

Nordic Dog Symposium 2019

Part 2

Behaviour and movement

Els Vidts, Belgium

Els is a trained physiotherapist and osteopath and director of the Belgium-based organisation FreeDogz Education Dog School. She is passionate about canine welfare and improving relationships between dogs and their owners. In 2013 she completed the renowned International Dog Trainer Education Program conducted by Turid Rugaas. This training, coupled with her training as a physiotherapist and osteopath, offered Els an insight into the wide range of physical and behavioural problems that dogs and their owners experience. Els also developed informational posters describing the anatomy of a dog's neck to illustrate how important correct equipment and appropriate handling skills are in protecting sensitive neck structures from injury. These posters have been translated into 14 languages, with Bulgarian soon to follow. They are free to download from her website www.freedogz.be



Els began by explaining that behaviour and movement go very closely together, to the extent where resolving some behavioural issues can involve physical exercises. She stressed that she was not talking about pain or physical therapy, but about exercises that we can do as dog trainers or behaviourists. Before that, there are a few things we should know and that we can easily apply in our everyday work with dogs.

The three foundations upon which her approach is based are 1) body awareness, 2) the feedback loop between body and emotion, and 3) behaviour and movement.

1: BODY AWARENESS

Body awareness is the means by which we make a distinction between "what is me" and "what is my environment". This distinction between self and everything else is hugely important and is not something we are born with; we need to develop it. Once we have body awareness, it helps us to structure the outside world and prevents us from getting "lost" among all the stimuli that bombard us every day.

Body awareness develops from birth through the senses. The reason we are not born with it is because in the uterus, whether human or dog, there is no distinction between the foetus and mother (and siblings). All the information that comes to the foetus is filtered — by nutrition, hormones, and other aspects of the mother.

Even sound is different when filtered through the womb. However, from the moment of birth there is a clear distinction.

Sensory stimuli

We do not just have five senses, nor even a "sixth sense"; we have eight. The external ones, which we are all familiar with, are visual, auditory, tactile, olfactory and gustatory. But we also have three internal senses: vestibular, interoception and proprioception. The vestibular apparatus in the inner ear has to do with balance in relation to gravity. Interoception is hugely important. Every newborn animal is constantly getting a huge amount of information on how they are functioning. The individual is not consciously aware of how much oxygen they have in their blood (blood saturation), but the brain is getting that information. We may first become aware of it when we feel little dizzy, for example, and open a window to let in a bit more air.

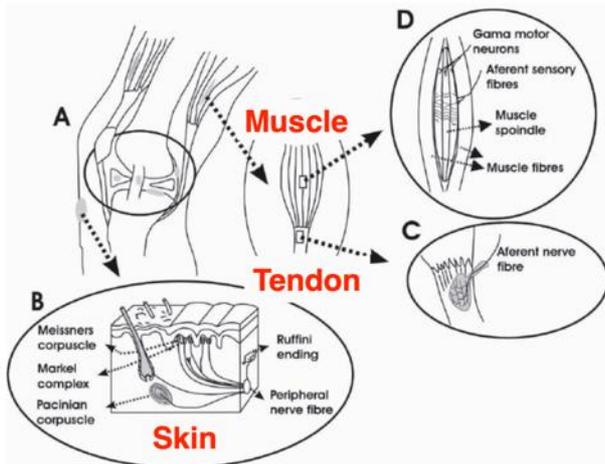
Of all these senses, there are three that are especially important: tactile, vestibular and proprioception.

Proprioception

We know where our feet are, or how far our knees are bent, without having to look at them. That is because there is a constant flow of information from our muscles and skin regarding how far they are stretched. There is

also information from the tendons and joint capsules. This mass of information reaches the brain, gets integrated, and this makes us aware of how our body is positioned.

What is important to remember is that this huge amount of information can affect behaviour! Thus, if we can do something about this information, we may be able to bring about behavioural change.



Proprioception

Tactile input

This is aimed primarily at discovering the world. For example, if I touch a table, what am I actually feeling? Do I feel the table? I don't have sensors in the table, but I do in my fingers. So, I am actually feeling my own limit. I feel that my body stops at the table, and the table continues from there.

This can be used passively, for example by stroking a dog. The dog is passively receiving the stroke. It can be used actively, for example by getting a dog to walk on different surfaces. Dogs will actively lick or touch things with their nose. This always helps a dog or a human to become calmer, because it separates external stimuli from the individual.

Some dogs lick themselves to sleep when they are tired, or they look for something to chew. It could be a coping

mechanism by which they set themselves apart from the environment, so that they can cope with all the stimuli heading their way.

