

Do some dog breeds have a better sense of smell?

Researchers:

Attila Salamon, Ádám Miklósi,
László Róbert Zsiris, and others

Associate Editors:

Naomi Greenberg and
Alexandra Appleton



Abstract

Have you ever seen a search dog? What breed of dog was it? Search dogs are specially trained to detect explosives, drugs, or diseases. To be good at this job, search dogs must have a sharp sense of smell and the ability to cooperate with humans.

Common breeds of search dogs include German and Belgian shepherds, Labradors, and border collies. But are these dogs better at smelling than other breeds? Or is it their training and cooperation that make them good at the job?

We wanted to find out whether some dogs are naturally better at smelling than others. So we used a test called the Natural Detection Task to compare how well dogs can find food using their nose without any previous training. We tested all the dogs with the same setup. We then compared specific breed groups and different breeds. We found that some breeds were better at smelling than others. But dog breeds that humans have selectively bred for their ability to smell were not always the better performers.

Introduction

Humans keep dogs for a wide range of reasons. Many people choose a certain dog breed because they are cute, friendly, or energetic. But in the past, we needed dogs to help with tasks such as hunting, herding sheep, or guarding against predators. To do this, humans chose dogs for a certain trait. The selected dogs reproduced and had puppies, many of which had the desired trait. Humans, then again, chose those puppies most suited to the particular task. Over time, that trait became more pronounced and more common. We call this **artificial selection**.

Dog breeds emerged from artificial selection for different traits. For example, German shepherds were bred for herding sheep. In contrast, beagles were bred for hunting small game animals. In our study, **we wanted to know whether dogs bred for olfaction (their sense of smell) are still talented sniffers today! We also wanted to know if the personality of a dog affected its ability to smell well.** Some of the dogs in our study had various levels of previous training, but some had none at all. This allowed us to focus on the dogs' natural ability to smell food.

Methods

We used the Natural Detection Task to find out whether some dogs naturally have better olfaction than others. This is a simple activity in which dogs have to find a certain amount of food in a natural search situation. It takes place

in a field or in an empty room. Before the test, **we laid out four pots in a line** (see Fig. 1 on p.2). One of the pots concealed a food container. Once the test began, **the dog needed to identify the pot with the food within a minute.**

There were three levels to the test. Each dog needed to pass one level before moving to the next. In the first level, the food containers were open under the pots. In the second level, the containers had lids with holes. In the third level, the food containers were fully sealed. The test was over if the dog did not choose the correct pot three times in a row.

We used three factors to measure how well a dog did in the Natural Detection Task:

1. If the dog passed the third level.
2. How many levels the dog passed and how many tries it took.
3. How quickly the dog made successful choices.

We compared **breed groups** (groups of dogs selected for smelling, **cooperation**, or both). We also compared breeds. Finally, we examined traits like responsiveness, activity, **attention-deficit/hyperactivity disorder**, and previous training. We wanted to see if these had an impact on their success.



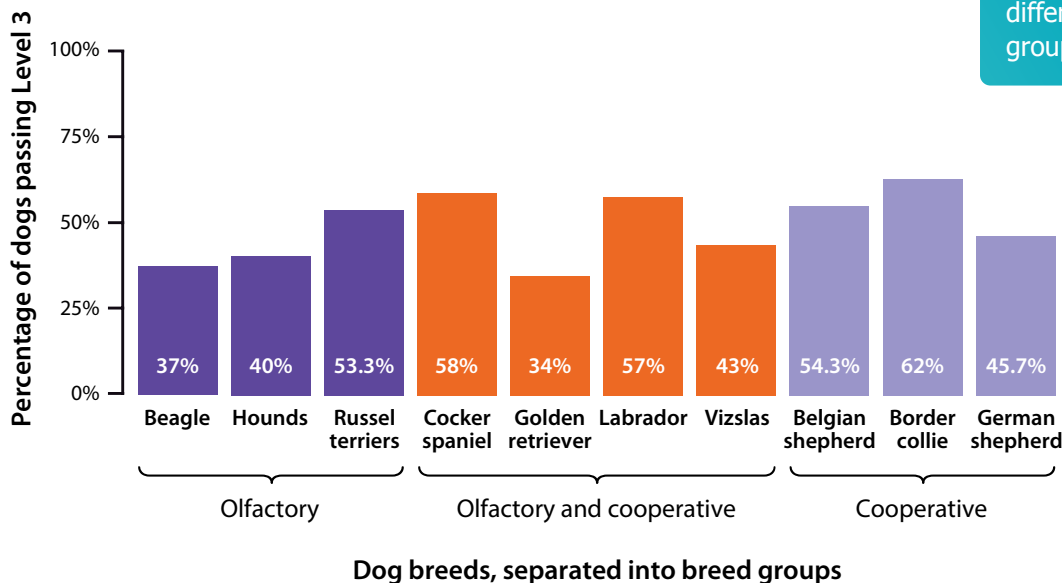
Figure 1: A dog owner leads a dog through the Natural Detection Task. The dog must identify the pot covering a container with food.

