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What dogs can teach us about the origins of speech

Researchers are studying dogs' ability to control and change their voices in the hope of shedding light on one of evolution's biggest mysteries: the origins of human speech.

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For over 14 000 years, dogs have hunted with us, guarded livestock, herded sheep and, more recently, curled up beside us on the sofa. Along the way, they have become remarkably good at reading our gestures and picking up on our cues.

Now researchers think dogs might also help answer a much bigger question: how did humans become the only species capable of spoken language?

Dr Tamás Faragó, a bioacoustics researcher at Eötvös Loránd University in Budapest, has spent nearly two decades studying how dogs communicate through sound. Through K9VocLearn, a five-year research project backed by EU funding, he and his team are now considering whether domestication changed the way dogs use their voices – and what that might reveal about the evolution of human speech.

Why dogs?

The researchers are investigating whether thousands of years of living alongside humans gave dogs some of the building blocks of vocal learning – the ability to modify vocalisations by listening to others.

"Vocal learning is a unique ability in humans, and it is a very strong prerequisite for spoken language," said Faragó. "Without the ability to modify your vocalisations and learn new vocalisations to produce new sounds, you cannot really learn how to speak."

Humans take this ability extraordinarily far, learning and deliberately producing the huge range of sounds needed for spoken language. Only a small number of other mammals show anything similar. Dolphins, whales,

seals, bats and elephants can imitate or modify sounds to varying degrees, while great apes – our closest relatives – show much more limited vocal flexibility.

Dogs occupy a unique place in evolution – bred over thousands of years for particular traits that made them useful to humans.

“During domestication, dogs were selected for tameness, being socially tolerant with humans, and for being able to cooperate with humans for hunting, herding, livestock driving,” Faragó said.

Domestic cooperation

The researchers are exploring whether the same traits that made dogs increasingly cooperative and socially tolerant may also have affected their ability to control and alter the sounds they make.

“Dogs have a lot of social cognitive abilities very similar to humans and our ability to cooperate. That’s why we thought dogs might be a very good model for these early human evolutionary steps,” said Faragó.

This connects to an intriguing – but still debated – idea in evolutionary biology known as the self-domestication hypothesis. It proposes that, over the course of human evolution, selection favoured greater social tolerance and cooperation, producing some changes comparable to those seen when animals were domesticated.

If greater social tolerance also favours more flexible communication, studying what domestication did to dogs could offer clues to some of the evolutionary conditions that eventually helped make human speech possible.

One clue lies in how much dogs’ voices have changed from those of their wild ancestors. A 2023 study found that breeds genetically closer to wolves were more likely to respond to a howl by howling, while breeds more distantly related to wolves were more likely to bark.

Unlike wolves, dogs bark in almost any situation. Researchers Eötvös Loránd University believe this is a direct product of domestication, possibly because early humans favoured dogs that could raise the alarm vocally.

That shift, from a rare wolf behaviour to a constant, human-directed signal, is exactly what K9VocLearn is trying to explain.

Inside the lab

At the aptly named Budapest BARKS Lab (Behaviour and Acoustics Research for K9 Sounds), the researchers are building the most detailed picture yet of canine vocal communication.

Dogs are presented with situations designed to evoke a range of emotions. They play games, tackle simple learning tasks, experience brief separations from their owners and even come face-to-face with an inflated bin bag that “mysteriously” moves across the room.

Every bark, whine, growl and howl is recorded alongside behaviour and heart rate, helping researchers connect particular vocalisations with emotional states.

The next question is whether dogs can learn to produce some of these sounds voluntarily. The training sessions are designed by Dr Sára Sándor, a geneticist and qualified dog trainer.

“Currently we are running pilot trainings to develop our protocol,” she said, stressing that the researchers are focused on figuring out how to train dogs to vocalise and participate voluntarily. “You don’t want to put any pressure on the dogs. You don’t want to force them to do anything.”

Central to the approach is letting dogs choose whether to continue.

“We teach the dogs how to give consent, so if the dog feels the situation is stressful, or it feels tired, it can signal that it doesn’t want to continue. Vocal learning is tiring for dogs, so we need to keep sessions short and give them as much control as possible.”

Sound control

The goal is not to teach dogs to “talk” in the human sense, but to discover how much voluntary control they have over their own sounds. Rather than reading too much into a dog’s behaviour, Faragó’s team tests something more specific. Can a dog learn to produce, on cue, a whine it would normally make from excitement – without the ball that usually triggers it?

It is not just highly vocal dogs that take part.

“Everything is data for us, so we are also interested in the trainability of dogs with minimal vocal repertoires. We currently have one barely vocalising dog who nevertheless got the idea in one session and now it loves woofing on cue,” Sándor said.

Being naturally “chatty” does not necessarily make a dog better at controlling its voice. Talkative dogs may bark because of genetics, their emotional state or an external trigger, rather than because they can deliberately choose to produce a particular sound. True vocal control works both ways: it can also mean learning to stay quiet when asked.

The team has so far relied on its own family dogs, but will soon recruit a much bigger cast of volunteers. Owners across Budapest will follow training protocols at home before bringing their pets to the BARKS Lab to yap, whine and howl in the name of science.

The work will also reach out beyond the lab. Through a citizen science challenge, inspired by the earlier Do As I Do Woof Challenge, dog owners worldwide will be invited to submit recordings a lab could never capture: contented sighs, sleepy snuffles, the quiet sounds a dog makes settling in for the night.

Owners will also be able to contribute DNA samples and behavioural surveys, helping researchers hunt for genes that might explain why some dogs have greater control over their vocalisations than others.

What it means for us

Beyond the origins of speech, the research could bring practical benefits.

“One of the possible applications is developing smart devices which can detect the emotions of dogs based on their vocalisations,” said Sándor.

AI is already being explored as a way to identify information about a dog’s emotional state from its vocalisations. A better scientific understanding of canine vocal communication could help owners recognise fear, stress or frustration before behavioural problems escalate, improving welfare and strengthening the relationship between people and their pets.

But the bigger question goes much further back.

Dogs have spent thousands of years evolving alongside humans, adapting to many of the same social pressures for cooperation and tolerance that some researchers believe also helped pave the way for human language.

If domestication gave dogs a flexible new voice, they may be quietly holding one of the missing pieces in the story of how humans learned to speak.

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- K9VocLearn (CORDIS)
- BARKS Lab