

Through Your Dog's Eyes: How She Views the World

Your dog is exposed to much of the same stimuli that you encounter each day, including video screens, but does she perceive the world around her the same way you do? This study revealed a striking difference - one that doesn't even rely on scent or sound.

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STORY AT-A-GLANCE

- Dogs are astutely in-tune with the actions going on around them, according to a study using machine learning and functional magnetic resonance imaging (fMRI)
- Dogs are among the only animals that can be trained to lie still in an MRI, having their brain scanned without the need for sedation or restraints
- Two dogs viewed three 30-minute videos that included content deemed interesting enough to keep a dog's attention, such as dogs sniffing, playing, eating and going out for a walk
- Using a machine-learning algorithm, the study revealed 75% to 88% accuracy in mapping data for action classifiers
- This suggests dogs were focused on the actions they were viewing — not the objects

Have you ever wished you could see the world through your dog's eyes? If you could, you'd likely be much more interested in a ball zooming by or a bird taking flight than who threw the ball or what caused the bird to take off.

In short, it seems, dogs are astutely in-tune with the actions going on around them, according to a study using machine learning and functional magnetic resonance imaging (fMRI).¹ The study, titled "Through a Dog's Eyes," was conducted by researchers with Emory University in Georgia, who were able to scan dogs' brains and decode what they saw.

Insights Into a Dog's Mind

Much remains to be discovered about primates' — including humans' — visual systems, but even less is known about how the brains of other mammalian species "see." "New approaches to brain imaging, however, are opening up the possibility of noninvasively studying the visual systems of a wider range of animals, which may yield new insights into the organization of the mammalian nervous system," the researchers explained.²

Dogs are uniquely suited to be involved in these new discoveries, as they're among the only animals that can be trained to lie still in an MRI, having their brain scanned without the need for sedation or restraints.

Further, the team noted, "Due to their co-evolution with humans over the last 15,000 years, dogs also inhabit our environments and are exposed to many of the stimuli that humans encounter on a daily basis, including video screens, which are the preferred way of presenting stimuli in an MRI scanner."³

They were curious whether dogs process stimuli in their environment differently than humans, which wouldn't be surprising given dogs' unique vision traits. For instance, dogs have dichromatic vision, which means they have two color receptors that perceive wavelengths of light that correspond to blue and yellow.

This means dogs can see color in combinations of blue and yellow. "So instead of bright red roses, dogs likely see yellowish brown petals, and lively green grass looks more dehydrated and dead," according to encyclopedia Britannica. Such differences, the Emory University team suggested, "may have significant downstream consequences not only for lower-level visual perception but also for higher-level visual representation."⁵

Dogs Focus on Actions

Two dogs — an 11-year-old Boston terrier-mix and a 4-year-old Boxer mix — were involved in the study. The dogs successfully viewed three 30-minute videos that included content deemed interesting enough to keep a dog's attention for that timeframe.

Scenes — filmed waist-high from a dog's perspective — included dogs being petted by people or receiving treats. There were also clips of dogs sniffing, playing, eating and going out for a walk. There were also "active" scenes, which included activities like a deer walking by, people eating or hugging and people offering a toy to the camera.⁶

"We showed that we can monitor the activity in a dog's brain while it is watching a video and, to at least a limited degree, reconstruct what it is looking at," study author Gregory Berns told Phys.org. "The fact that we are able to do that is remarkable."⁷ Study author Erin Phillip added:

"While our work is based on just two dogs it offers proof of concept that these methods work on canines. I hope this paper helps pave the way for other researchers to apply these methods on dogs, as well as on other species, so we can get more data and bigger insights into how the minds of different animals work."

Two humans also underwent the experiment, and watched the same videos while having their brain scanned. The machine-learning algorithm classified the brain-data content, revealing 99% accuracy in mapping brain data for object- and action-based classifiers when it came to the human subjects.

However, for the dogs, the tool did not get results for the object classifiers, while it revealed 75% to 88% accuracy in mapping data for action classifiers. This suggests dogs were focused on action — not objects. Berns explained:⁸

"We humans are very object oriented. There are 10 times as many nouns as there are verbs in the English language because we have a particular obsession with naming objects. Dogs appear to be less concerned with who or what they are seeing and more concerned with the action itself."

... It makes perfect sense that dogs' brains are going to be highly attuned to actions first and foremost. Animals have to be very concerned with things happening in their environment to avoid being eaten or to monitor animals they might want to hunt. Action and movement are paramount."

Future Studies May Shed Light on How Dogs See the World

The study was considered a success, in part because it showed that recovering “naturalistic visual information from the dog cortex using fMRI in the same way that is done for the human cortex” is possible. The results demonstrated that dogs are, in fact, taking in information from videos and that information can be recovered from their brains — even without the need for scents or sounds, two other senses that dogs rely on heavily.

“These results open up a new way of examining how dogs perceive the environments they share with humans, including video screens, and suggest rich avenues for future exploration of how they and other non-primate animals ‘see’ the world,” the researchers noted.⁹ It’s an exciting prospect, since anything that helps us understand our dog’s minds better has the potential to bring dogs and their guardians even closer together.

Sources and References

^{1,2,3,5,9} [Neuroscience September 13, 2022](#)

⁴ [Britannica. Are Dogs Really Color-Blind?](#)

^{6,7} [Phys.org September 16, 2022](#)

⁸ [Science Daily September 15, 2022](#)
