Study shows selective breeding has constrained communication abilities in domestic dogs compared to wolves

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Credit: Elana Hobkirk / Durham University

A study from researchers at Durham University has found that the

process of domestication and selective breeding has limited the ability of domestic dogs to use facial expressions to convey effective states (emotions) as effectively as their wolf ancestors.

The research, published in *Scientific Reports,* used an extended Dog Facial Action Coding System to analyze video recordings of captive wolves and domestic dogs during spontaneous social interactions and reactions to external stimuli.

The researchers identified nine distinct affective states—including anger, anxiety, curiosity, fear, friendliness, happiness, interest, joy and surprise—that could be predicted based on wolves' facial movements with 71% accuracy.

However, the accuracy dropped to only 65% for domestic dogs across different breeds. The confusion was especially high between positive states like friendliness and negative states like fear.

The researchers suggest that the varying facial morphologies resulting from selective breeding, such as shorter muzzles, floppy ears, pendulous lips and excessive wrinkling, have limited dogs' ability to produce the same range of facial expressions as their wolf ancestors.

Commenting on the research findings, lead author of the study Elana Hobkirk, a former Masters student and prospective Ph.D. student at Durham University's Department of Biosciences said, "This study demonstrates how important it is to be able to observe fine details in behavior, and how such observations have allowed us to see just how communicatively complex and sentient wolves are and how domestication may be affecting our social bonds with our companion dogs."

Study co-author Dr. Sean Twiss of Durham University said, "Our

research team at Durham University focuses on individual differences in animal behavior, and Elana's work adds an exciting new dimension to this, revealing how individuals differ in their abilities to convey their emotional states, and what that might imply for successful communication (or not!) within social groups, including humans and their dogs."

The research indicates that traits like brachycephalic (short, broad) skulls, floppy and semi-floppy ears, and pendulous lips were linked to nearly 80% of the cases where a dog's facial expressions did not match the identified effective state.

According to the authors, this confusion between positive and negative states could be detrimental for dog-human interactions and even pose safety risks if humans misinterpret fearful or aggressive behavior in dogs as friendliness.

Successful communication of effective states is essential for highly social species as the study provides evidence that an unintended consequence of domestication is a reduced range of emotional expression in domestic dogs compared to wolves.

The researchers suggest domestic dogs may compensate for limited facial expressions by vocalizing more than wolves during social interactions.

More information: Elana R. Hobkirk et al, Domestication constrains the ability of dogs to convey emotions via facial expressions in comparison to their wolf ancestors, *Scientific Reports* (2024). DOI: 10.1038/s41598-024-61110-6

Provided by Durham University

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