. MacLean, "That suggests they might be born 'biologically prepared' with this skill, rather than it being a learned behavior."

ence—and it shocked me—was that if you want a clever fox, you don't select for cleverness, you select for friendliness. Then you get a socially savvy fox. This experiment in Siberia used human artificial selection to show the power of survival of the friendliest." That underscored the power of domestication in nature.

"Domestication selects for animals that want to be near and around people," explains Dr. Hare, "Dogs evolved from wolves that were the least fearful of humans. Those wolves hung out around people, eating their garbage. Over tens of thousands of years, each species succeeded by developing cooperative-communication skills--humans with other humans, and wolves with humans. Along with evolution and domestication came dogs' ability to relate to human communication—and respond to human emotion. "

"Our study showed that dogs' cognitive evolution alongside humans enables them to read the meaning of human gestures and emotions much as human babies do," Dr. Hare continues, "So, even though humans are often compared to chimps and other apes due to DNA, the study found that chimps and other apes remain wild—they've not been domesticated by humans, and therefore lack the cooperative communication skills with humans that dogs have."

Studying Dogs Helps Humans

Ironically, dog evolution is helping anthropologists such as Drs. Hare and MacLean study humans. "I study dogs to better understand humans," says Dr. Hare. "Fifty thousand years ago, there were multiple species of humans," he continues, "How did our species turn out to be the ultimate survivor? It was, again, survival of the friendliest. Humans that would live and work together to solve problems could out-compete humans that wouldn't." Dr. MacLean adds, "Domestication is now being thought of as selection against fear and aggression. Humans

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may have gone through a domestication-like event themselves, with selection for cooperative, docile temperaments, just as dogs did. I was surprised with the human-dog similarities we found in our studies. That's a huge step forward in science to me."

The bottom line? "Whether it's natural selection or domestication," says Dr. MacLean, "the results are similar.

> This may account for the similarity between humans and dogs." Beyond in-



Dr. Brian Hare

https://www.brianhare.net/bio/ Professor of Evolutionary Anthropology at Duke University, and Founder/Co-Director of the Duke Canine Cognition Center

creasing our understanding of canine cognition, and of our dogs' unique and special relationship to humans, the information from this and other AKC Caning

humans, the information from this and other AKC Canine Health Foundation-funded canine health and behavioral studies can be applied for broader purposes. These include the selection and breeding of service and detection dogs, as well as studies on canine/human health and disease.

For instance, dogs and humans get many of the same cancers, which has sparked joint research efforts between the veterinary and medical fields, collectively known as "One Health." Dr. MacLean explains, "Dogs have turned out to provide a really interesting example for almost every aspect of human biology."

Dr. Evan MacLean https://www.dogs.arizona.edu/people/drevan-maclean Assistant Professor, School of Anthropology, Department of Psychology, at University of Arizona, and Director, Arizona Canine Cognition Center



"The remarkable findings of these two scientists, Drs. Hare and MacLean, con-

tribute greatly to our understanding of canine behavior, building on our ability to better care for the development, health, and wellbeing of working dogs, as well as the dogs with whom we share our lives," says Dr. Diane Brown, chief executive officer and chief scientific officer for the AKC Canine Health Foundation, "Such scientific research ultimately benefits both species, and there is so much more to be done."



Dr. Diane Brown http://www.akcchf.org/aboutus/who_we_are/diane-brown-dvm-phddacvp.html Chief Executive Officer AKC Canine Health Foundation

ABOUT THE EXPERTS

To Learn More:

MacLean, E. L., Herrmann, E., Suchindran, S., & Hare, B. (2017). Individual differences in cooperative communicative skills are more similar between dogs and humans than chimpanzees. *Animal Behaviour*, 126, 41–51. *https://doi.org/10.1016/j.anbehav.2017.01.005*

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http://www.akcchf.org/research/researchportfolio/2518.html



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