One morning, my dad looked at the newspaper at the bottom of our long, steep driveway and decided that Oreo ought to start fetching it. Oreo was seven at the time, and I remember thinking that he was too old to learn new tricks.

Dad went to the bottom of the driveway, pointed to the newspaper, and said, "Fetch paper!" The Sunday paper was so heavy that Oreo's head sagged with the weight, but he wagged his tail when Dad patted his head and said, "Good boy!"

Dad repeated this exercise each morning for a week. By the following Sunday, Dad just stood at the top of the driveway and said "Fetch paper!" and Oreo ran down the driveway to get it. And just like that, Dad had a dog who could fetch the paper. I remember being amazed that it had not taken a hundred mornings to teach Oreo to retrieve the paper and wondering how he had learned the word so quickly.

To answer this question, we need to revisit the story of Rico, who could remember hundreds of names for toys, and Chaser, who could remember more than a thousand. These dogs discussed in Chapter 1 were found to be capable of learning words through a process of exclusion. When Rico or Chaser heard a new word, each inferred

that it was for a new toy. So they brought back a toy that they had not yet learned a name for. Both dogs could remember the name–object pairings for a minimum of ten minutes after only hearing the new sound twice. Rico could remember some new names a month later. Amazingly, with very little practice, Chaser remembered all the words she was taught—and her vocabulary just kept growing.

Rico and Chaser's ability to use exclusion to link new human-made sounds to new objects and to remember so many of these names for so long is the closest thing researchers have seen to how children learn words.

However, when children learn a word like *sock,* they do not just associate the noise *sock* with one object that happens to be a sock. Instead, they understand that the name *sock* refers to all objects that function as clothing for our feet. The word *sock* represents a category of objects that can be different colors, shapes, textures, and sizes. The original study with Rico did not address the question of whether he understood that words refer to categories of objects. This led developmental psychologist Paul Bloom at Yale University to suggest that it is likely that "babies learn words and dogs do not."

Chaser's owner, John Pilley, designed a study with Chaser to address this concern. Pilley used different categories of toys: Frisbees, balls, and random dog toys of different sizes and shapes.

After Chaser knew the names of hundreds of toys from the different categories, Pilley introduced a new test, where he set out toys that were all from the same category—either Frisbee or ball. He then asked Chaser to fetch the toys by saying "Fetch the . . ." followed by the category.

Because all the toys belonged to the same category, Chaser was rewarded with praise regardless of which toy she retrieved. After she

did this three times with a group of toys from each category, Pilley mixed toys from the different categories that had not been used in the introduction. He then asked Chaser to either fetch a Frisbee or a ball. Even though Chaser had never been tested with the toys this way, she always brought back the toy from the category Pilley had requested.

As a bigger challenge, Pilley did the same thing for a set of objects Chaser was familiar with from home, like shoes and books. Pilley put out some of these objects that had never functioned as toys, along with a random set of her toys, and asked Chaser to retrieve either a "toy" or a "non-toy." Again, Chaser never made a mistake. It seems that while Chaser was learning the names of each new toy, like a human child, she also spontaneously placed each toy into categories (toy and non-toy) as well as subcategories (Frisbee, ball, and other).

As impressive as this might seem, a developmental psychologist would still be doubtful that dogs are learning words. This is because children also understand the symbolic nature of words. One of the simplest demonstrations of children's understanding of symbols is their ability to see the link between an object and a visual replica of the object. For example, if an experimenter hides a toy inside a triangular container, then shows a child a small replica of the triangular container, the child immediately understands to search inside the triangular container for the toy instead of other containers of different shapes. Children also learn that two-dimensional pictures can represent three-dimensional objects. They know that a toy that is one centimeter in a photo is much larger in real life.

We often use these layers of meaning when we communicate. Cuneiform was among the first written languages and consists of a series of pictographs. Computer icons are just another example of

a symbolic system. Anyone who wants to print a document looks for the tiny replica of a printer on the toolbar. The designer employed an icon as an effective, succinct method of communicating the act of printing.

Juliane Kaminski, who did the original Rico studies, wanted to know if dogs could spontaneously use visual replicas as symbols. She designed a test similar to the one used with children. As in previous tests of Rico, Kaminski placed toys in a different room and asked Rico and several other Border collies to retrieve the toys one by one.

This time, Kaminski did not request the toys using words. Instead, she showed the dogs replicas of the toys and asked them to fetch. If the dogs understood the communicative nature of her request, they should retrieve the correct toys based on the visual representation.

When I first heard Kaminski was conducting this experiment, I thought there was no way a dog would spontaneously understand the link between a symbol and a toy. Happily, I was wrong.

All the dogs spontaneously retrieved a toy that was represented by the replica. If Kaminski showed them a hot-dog toy, they went into the next room and brought back the matching hot-dog toy. Most of the dogs did this whether the replica was the same size as the toy or a miniature version of it. Rico and one other dog even retrieved the correct toy on their first trial when they were only shown a photograph of the toy. This spontaneous performance could only be possible if the dogs combined their understanding of our communicative intentions with an understanding of the symbolic nature of our helpful behavior.

The latest experiments show that at least some dogs understand the categorical and symbolic nature of human communicative

signals. Rico, Chaser, and several other dogs clearly show that at least some dogs use a variety of communicative skills that continue to match what we see in infants. No other species besides humans has demonstrated the ability to learn the meaning of words so quickly and with so much flexibility.

Every dog lover, including me, would love to know if these skills are somehow special to a handful of dogs or if most dogs have them. Since this research has only been conducted with Border collies, maybe these skills are found in only this breed.

But maybe Rico and Chaser are just the tip of the iceberg. The human parents of Rico and Chaser do not believe their dogs are unusually gifted. Neither dog was specially selected from a large pool of dogs who failed to show the same skills. Chaser, for instance, was randomly selected from a litter for the purpose of training her to participate in the studies. It would be quite a coincidence if the very first dog chosen just happened to break the world record for word learning.

A number of studies point to the possibility that a variety of dogs can make the type of inferences Rico and Chaser are using while fast mapping. Remember that dogs can make inferences based on exclusion when searching for a toy or when judging new pictures on a computer screen. Dogs also fail a complicated toy-finding game but can spontaneously infer the solution when an experimenter communicates it.

There is also evidence that dogs are able to learn the names for new objects by simply hearing a conversation between two people. Two people spoke about a new object repeatedly before asking a dog to retrieve it using the new name and rewarded the dog only with praise, rather than food. While these dogs did not learn nearly as fast as Rico or Chaser, they did learn the names of two new objects

as quickly by overhearing their names as when they were explicitly trained with more traditional food-rewarding techniques. It is likely, then, that most dogs learn to respond to a number of our words without any active training on our part.

Your dog may not be up to Rico and Chaser's level—or they might be above it. In any case, our pet dogs probably have some, if not all, of Rico and Chaser's inferential skills. We will know more as researchers continue studying the communicative skills of pet dogs.

As remarkable as dogs are at understanding us, this is just one side of communication. Communication does not just involve receiving information. Does the conversation go both ways?