

What We're Learning From the World's Smartest Dog

With a 1,000-plus word vocabulary, Chaser may be the most important dog in the history of modern scientific research. While dogs can develop the mental capacity of a 2-year-old toddler, she has learned more than three times the number of words. What's the secret sauce in her specialness?

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STORY AT-A-GLANCE

- A 2014 60 Minutes video segment about the canine brain and intellect features the brilliant Border Collie, Chaser, and her human, John Pilley, in an interview with Anderson Cooper
- In the segment, Cooper also interviews canine behavior experts Brian Hare of Duke University, developer of the Dognition website, and Gregory Berns of Emory University, who developed a technique for running fMRI brain scans on alert, non-sedated dogs to watch their brains in action
- Hare believes Chaser to be the most important dog in the history of modern scientific research; however, he also suspects that the secret sauce in her specialness was Pilley's willingness to spend so much time with her, helping her to learn words

In the 2014 60 Minutes video clip above, broadcast journalist Anderson Cooper discusses the fascinating topic of dog smarts, first with retired psychology professor Dr. John Pilley, owner of "The Smartest Dog in the World," Chaser the Border Collie.

Chaser's 1,000+ Word Vocabulary

Pilley explains that he views Chaser as his child, and it's clear he spends more time interacting with her than most parents spend with their human children — up to 5 hours a day, 5 days a week. It has become common knowledge that dogs can develop the mental capacity of a 2-year-old toddler, and that's exactly how Pilley views Chaser.

But as Cooper points out, while most 2-year-old children know about 300 words, Chaser learned over three times that number under the tutelage of Pilley. To expand her word knowledge, Pilley used toys. Lots of them, e.g., 800 stuffies, 116 different balls, and more than 100 plastic toys — a total of 1,022 toys in all, each with its own name.

Pilley published the results of his work with Chaser in a 2010 study in *Behavioural Processes*, his dog became famous, and a book, **Chaser: Unlocking the Genius of the Dog Who Knows a Thousand Words**, followed in 2013.

Not satisfied with teaching his dog only nouns, Pilley moved on to verbs, and noun/verb combinations such as "Take [name of toy]," "Paw [name of toy]," and "Nose [name of toy]." Chaser learned the difference between taking (picking up) a named toy, pawing it, and nosing it.

Chaser Is the Most Important Dog in Modern Research

Cooper also interviewed Brian Hare, an evolutionary anthropologist at Duke University. Hare runs the Canine Cognition Center at Duke, and is the developer of the Dognition website, which asks online participants to play games (created by scientists, trainers and behaviorists) with their dogs. Hare believes dogs, like humans, have multiple types of intelligence. Dognition assesses a dog's empathy, communication, cunning, memory, and reasoning.

Regarding Pilley's work with Chaser, Hare says, "It's the closest thing in animals we've seen to being like what young children do as they're learning words." He believes Chaser is the most important dog in the history of modern scientific research.

"This is very serious science," says Hare. "We're not talking about 'stupid pet tricks' where people have spent hours just trying to train a dog to do the same thing over and over. What's neat about what Chaser's doing is, Chaser is learning tons — literally thousands of new things — by using the same ability that kids use when they learn lots of words."

What Hare's talking about is "social inference," says Cooper. It's a capability human children acquire at about one year of age. When they start to understand the meaning of pointing gestures, it's the same point in time when the foundations of what lead to language and culture start to develop.

Interestingly, Hare has demonstrated that Bonobo apes — the closest genetic relative to humans — cannot grasp the meaning of pointing, but dogs can. Understanding human pointing gestures is really hard for a lot of animals, says Hare, which makes dogs just that much more special due to their similarities to human toddlers.

The idea that dogs are capable of inferential reasoning is a quite recent scientific discovery, according to Hare.

"That's what's new, that's what's shocking," he explains, "that of all the species, it's dogs that are showing a couple of abilities that are really important that allow humans to develop culture and language."

fMRI Scans of the Canine Brain Are Enlightening

Cooper also talked with Gregory Berns, a physician and neuroscientist at Emory University, who has studied the human brain for more than two decades. Questions Berns had about his own dog inspired him to begin studying the canine brain and he was able to do something other researchers had not.

He perfected the ability to conduct fMRI brain scans on dogs who are wide awake (not sedated), which requires 3 to 4 months of training the animals to lie absolutely still inside the scanner and respond to requests.

Berns gave Cooper a demonstration with volunteer Tigger, a well-trained Boston Terrier, who ran right up the steps and into the scanner when invited. While inside, Tigger was presented with cotton swabs containing different odors, for example, the underarm sweat of a stranger, and that of his owner.

The scans showed the dog's brain lit up in its "smell center" in response to the swabs. But when he got a whiff of his owner's sweat, a second area of Tigger's brain lit up — the "reward center."

Berns believes this means Tigger is experiencing more than, say, the good feeling that comes with a meal, but also shows the dog is recognizing someone who is extremely important to him. It's the same area in the human brain that activates when we listen to a favorite song or anticipate being with someone we love.

Hare explains that when dogs and their humans make eye contact, play, or touch, there's a release of the "love hormone" oxytocin in both.

"What we know now is that when dogs are actually looking at you, they're essentially hugging you with their eyes," says Hare. "It's not just that when a dog is making a lot of eye contact that they're just trying to get something from you. It actually is probably really enjoyable for them, because they get an uptick in oxytocin, too."

Chaser Excels in Some Areas, but Not in Others

As I mentioned earlier, Hare is the developer of the Dognition website, which asks online participants to play games (created by scientists, trainers and behaviorists) with their dogs. Hare believes dogs, like humans, have multiple types of intelligence. For example, his own dog isn't so great at remembering things, but is a very good communicator. Dognition assesses a dog's empathy, communication, cunning, memory, and reasoning.

As you might guess, Chaser's Dognition results were stunning. Researchers placed 10 items the dog could already identify in a pile with an unfamiliar one and asked her to fetch the one she had not yet learned. She did so correctly because she was able to infer that the item being asked for was the only item she didn't recognize. Even more astonishing was that a week later when asked to retrieve the same item, Chaser remembered.

In the areas of reasoning and memory, Chaser scored "off the charts" according to Hare. However, in the areas of empathy and communication — characteristics that pet owners dearly love about their dogs — Chaser's results were "totally uninteresting," says Hare.

Chances Are, There Are Lots of Chasers Out There

Finally, Cooper asks Hare if Chaser is "just an Einstein of dogs." Hare replies that rather than assume Chaser is simply special compared to other dogs, it's much more likely that what was special was Pilley's willingness to spend so much time with his dog, playing games to help her learn words.

"But are there lots of Chasers out there?" asks Hare. "Absolutely."

As I mentioned at the beginning of this article, the 60 Minutes video segment was filmed in 2014, when Chaser was 10, and John Pilley was 86. Sadly, Mr. Pilley passed away in June 2018, two weeks before his 90th birthday. Chaser died a year later on July 23rd, 2019, at age 15, surrounded by loved ones in her hometown of Spartanburg, South Carolina.

Sources and References

¹ [Pilley, J.W. and Reid, A.K. Border collie comprehends object names as verbal referents, Behavioural Processes, 2011 Feb;86\(2\):184-95](#)