Results

We were able to compare dogs within the same breed and between different breed groups.

- Breed groups → none of the breed groups had significantly better scores than another (Fig. 2). Each breed group had better and worse performing breeds.

- Breeds → some breeds were more successful. But other breeds were quickest at completing the levels. For example, border collies were especially good at reaching the highest level in the task. But beagles were quickest at completing the last level successfully.



Were there any significant differences between the breed groups? What was similar?

Figure 2: How well each breed performed on Level 3 of the Natural Detection Task.

- Personality and training → **dogs that were more responsive to training performed better overall.** Other traits (such as excitability and attention-deficit/hyperactivity disorder)

did not affect success. Dogs with more advanced training were slower on the last level.

Discussion

Our results show that breed groups don't really tell us if a dog will be good at smelling or not. Dogs that were bred for olfaction, for working with people, or for both had similar task results. This might be because people used to breed dogs for these skills, but this has decreased in recent years. This is called **relaxed selection**. Today, people usually breed dogs based on how they look or how well they get along with people.

We also saw a lot of differences between dogs of the same breed. This shows that each dog's genes and individual life experiences matter a lot.

The Natural Detection Task is a helpful tool for comparing how well different dogs can smell. **Unlike many previous studies, the task relies on the natural lure of food, so dogs with no training can be tested. This can provide early information about how well a dog might perform if trained as a search dog.** After all, dogs don't naturally want to find things like explosives or drugs. These smells don't mean anything to them, so they need training to identify them and then alert the handler. The Natural Detection Task allows us to assess a dog's natural, untrained olfactory ability.

Conclusion

Modern research shows that some old ideas about animal skills or traits may not be true. We are always learning new things about how animals think, learn, and solve problems! You can explore these ideas by asking questions and observing animals around you. You can also use this

thinking in your own life. Do people make assumptions about others based on how they look, where they're from, or what group they belong to? Instead of accepting those ideas, first ask yourself: "Is that really fair or true?"

Glossary of Key Terms

Artificial selection - the process of humans choosing animals or plants with desired traits and breeding them together to produce offspring with those traits.

Attention-deficit/hyperactivity disorder (ADHD) - a group of behavioral symptoms that include difficulty concentrating and paying attention, having too much energy, moving a lot and fidgeting, and impulsiveness (acting quickly without thinking about the consequences).

Breed group - a collection of dog breeds that were selected for the same trait.

Cooperation - the ability to work together. When two friends play together, they are often cooperating.

Olfaction - an animal's sense of smell or the ability to smell.

Relaxed selection - when something that used to be important for keeping a trait strong is no longer used or needed, so it starts to fade away over time.

Check your understanding

- 1 In our study, what three breed groups did we use to classify the dogs?
- 2 We mentioned smelling and cooperation as two skills search dogs might need to be successful at their tasks. What other skills might search dogs need?
- 3 Think of a dog you know well – it might even be your own! If you don't know any dogs personally, think of one that you have seen on a movie or TV show. Do you think this dog would do well at the Natural Detection Task? Why or why not?
- 4 We assumed that dog breeds selected for their smelling ability would perform better in smell-related tests than other dogs. We did not find this to be true. When have you made an assumption about an animal or plant based on the group it belongs to?
- 5 Selecting dogs for a certain trait is called artificial selection. By contrast, when wild wolves with certain traits survive better than other wolves, this is called natural selection. Can you identify some of the differences between these processes?

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