Psittacine Corner

How Companion Animals Can Help Us Understand Musicality, Vocal Learning, and Communication

Anna N Osiecka, The Many Parrots Consortium, manyparrots.org

Why Companion Animals Can Transform Behavioral Sciences

You can learn a lot about an animal by simply listening to it. Over the last few decades, our understanding of how animals communicate and perceive the world has really evolved, and studies of animal communication have moved from simply describing sounds to investigating their usage, meaning, learning processes, and more. In fact, this interest is currently so big that there is even a multi-million dollar prize offered to whoever is able to prove two-way communication with an animal!

Still, certain aspects of animal behavior, such as cognition and learning, remain extremely challenging to study in the wild. Companion animals can be a game changer in such cases. The long history of living together makes them the species we arguably know the most about in terms of their communication systems (besides humans). What's more, many companion animals actively engage in communication with humans. This allows us to better explore the cognitive and communicative similarities and barriers between our species.

The global pet population is estimated at over one billion animals and continues to grow rapidly. This provides an immense resource; a vast pool of individual animals to whom we have close and consistent access, often through owners who are highly familiar with them. Pet owners frequently have deep knowledge of their animals' behavior and medical history accompanying them throughout their lives and across a variety of contexts. Scenarios that are difficult or impossible to record in the wild can be readily observed with companion animals in large-scale animal-keeping facilities, or experimental settings. For instance, while vocal expressions in pigs have been relatively well-studied in farming contexts, pet pigs can offer insights into playful and social behaviors that are rarely or never observed on farms.

Companion animals also present opportunities to address diagnostic challenges in veterinary care. Many conditions in pets are only discovered in advanced stages, yet vocalizations can indicate stress, infectious diseases, or even the quality of human-animal relationships. From playful pups and curious fledglings to elderly or sick animals, pet vocalizations give us some access to look into their complex lives.

Parrots: Learners and Singers

In many parts of the world, parrots are among the most popular companion animals. Parrots commonly engage with humans by imitating sounds, including human speech and music. They can be very adept at mimicking human speech, and follow musical rhythms quite well – for example, Cockatiels (*Nymphicus hollandicus*) sing in nearly perfect synchrony with musical playbacks. Perhaps you even know some parrot superstars, like Alex the outspoken African grey parrot, or Snowball, the internet-famous dancing cockatoo. In nature, vocal mimicry is a social act; many species will imitate the calls of their partners or social groups to strengthen or maintain bonds. The fact that this behavior is displayed towards humans offers unique insights into what aspects of these sounds resonate with another vocal-learning species, indirectly shedding light on their own communication systems.

Parrots are exceptional in their ability to learn new sounds and their usage even in adulthood. While we have made significant progress in understanding the neurobiology underlying learning in birds, behavioral data on these processes remain scarce. This is because studying parrots in the wild is tricky: they live high in trees, often in large, socially complex flocks where it is difficult for human observers to distinguish individuals. Even when parrots are color-ringed for identification, they are adept at removing the rings, making long-term tracking difficult. Companion parrots, on the other hand, are often eager to associate with humans and have much to teach us about their own learning.

Previous studies using lab-kept parrots or caretaker-donated data show that most parrot species are able to improvise while mimicking human speech, for example rearranging words to create new meanings. Often, they use the mimicked sounds in appropriate human contexts, such as saying "Tasty?", when spotting their human eat.

Above: Alex used nearly 150 English words that he recombined to create new labels and answer questions such as "What color bigger? " Photo: The Alex Foundation

Left: Like many rescue parrots, Francesca (here, wearing feather-picking protection) suffered from the psittacine beak and feather disease. Still, she eagerly "spoke" to her caretakers. With more recordings of chronically ill pets, we can try to create tools for simple health screening based on acoustics. Photo: Katarzyna Bryndza, PBFD rescue home.

This ability to reproduce and potentially understand human sounds seems to vary across the species, which may indicate that both the whys and the hows of learning differ amongst parrots.

