

How dogs ~~see~~ *smell* the world

We're pretty sure you've noticed your dog's nose is unlike your own. The shape, texture, and moistness of your dog's nose are unique, and all are completely evolved to further their sense of smell. While dog noses function fairly similar to humans', they have several unique features.

Brain

Dogs can successfully detect smells **1 or 2 parts per trillion**. This is equivalent to detecting 1 teaspoon of sugar in a million gallons of water. This explains why dogs are such reliable detectors of disease, allergens, drugs, and explosives.

Olfactory Bulb

A canine olfactory bulb is approximately **40 times larger** in dogs than in humans, relative to total brain size. The olfactory bulb shares information with the limbic system (emotions, memories, behaviors) and the cortex (the conscious part of the brain)

Nasal Cavity

Inside the snout, a dog has a **maze of thin bones**, lined by mucous membranes. This provides an enormous surface to house up to **300 million olfactory cells** (depending on breed). For comparison, humans have about 5 million.

Vomeronasal Organ

Also called Jacobson's Organ, this functions by **detecting "undetectable" odors** — most notably **sex pheromones**. This is how dogs disclose their sexual interest, fertility, and whether or not they are ready and willing to mate.

The Dog's Nose

Dogs split the air they breathe into two paths: one for **breathing** and one for **smelling**. Air enters through the main nostril and exits through the side slits. This allows dogs to inhale and exhale without losing scent. This unique shape also circulates the scent, ensuring every particle is assessed.

The wetness of a dog's nose helps capture scent particles.



 say hi!

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Why does this matter?

Because humans are a sight-first species, we sometimes project our sensory experience onto our dogs. In other words, we assume dogs experience the world the same way that we do. But dogs aren't sight-first; they're scent-first. Understanding this fundamental difference is key to interacting with dogs in a safe, positive, and productive way.

How To Greet A Dog

Perhaps the most ubiquitous example of why this matters is the misinformed practice of how to greet a dog. You're supposed to just let the dog sniff your hand, and then you're good to go! Then you can pet it...right? **No.**

We get it. We love to pet dogs too. But inviting oneself into an unknown dog's space could lead to an unpleasant interaction (and, in some scenarios, could get you bit). Some dogs are sensitive to strangers. Others may perceive your reaching as pressure or a correction, which is not a good thing to do without a relationship. So what should you do instead?

Ignore the dog! It's that simple. Don't look at it, don't reach for it, don't talk to it. The dog is well aware of you and can smell you just fine. Make slow movements and overall, just be calm.

They're making assessments as to whether you're a safe person. We should be familiar with this behavior — humans do this, too. It's why **it takes time to build relationships.** Humans aren't okay with strangers touching us, so don't expect a new dog you meet to love it either.

For owners, it's important to understand this so you can advocate for your dog. Asking people to give them space and to ignore them can give your dog the time they need to make their own assessment of new people, without putting pressure or undue stress on them.

*It's worth noting that some situations **require** eye contact. We are not suggesting you never look at your dog! Also, certain dog sports feature tricks like "focused heeling" where the animal must continue to look at his owner. This information is just to increase your understanding of your dog.*

Scent-First Training

Eye contact is often called "engagement" in training and some trainers require it to show that the dog is aware of you, the handler. This strategy can be useful for some dog-owner pairs. But eye contact can be perceived as [threatening to canines](#). As such, this method is sometimes counterproductive in nervous dogs.

To us, engagement just means that **your dog is aware of you.** We allow our dogs to look at us, of course, but we (usually) don't require it. There are so many other ways dogs check in. One of the easiest things to see is a dog lending his ear (this is a bit easier to notice in pointy-eared dogs).

Dogs may also occasionally give a sniff. Nostrils have subtle movements, so this can be tougher to catch.

A dog may also use his body to indicate engagement. For example, on an off-leash hike, if a dog is in tune with his owner, and his owner slows down — so will the dog.

You may also drop a command occasionally to check the dog's awareness of you. If he is obedient, he's well aware of you.

Scent-First in Canine Science

Our ego-centric sight-first view has likely contributed to some failures in canine science. Take, for instance, the fact that scientists used a sight-based cognitive test—[the mirror test](#)—to try to answer the question: do dogs know they exist? It's a big concept and a wild thing to test.

Here's how it works: Scientists place a dot somewhere on the animal's body and place the animal in front of the mirror. To pass this test, the animal must indicate that it's aware of the dot on its body.

There are very few species that are self aware by this measure: chimpanzees, orangutans, and humans. Some scientists will also include elephants, Bottlenose Dolphins, Orca Whales, Eurasian Magpies, Ants, and maybe Manta Rays. Dogs do not pass.

But what happens if we adjust this test to be scent-based? Scientists decided to [test it out](#). They placed some containers of dog urine: odors of self (dog's own urine) and odors of modified-self (dog's own urine, with an added odorant). They found that dogs spent considerably less time on their pure urine, indicating that dogs know their own scent well. As in, "Oh! That's mine. I already know my own information."

This indicates self-awareness.

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