

Think You Know Your Dog? Science Disagrees

A comprehensive study dismantles the myth that a dog's breed dictates their behavior. In truth, with only 9% of behavioral differences attributed to breed, find out what really makes your dog tick and how this knowledge can foster a deeper bond between you and your pet.

Analysis by Dr. Karen Shaw Becker

STORY AT-A-GLANCE

- A recent study reveals the surprising result that a dog's breed is actually a poor predictor of behavior
- While behavioral tendencies are obvious in breed groups (e.g., prey drive in hounds, and retrieving in retrievers), it is far from a guarantee that individual dogs within a breed group will display those behaviors
- Each dog's behavior is a combination of nature and nurture; behavioral influences include early and ongoing (lifelong) socialization, the level of daily exercise, training, diet, and other factors

Most of us with dogs depend to some extent on their breed(s) to help us better understand, predict, and influence their behavior. This is because historically, breeds have been associated with certain behaviors, for example, the **super-intelligent Border Collie**, and the loyal, loving Golden Retriever.

However, according to a recent study published in Science, a dog's breed is actually a poor predictor of behavior.¹ Using genetic information from over 2,000 dogs, along with dog owner self-reported surveys, the study authors report that on average, breed explains a mere 9% of the behavior differences between individual dogs.

Study Looked at Breed Influence on Individual Dog Behavior

According to study co-author and geneticist Elinor Karlsson of the University of Massachusetts Chan Medical School in Worcester:

*"Everybody was assuming that breed was predictive of behavior in dogs, but that had never really been asked particularly well."*²

For example, a 2019 study³ examined whether behaviors like **aggression and fearfulness** are linked to breed genetics and found that genes could explain some of the differences between, say, Poodles and Chihuahuas.

Karlsson and her colleagues set out to try to determine how much breed can predict variation in the behavior of individual dogs. Toward that end, the researchers had to first develop **Darwin's Ark**, "the world's largest pet community science project," which is an open-source database of more than 18,000 pet owner responses to surveys about their dog's traits and behavior.

The surveys included over 100 questions about observable behaviors, which the research team grouped into eight “behavioral factors,” including human sociability (how comfortable a dog is around humans) and biddability (how responsive he or she is to commands).

The study authors also collected genetic data from 2,155 purebred and mixed breed dogs, including 1,715 dogs from the Darwin’s Ark database whose owners had sent in dog saliva swabs. Including mixed breed dogs helped illuminate how ancestry affects behavior while at the same time removing the purebred stereotypes that could affect the way the dog is treated and therefore behaves.

Lead study author Kathleen Morrill, a geneticist in Karlsson’s lab, explains that studying mixed breed dogs makes it easier to decouple traits.

“And that means on an individual basis, you’re going to have a better shot at mapping a gene that is actually tied to the question you’re asking,” says Morrill.⁴

Study Says: Breed Doesn’t Reliably Predict a Dog’s Behavior

Next, the researchers combined genetic and survey data for individual dogs to pinpoint genes associated with particular traits. Their results revealed that the most hereditary behavioral trait in dogs is human sociability, and that “motor patterns” (e.g., howling, retrieving) also tend to be more heritable than other behaviors.

This makes sense, since modern breeding methods are only a couple hundred years old. Prior to that, dogs were bred for the functional roles they served, such as hunting or herding.⁵ These behavioral tendencies still show up in breed groups, such as prey drive in hounds, and retrieving in retrievers.

However, even though breed dictates certain behaviors, it doesn’t appear to be a reliable predictor of individual behavior. For example, many hounds are perfectly capable of living in harmony with smaller animals, and many retrievers won’t chase after a ball no matter how many times it’s thrown.

Obviously, this study backs up what many people have observed or suspected about their canine family members. Breeds of dogs exhibit certain behaviors, but individual dogs within each breed may or may not exhibit those behaviors.

Interestingly, the study also revealed that size has virtually no effect on an individual dogs’ behavior. For example, **small dogs** tend to be yappy and nippy compared to larger breeds. Those traits aren’t genetic, but rather the result of pet owner tolerance for poor behavior in small dogs vs. big dogs.

A Dog’s Behavior Is the Result of Nature + Nurture

Dog trainer Curtis Kelley of Pet Parent Allies in Philadelphia believes in meeting dogs where they’re at. “Dogs are as individual as people are,” he says. Breed gives a loose guideline for what kind of behaviors to expect, “but it’s certainly not a hard-and-fast rule.”⁶ According to certified professional dog trainer Victoria Schade, writing for PetMD:

“While there are aspects of a dog’s temperament that can seem hardwired, personality is a combination of nature and nurture.”⁷

She lists eight factors that can influence the way a dog's behavior develops:

1. **Maternal influence** — A mother dog's behavior during weaning can impact a puppy's willingness to interact with people. For example, skittish mothers might model behaviors that puppies adopt.
2. **The amount and quality of early socialization** — Puppies raised without frequent positive exposures to novel sights, sounds, locations, and beings might be less confident, easily startled, and slower to recover from stress.
3. **Environment** — Dogs who grow up in households where all their needs are met will likely develop differently than dogs who live in deprived households, like those kept outside with minimal human contact.
4. **Ongoing socialization as the dog matures** — While early socialization is critical for developing confident and behaviorally appropriate puppies, socialization is a muscle that needs to be worked throughout a dog's life. Adult dogs who don't have opportunities for positive experiences with new environments and people might be less likely to react to the world confidently.
5. **Level of daily exercise** — Many behavioral challenges stem from a lack of adequate physical and mental **exercise**. Dogs who seem to be "hyper" or "naughty" probably aren't getting enough exercise.
6. **Training** — Training is more than just a way to ensure polite behavior; it's also a passport to the world, as well-trained dogs are usually able to feel comfortable in a variety of settings.
7. **Diet** — Dogs fed a **balanced diet of healthy food** will develop and behave differently than dogs eating lower-quality foods. Dogs who eat foods with too many fillers and artificial ingredients might be more likely to have energy peaks (like overexcitability) and crashes (like lethargy).
8. **Caregiver personality** — We love our dogs because they're such wonderful companions, and that bond between us can lead to our dogs mirroring our behavior. High-strung, nervous pet parents might wind up with a dog that has similar challenges.

Sources and References

¹ [Morrill, K. et al. Science, 29 Apr 2022, Vol 376, Issue 6592](#)

^{2,4,6} [ScienceNews, April 28, 2022](#)

³ [MacLean, E.L. et al. Proceedings of the Royal Society B, 02 October 2019, Volume 286, Issue 1912](#)

⁵ [Parker, H.G. et al. Cell Reports, Volume 19, Issue 4, P697-708, April 25, 2017](#)

⁷ [PetMD, November 10, 2023](#)
