

How Does Your Dog Think of Her Favorite Toys?

Do you ever wonder what goes on in your dog's mind when you ask her to fetch a certain toy? Is she connecting with its name or an image that's far more multisensory? While prior studies concluded that dogs typically rely on vision alone, this newer study suggests something much more complex.

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Nov 11, 2022 • 4 min read

STORY AT-A-GLANCE

- A recently published study concludes that dogs form "multisensory mental representations" of toys based primarily on how they look and smell
- The study involved a group of "typical" dogs plus a handful of "gifted word learner" dogs
- Study results show that when dogs play with a toy, they "record" its features using multiple senses; to retrieve the toy when asked, they rely primarily on its appearance, but as necessary can incorporate other sensory cues, in particular smell

An earlier study by the same team of researchers established that members of certain dog breeds, such as Border Collies, can learn the names of their toys. This time around the researchers went a step further, aiming to discover what goes on in the mind of dogs when they're told to fetch a certain toy.

"If we can understand which senses dogs use while searching for a toy, this may reveal how they think about it," said co-author Shany Dror, a biologist at Eotvos Lorand University in Budapest, Hungary. "When dogs use olfaction or sight while searching for a toy, this indicates that they know how that toy smells or looks like."³

Their study results suggest that dogs load certain sensory features about their toys (e.g., the look and smell of them) into their memory banks, and then recall those features when searching for the toy they are asked to retrieve.

Prior studies concluded that dogs typically rely on vision alone, or a combination of sight and smell, to locate objects they're searching for. A few dogs can also identify objects based on verbal labels, which the study authors call gifted word learner (GWL) dogs.

"Just like humans, GWL dogs not only recognize the labeled objects — or categories of objects — as stimuli they have already encountered, but they also identify them among other similarly familiar named objects, based on their verbal labels," the authors wrote.⁴

How the Dogs Were Tested

For the current study, the research team decided to explore whether GWL dogs are better able to differentiate and/or recognize specific objects compared to typical dogs.

Toward that end, they performed two separate experiments, the first of which involved 14 dogs, including three GWL Border Collies named Max, Gaia, and Nalani. All three of the GWLs had been part of earlier studies and displayed the ability to identify more than 20 dog toys by name. Most of the dogs were tested in the lab; three were tested at home using the same experimental set-up.

- **The setting** — A researcher and the dog's owner stood with the dog in one room; a nearby room down a hallway and separated by heavy curtains contained dog toys. All windows were covered with dark sheets.
- **The toys** — The same 10 unfamiliar dog toys, all featuring different shapes, sizes, colors, and materials, were used with all the dogs. The researcher randomly divided the toys into two five-toy sets, and then picked one toy randomly out of each set to be the target. The remaining four toys in each set were "distractor objects."
- **The training phase** — The owners played with their dogs using a target toy, sometimes placing it with the other toys and asking the dog to retrieve it. When the dogs were successful, they received a reward.
- **Experiment No. 1** — After the training phase, the dogs were tested in both light and dark conditions (the hallway and toy room lights were turned off). Each was asked 10 times to retrieve the target toy from among the other four other toys in a set, all randomly scattered on the floor.

The toys were reshuffled between each attempt. The action was recorded with an infrared video camera and included toy selection and retrieval as well as the dogs' searching and sniffing behavior.

- **Experiment No. 2** — The second experiment mirrored the first, but involved only the three GWL dogs, along with an additional GWL dog named Whisky. All four knew the names of the now 20 toys used in the experiment, scattered randomly on the floor. According to Ars Technica:

*"This constituted a more complex case of object recognition; the dogs could not simply rely on familiarity with the toys to retrieve the target toy successfully. Each owner commanded their dog to retrieve a particular toy by naming it. If the dog retrieved the correct toy, it was rewarded. Once again, the dogs were tested in both light and dark conditions."*⁵

Dogs Form Multisensory Mental Representations of Toys

All the dogs in experiment No. 1 — GWL and typical dogs alike — were able to pick out the target toys in both light and dark conditions, although it took them longer in the dark. Most found the toys by sight, even though dogs possess an incredible sense of smell. But as you would expect, the dogs used their noses more frequently when they were looking for the target toy in the dark.

In experiment No. 2, the GWL dogs were also able to correctly identify the named toys when prompted by their owners, using visual cues augmented by their sniffers, particularly in dark conditions.

The study authors conclude that when dogs play with a toy, they "record" its features using multiple senses to create a "multisensory mental image." They rely primarily on the appearance of the toy, but can incorporate other sensory cues, in particular smell, as necessary.

*"Dogs spontaneously encode different features of the objects, leading to the construction of multisensory mental representations," the authors wrote. "In the case of GWL dogs, a memory of the multisensory representation is evoked by hearing the objects' verbal labels as they perform complex object recognition tasks."*⁶

Sources and References

^{1, 4, 6} [Dror, S. et al. Multisensory mental representation of objects in typical and Gifted Word Learner dogs. Animal Cognition, June 8, 2022](#)

² [Phys.org, June 13, 2022](#)

^{3, 5} [Ars Technica, July 27, 2022](#)
