

# A DOG'S NOSE KNOWS

Animals kept outside their natural environment often suffer from boredom. They don't hunt or have a chance to conduct their mating rituals, and their natural tendency for physical activity is limited by space. These deficiencies affect their psychological well-being. But when it comes to dogs, we can help them by exploiting their excellent sense of smell.



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**H**umans are one of the few species belonging to the microsmatic group (with a less-developed sense of smell). Having no olfactory function wouldn't affect our lives much at all – perhaps food would taste a bit worse and we might miss the pleasure of perfume for example, but our existence would not be compromised in any way, and we would still be able to function well in society. In the life of macrosmatic animals (with well-developed olfactory function), the sense of smell plays a major role and is an essential element of communication. They use it to find and classify food, find partners for reproduction and assess their willingness to mate, identify offspring, as well as recognize warnings of an approaching enemy and dangerous situations.

The biggest difference between the chemical stimuli received by the sensory cells of smell and taste, and the visual and auditory stimuli, is the speed in which they reach the sense organ (receptor), but also their sustainability in the environment. The scent itself is produced by gas substances, which mix with air and enter the nasal cavity. Inside it, they dissolve in the mucus of the olfactory epithelium (produced by Bowman's glands), which contains specific proteins binding the olfactory molecules. The cells responsible for the senses of smell and taste are the chemoreceptors found in the mucosa of the dorsal, posterior part of the nasal cavity, known as the olfactory area, and in the mucosa of the nasal septum. The scent particles irritate the olfactory receptors, causing their depolarization. The chemical signals are thus converted into electrical impulses, which travel via nerve cell axons to the brain where they are analyzed.

The substances used for the purposes of communication are known as semi-chemical substances. These are further divided into allelochemical compounds, which are useful in intra-species communication, and pheromones, used within a single species. The instrument primarily responsible for receiving these substances is the vomeronasal organ, otherwise known as Jacobson's organ. It is not present in humans, or occurs only in residual form. It functions during prenatal and neonatal stages, but with age the neural connections, and sometimes the entire organ, disappear.

Humans have about 5 million olfactory cells located within 5 cm<sup>2</sup> of the olfactory epithelium, while the domestic dog has anywhere from 70 million to 230 million olfactory cells on the surface of 150–170 cm<sup>2</sup>. It all depends on the breed. A German shepherd has about 225 million cells. What does it smell? And how does it help him function? For example, sniffing faeces. For a human it's a revolting activity, but for the dog it is merely reading the local morning newspaper. He knows who and when was present in a given location, and whether they're healthy or sick. It is even able to tell what mood they were in. Sniffing is therefore extremely exciting and fascinating. Also, on the physiological level it stimulates pleasure centers and causes the release of serotonin, which strictly improves the dog's well-being. So there is nothing to prevent us from exploiting this particular trait.

Dogs can search for specific chemicals, such as drugs or explosives. They can find people lost in an avalanche, for example, or pick up scent traces left by potential criminals. Dogs can detect certain diseases in both humans and other animals, sense and warn against epileptic seizures. They can even be trained to detect cows in estrus. This has led me to the conclusion that this sense of smell may help not only others, but also the dogs themselves.

Animals kept in captivity, such as those kept for breeding, are at a risk for psychological disorders, such

## POKING A NOSE INTO DOGS' EMOTIONAL WELL-BEING



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as obsessive-compulsive disorder, depression, anxiety, and phobias. They can also develop stereotypical movement patterns (pacing along the fence, turning in circles, etc.), as well as oral stereotypes, such as self-mutilation, feather-pecking, barbering, cannibalism, bar-biting, etc. In order to prevent these problems the animal brain needs to be stimulated, increasing its plasticity and neurogenesis, and the expression of the neurotrophic factor. Basically, it's about providing them with the widest and most diverse range of stimuli similar to natural ones, which encourages physical and mental activity, and satisfies their needs for exploration, which is crucial to break boredom and monotony. Providing stimuli to animals in captivity in order to improve their quality of life is known as environmental enrichment.

The five types of environmental enrichment include social enrichment (the chance to interact with members of the same species), psychological enrichment (objects with which the animal can interact, such as containers which require the animal to perform specific actions in order to release food), physical enrichment (structures for climbing, nooks and crannies to explore, space to run around), and sensory enrichment. The latter stimuli may be visual (television, mirrors), auditory (music, vocalizations), taste (frequent change of food type and different ways of providing it), tactile (toys with various textures), or, most interesting to me, olfactory.

In the case of some species we can use a variety of natural attractants. As with any other method of en-

richment we should determine what will provide the greatest attraction for a particular species. Predators can be more willing to wander around a catwalk, and do so with greater interest, if along the way they can find hidden litter from cages of their potential victims with the scent of feathers or fur. The same applies to searching for food. This is what animals lack most, because hunger is the strongest motivator. Another type of olfactory stimulation is placing objects treated with synthetic pheromones, which are effective in treating anxiety.

The most important in this whole process are emotions. When the dog finally finds the coveted treat, the item itself is not the reward, so much as the feelings associated with searching for it and eating it. Therefore, the key to treatment is providing joy. And sometimes it's calming the animal – here we can use essential oils such as lavender or lemon balm, as well as DAP (*Dog appeasing pheromones*), which are synthetic pheromones similar to those found in the milk of nursing females, and which soothe and calm puppies. We should also consider using classical or instrumental conditioning processes. Using specific scented oils when massaging your dog, we can evoke in him the feeling of relaxation at a later time with only the scent itself (without massage). The possibilities are plenty – it depends on human ingenuity and, of course, the nature of the dog. The most important thing is to choose the methods that will help deal with the animal's behavioral problems. If proven effective, they will prevent new ones from emerging. ■

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## Further reading:

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