

Does your dog understand when you say 'fetch the ball'? A new study in Hungary says yes

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Researcher Marianna Boros attaches electrodes to the head of Cuki, with during an experiment at the department of Ethology of the Eotvos Lorand University in Budapest, Hungary, on Wednesday, March 27, 2024. A new study in Hungary has found that beyond being able to learn how to perform commands, dogs can learn to associate words with specific objects — a relationship with language called referential understanding that had been unproven until now. Credit: AP

Photo/Denes Erdos

Many dog owners believe their pets understand and respond not only to commands such as "sit" and "stay," but also to words referring to their favorite objects. "Bring me your ball" will often result in exactly that.

But science has had trouble determining whether dogs and other animals genuinely activate a [mental image](#) in their minds when they hear the name of an object, something that would suggest a deeper grasp of language, similar to the kind that humans have.

A new study in Hungary has found that beyond being able to respond to commands like "roll over," dogs can learn to associate words with specific objects—a relationship with language called referential understanding that had been unproven in dogs until now.

"When we are talking about objects, objects are external to the dogs, and dogs have to learn that words refer, they stand for something that is external to them," said Marianna Boros, a [cognitive neuroscientist](#) and co-lead author of the study conducted by the Department of Ethology of the Eotvos Lorand University in Budapest.

The study, which has been peer reviewed, was published last Friday in the science journal *Current Biology*. It involved 18 dogs and a non-invasive EEG procedure using electrodes attached to dogs' heads to measure brain activity and register brain waves.



Rohan, the border collie has electrodes attached to his head during an experiment at the department of Ethology of the Eotvos Lorand University in Budapest, Hungary, on Wednesday, March 27, 2024. A new study in Hungary has found that beyond being able to learn how to perform commands, dogs can learn to associate words with specific objects — a relationship with language called referential understanding that had been unproven until now. Credit: AP Photo/Denes Erdos

Dog owners participating in the study would play an audio clip in which they said the name of their dog's toy—like "ball" or "frisbee"—and then they would show the dog an object. The researchers measured the dogs' [brain activity](#) when the object in the recording matched the object that was displayed, and also when it differed.

"We expected that if a dog really understands the meaning of the object's word, it will expect to see that object. And if the owner shows a different one, there will be a so-called surprise reaction in the brain," Boros said. "And this is exactly what we found."

The study found a different brain pattern when the dogs were shown an object that matched the word, compared to when it didn't—suggesting the animals conjured a mental image of an object based on hearing the word for it.

Lilla Magyari, also a cognitive neuroscientist and co-lead author of the study, said that while other animals have been shown to have some degree of referential understanding of language, those animals have typically been highly trained to do so.



Researcher Marianna Boros, left, attached electrodes to the head of Cuki the dog, during an experiment at the department of Ethology of the Eotvos Lorand University in Budapest, Hungary, on Wednesday, March 27, 2024. A new study in Hungary has found that beyond being able to learn how to perform commands, dogs can learn to associate words with specific objects — a relationship with language called referential understanding that had been unproven until now. Credit: AP Photo/Denes Erdos

In dogs, she said, the findings show that such capacities appear to be inborn and require no special training or talent.

The study supports "theories of language evolution which actually say that referential understanding is not necessarily unique to humans," added Magyari, who is also an associate professor at the University of Stavanger in Norway.

While the study has received praise, some experts have expressed doubts about its findings. Behavioral scientist and professor of psychology at Arizona State University, Clive Wynne, said in a post on Facebook that he believes that all the study shows is that dogs respond to stimuli—but that they don't actually understand the meaning of specific words.

Scientists believe the first dogs began to be domesticated by humans up to 30,000 years ago, and have lived closely alongside us ever since.



Researchers test Rohan, a border collie with her owner Paula Perez, during an experiment at the department of Ethology of the Eotvos Lorand University in Budapest, Hungary, on Wednesday, March 27, 2024. A new study in Hungary has found that beyond being able to learn how to perform commands, dogs can learn to associate words with specific objects — a relationship with language called referential understanding that had been unproven until now. Credit: AP Photo/Denes Erdos

But whether dogs acquired their apparent capacity to understand referential language during that evolution remains unclear.

Budapest resident Emese Doroszalai said during a walk with her dog in a city park on Wednesday that she usually teaches him commands for specific actions.

When told about the study, she said she hasn't given much thought to building her dog's vocabulary or teaching him names for objects.

But, she said, maybe the results of the study would change that.

More information: Neural evidence for referential understanding of object words in dogs, *Current Biology* (2024). [DOI: 10.1016/j.cub.2024.02.029](https://doi.org/10.1016/j.cub.2024.02.029). [www.cell.com/current-biology/fulltext/S0960-9822\(24\)00171-4](https://www.cell.com/current-biology/fulltext/S0960-9822(24)00171-4)

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