

TIME

The Secrets Inside Your Dog's Mind

By **CARL ZIMMER** Monday, Sep. 21, 2009



Hare and greyhound pal Bruno take a deserved break.
D.L. Anderson for Time

Brian Hare, assistant professor of evolutionary anthropology at Duke University, holds out a dog biscuit.

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"Henry!" he says. Henry is a big black schnauzer-poodle mix--a schnoodle, in the words of his owner, Tracy Kivell, another Duke anthropologist. Kivell holds on to Henry's collar so that he can only gaze at the biscuit.

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"You got it?" Hare asks Henry. Hare then steps back until he's standing between a pair of inverted plastic cups on the floor. He quickly puts the hand holding the biscuit under one cup, then the other, and holds up both empty hands. Hare could run a very profitable

shell game. No one in the room--neither dog nor human--can tell which cup hides the biscuit.

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Henry could find the biscuit by sniffing the cups or knocking them over. But Hare does not plan to let him have it so easy. Instead, he simply points at the cup on the right. Henry looks at Hare's hand and follows the pointed finger. Kivell then releases the leash, and Henry walks over to the cup that Hare is pointing to. Hare lifts it to reveal the biscuit reward.

See TIME's photoessay " Puppies Behind Bars".

Henry the schnoodle just did a remarkable thing. Understanding a pointed finger may seem easy, but consider this: while humans and canines can do it naturally, no other known species in the animal kingdom can. Consider too all the mental work that goes into figuring out what a pointed finger means: paying close attention to a person, recognizing that a gesture reflects a thought, that another animal can even have a thought. Henry, as Kivell affectionately admits, may not be "the sharpest knife in the drawer," but compared to other animals, he's a true scholar.

See TIME's photoessay "Color My Dog!"

It's no coincidence that the two species that pass Hare's pointing test also share a profound cross-species bond. Many animals have some level of social intelligence, allowing them to coexist and cooperate with other members of their species. Wolves, for example--the probable ancestors of dogs--live in packs that hunt together and have a complex hierarchy. But dogs have evolved an extraordinarily rich social intelligence as they've adapted to life with us. All the things we love about our dogs--the joy they seem to take in our presence, the many ways they integrate themselves into our lives--spring from those social skills. Hare and others are trying to figure out how the intimate coexistence of humans and dogs has shaped the animal's remarkable abilities.

Trying to plumb the canine mind is a favorite pastime of dog owners. "Everyone feels like an expert on their dog," says Alexandra Horowitz, a cognitive scientist at Barnard College and author of the new book *Inside of a Dog: What Dogs See, Smell, and Know*. But scientists had carried out few studies to test those beliefs--until now.

This fall, Hare is opening the Duke Canine Cognition Center, where he is going to test hundreds of dogs brought in by willing owners. Marc Hauser, a cognitive psychologist at Harvard University, recently opened his own such research lab and has 1,000 dogs lined

up as subjects. Other facilities are operating in the U.S. and Europe.

The work of these researchers won't just satisfy the curiosity of the millions of people who love their dogs; it may also lead to more effective ways to train ordinary dogs or-- more important--working dogs that can sniff out bombs and guide the blind. At a deeper level, it may even tell us something about ourselves.

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Evolving Gifts

Hare suspects that the evolutionary pressures that turned suspicious wolves into outgoing dogs were similar to the ones that turned combative apes into cooperative humans. "Humans are unique. But how did that uniqueness evolve?" asks Hare. "That's where dogs are important."

The first rule for scientists studying dogs is, Don't trust your hunches. Just because a dog looks as if it can count or understand words doesn't mean it can. "We say to owners, Look, you may have intuitions about your dog that are valuable," says Hauser. "But they might be wrong." [See TIME's video "The New Frugality: Doggie Day Care."](#)

Take for instance the kiss a dog gives you when you come home. It looks like love, but it could also be hunger. Wolves also lick one another's mouths, particularly when one wolf returns to the pack. They can use their sense of taste and smell to see if the returnee has caught some prey on its journey. If it did, the licking often prompts it to vomit up some of that kill for the other members of the pack to share. The kiss dogs give us probably evolved from this inspection. "If we happened to spit up whatever we just ate," says Horowitz, "I don't think our dogs would be upset at all." [See TIME's video "The March of TIME: Hunting Dog Field Trials."](#)

Horowitz and other scientists are now running experiments to determine what a behavior, like a kiss, really means. In some cases, their research suggests that our pets are manipulating us rather than welling up with human-like feeling. "They could be the ultimate charlatans," says Hauser.

We've all seen guilty dogs slinking away with lowered tails, for example. Horowitz wondered if they behave this way because they truly recognize they've done something wrong, so she devised an experiment. First she observed how dogs behaved when they did something they weren't supposed to do and were scolded by their owners. Then she tricked the owners into believing the dogs had misbehaved when they hadn't. When the humans scolded the dogs, the dogs were just as likely to look guilty, even though they were innocent of any misbehavior. What's at play here, she concluded, is not some inner sense of right and wrong but a learned ability to act submissive when an owner gets

angry. "It's a white-flag response," Horowitz says.

While this kind of manipulation may be unsettling to us, it reveals how carefully dogs pay attention to humans and learn from what they observe. That same attentiveness also gives dogs--or at least certain dogs--a skill with words that seems eerily human.

Juliane Kaminski of the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany, began exploring the verbal gifts of dogs when she saw a television show about a border collie named Rico--an animal that to all appearances could fetch dozens of different objects in response to their names. Kaminski put Rico to a rigorous test and confirmed that the dog could learn names for more than 200 toys, balls and other items. "I think Rico is a highly talented dog," says Kaminski, "but we've also found new dogs that do what Rico did."