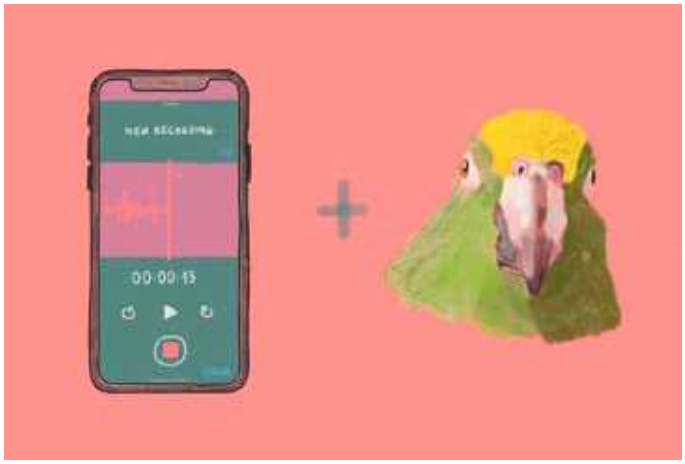
By looking at many trained and self-taught mimickers, we can start to understand how vocal learning occurs, and what other information can be found in parrot signals. Alex, the African Grey Parrot (*Psittacus erithacus*), had the New England accent of his caretaker. Do all parrots imitate mostly their principal human partner? Within their mimicked communication, what are the semantic categories they use. For example, (how well) do they use names and labels? Aside from "talking," many parrots love to sing, including parrot-hits like La Cucaracha or the Queen of the Night aria. Do they learn these melodies better from a human model, or when music is played? How good and what are their rhythmic and musical abilities? Can they follow pitch contours, and how do they interpret rhythm?

Aside from learning and musicality, having access to recordings of well-known parrots can let us ask some more biological questions. Information such as age, sex, or species is commonly carried in natural animal vocalizations – is this also true for mimicked vocalizations? Similarly, can mimicked vocalizations still inform about the caller's health or emotional status? Are there contexts in which their imitation is more precise? For example, are happy parrots better at "sounding human?" Collecting small pieces of information on the mechanisms and functions of learning and communication, we are getting closer to understanding not only the parrot tongue and mind, but also larger patterns in the evolution of speech, musicality,. and cognition.

The Many Parrots Consortium

The Many Parrots Consortium is an international group

You can record good quality audio with nothing more than your phone! Drawing by Feliksa Żurawska and Blank Kwiatkowska



of researchers united by a shared interest in vocal and rhythmic abilities in parrots. We build mostly on the ongoing "What Does Polly Say?" project, which has already explored the repertoire and usage of mimicked English words across parrot species. Our work is driven by recordings and information provided by parrot owners through two ongoing, anonymous surveys available online in eight languages. These surveys allow owners to share details about their parrots, such as species, sex, and age, as well as their learning history and vocal and musical repertoires.

The Many Parrots Consortium follows the model of other successful multi-lab collaborations like ManyDogs, ManyBirds, and ManyBabies. By pooling resources for shared data collection and analysis, we can achieve larger sample sizes and extract more insights from the data than a single lab could. What truly sets ManyParrots apart, however, is the diversity of its members, whose expertise spans ornithology, bioacoustics, musicology, linguistics, and cognitive science. This interdisciplinary approach provides unique perspectives that enrich our understanding of parrots and their abilities.

Of course, citizen science has some limitations. For example, we do not have access to the full input or training received by the parrots, and the reliability of the data is largely based on trust in the contributors. Even with these limitations, citizen science has tremendous potential – especially when done collaboratively. We strive to make participation in our research accessible, safe, and rewarding for parrot owners, ensuring their efforts are worthwhile. To support contributors, we provide simple instructions and a brief illustrated video on how to record high-quality audio using a smartphone.

Recordings provided by parrot owners advance our knowledge. We believe this is a collaboration where everyone benefits.

Join Us

Do you know a parrot that mimics human speech and sounds? Do you have parrot recordings that might be relevant to our research? Visit our website to tell us about your parrot's repertoire and/or submit recordings of the bird and its human model. Do you have questions about the surveys or that our data could help answer? Get in touch with a member of the Many Parrots Consortium – we'd love to hear from you!