That doesn't mean that the dogs understand the words the way we think they do. When they hear "Frisbee," they may think only, Get the Frisbee. Unlike us, they may not be able to recognize that Frisbee is a word for a distinct object that can be combined with other words to create sentences like "Run away from the Frisbee."

Going to the Dogs

Some scientists acquired their fascination with dogs directly, but Hare's grew out of his research on chimpanzee cognition in the late 1990s, when he was part of a team of primatologists led by Michael Tomasello, now at Max Planck. A chimp can follow the gaze of other chimps and figure out what they can and cannot see. That's a skill that seems to be limited to great apes and humans. Tomasello and his team wondered if such a rare ability extended to hand gestures and tested chimps to see if they could understand pointing. To their surprise, the chimps did badly, able to learn the meaning of a pointed finger only after lots of training.

The apparent explanation for these results was that pointing--and the social smarts behind it--required a humans-only level of intelligence and evolved in our ancestors only after they branched off from the ancestors of chimpanzees some 7 million years ago. When Tomasello suggested this idea to Hare, however, Hare demurred. "I said, 'Um, Mike, I think my dogs can do that,'" Hare recalls.

Hare's later research revealed that while chimps and even wolves lack an innate ability to understand what pointing means, dogs come by the knowledge naturally. They're not limited to reading hands and fingers alone. Dogs understand what Hare means if he points with his foot or sets a piece of wood on top of a container with food inside. Even puppies understand, which means it can't be a skill they need to learn. "This is something that dogs just do," says Hare.

Foxy Dogs

To understand how dogs evolved this skill, Hare traveled to Siberia. In the 1950s, Soviet scientists set up an experiment on a farm outside the city of Novosibirsk to understand

how animals were domesticated. They decided to study foxes, which are closely related to wolves and dogs.

The Russians began by breeding a group of foxes according to one simple rule: they would walk up to a cage and put a hand on the bars. Foxes that slunk back in fear and snapped their teeth didn't get to breed. Ones that came up to the scientists did. Meanwhile, the scientists also raised a separate group of foxes under identical conditions, except for one difference: they didn't have to pass a test to mate.

More than 40 generations of foxes have now been bred in Novosibirsk, and the results speak for themselves. The foxes that the scientists bred selectively have become remarkably doglike. They will affectionately run up to people and even wag their tails. In 2003, Hare traveled to Novosibirsk and ran his pointing test on baby foxes. The ordinary ones failed miserably. As for the doglike ones, "they did just as well as puppies right out of the box," Hare says. As the animals were bred for their affability, a new side of their social intelligence was apparently awakened.

If foxes are a guide, dog evolution may have begun with a similar shift in personality. Ancestors of dogs could cooperate to hunt, but the cooperation had limits. Wolves are fiercely competitive, as each one tries to claw its way to the top of the pack. Hare proposes that aggressive wolves evolved to have an easygoing personality thanks to a new opportunity: trash.

As humans became better at hunting, they left scraps around their gathering spots. When they departed, the ancestors of dogs could move in. At first, when humans and wolves came into contact, many of the animals ran away. Others lashed out and were killed. Only the affable animals had the temperament to become camp followers, and their new supply of food let them produce affable puppies. "They selected themselves," says Horowitz.

Once dogs became comfortable in our company, humans began to speed up dogs' social evolution. They may have started by giving extra food to helpful dogs--ones that barked to warn of danger, say. Dogs that paid close attention to humans got more rewards and eventually became partners with humans, helping with hunts or herding other animals. Along the way, the dogs' social intelligence became eerily like ours, and not just in their ability to follow a pointed finger. Indeed, they even started to make very human mistakes.

A team led by cognitive scientist Josef Topál of the Research Institute for Psychology in Hungary recently ran an experiment to study how 10-month-old babies pay attention to people. The scientists put a toy under one of two cups and then let the children choose which cup to pick up. The children, of course, picked the right cup--no surprise since they saw the toy being hidden. Topál and his colleagues repeated the trial several times, always hiding the toy under the same cup, until finally they hid it under the other one. Despite the evidence of their eyes, the kids picked the original cup--the one that had hidden the toy before but did not now.

To investigate why the kids made this counterintuitive mistake, the scientists rigged the

cups to wires and then lowered them over the toy. Without the distraction of a human being, the babies were far more likely to pick the right cup. Small children, it seems, are hardwired to pay such close attention to people that they disregard their other observations. Topál and his colleagues ran the same experiment on dogs--and the results were the same. When they administered the test to wolves, however, the animals did not make the mistake the babies and dogs did. They relied on their own observations rather than focusing on a human.

One question the research of Topál, Hare and others raises is why chimpanzees--who are in most ways much smarter than dogs--lack the ability to read gestures. Hare believes that the chimps' poor performance is one more piece of proof that the talent is rooted not in raw intelligence but in personality. Our ape cousins are simply too distracted by their aggression and competitiveness to fathom gestures easily. Chimps can cooperate to get food that they can't get on their own, but if there's the slightest chance for them to fight over it, they will. For humans to evolve as we did, Hare says, "We had to not get freaked out about sharing."

Deeper understanding of the mind of the dog will come with more testing, and Hare and other researchers are planning it--on a grand scale. They're designing new experiments to compare different breeds and to search for genes that were transformed as the animals' social intelligence evolved. Plenty of dog owners are signing up for the studies Hare will be launching this fall. "We'd be happy with thousands," he says.

The biggest challenge to the new experiments, Hare says, will be not the giant pack of dogs he'll be studying but their anxious owners. "When a puppy does badly, people get upset," says Hare. "You have to emphasize that this is not the SATs."

Perhaps that's the most telling sign of just how evolved dogs are. They have us very well trained.