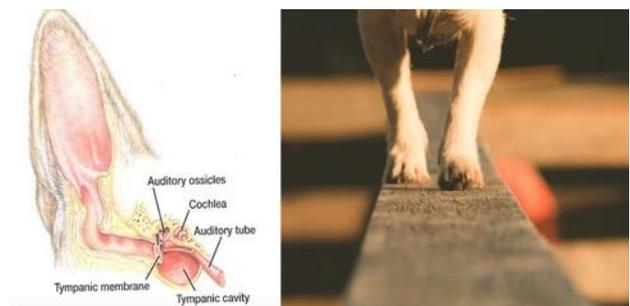


Tactile input: body, tongue, nose, paws.

Students who are studying for exams, for instance, may bite their fingernails. They should not be discouraged from doing this, as it helps them cope. It would be removing their coping mechanism by which they try to structure the outside world in order to study. They need to structure all the information that is coming from their books so they can reproduce it. Therefore, they are constantly stimulating their own body awareness. Taking it away will have an effect on their test scores. It is the same with dogs; we should not be taking things away when they need to put something in their mouth. We should instead ensure that the object is safe. Els mentioned that her Labrador always wants to carry a beanie (type of hat) when visitors arrive, so she has a stack of those by her door.

Vestibular input

Why do puppies tilt their heads when something intrigues them? They are giving themselves some vestibular input. Could it be that they use it to distinguish themselves from the environment, so they know where the "thing" is in relation to themselves?



Vestibular input involves balance.

This is why people relax in rocking chairs, or babies calm down when we rock them. This setting apart from anything that is overwhelming helps cope with the input.

Although we may do a lot of body stimulation in puppy classes, if the classes are too busy, we are overstimulating the systems and the puppies will not get the conclusions they need in order to develop body awareness.

It is very easy to stimulate vestibular awareness by allowing our dogs to walk on and off things. It is very easy to stimulate body awareness, but often it is overdone and there are too many external and internal stimuli.

A very simple exercise is to place a few sticks on the ground and have the dog or puppy do a treat search. Els showed a video of a senior, shut-down and depressed dog, which for the first time was doing a pâté search amid a pile of rubble. The first time he did this, he could only cope with the situation for a few seconds. Els stressed that an absolute prerequisite to helping dogs develop body awareness is freedom of choice.

When people are depressed, they are often told to become more active. Sports or other activities, like gardening, heighten the distinction between "body" and "environment" and mitigate the overwhelming nature of the stressors. Body awareness leads to calmness.

Body awareness is one of the foundations for developing normal social behaviour and coping strategies. For puppies, this should be really simple. They cannot do anything else BUT develop body awareness. They are using their body throughout the day, even when asleep. The biggest danger is over-triggering them: putting them in puppy classes that are overcrowded, way too big, or going on for too long. Keeping things simple helps the puppy to integrate. It is not so much a question of what stimuli they are getting, as the fact that the brain needs to develop in order to integrate them.

For young dogs, what we should be careful with is WHEN and WHERE we do certain exercises. Young dogs don't grow consistently in all directions: suddenly their bum may be sticking out, or they don't know what to do with their front paws, which don't have the same shape they did a few weeks ago. During puberty there is a huge amount of interception going on. These young dogs essentially have to create a somewhat different body map. That is why a young, adolescent dog has a shorter attention span. It is why we have to be careful with the amount of walks we take them on, because as the body changes, they may develop a compensation movement that may become permanent if we overdo it.

Small dogs

For small dogs it is often more difficult to develop good body awareness, especially in terms of stability. Small dogs often need to walk fast or even run to keep up. What we need for these dogs is slow exercises, where they can concentrate on themselves. Also, moving fast makes it more likely that the dog will lose its balance. Many small dogs never develop enough stability because they are never walked very slowly.

This also applies to dogs that are very nose-oriented. Scent dogs, especially of the working type, move very fast. This is because olfactory information is the only sense that goes directly to the cortex in the brain instead of being filtered through the limbic system. Thus, the dog reacts immediately. This tends to override their possibility to go slow. They might therefore have problems developing proper balance or dealing with slow vestibular input.

2: BODY-EMOTION FEEDBACK LOOP

We all know from our own experiences that there is a clear feedback loop between body and emotion. When we are stressed, our body becomes tighter. Els demonstrated, to the everyone's amusement, the difference between holding a pencil between one's lips and between one's teeth, and what that does to the facial muscles. To demonstrate the effect on emotions, a study had people doing this while watching cartoons. Those who held the pencil with their teeth (causing the facial muscles to smile) found the cartoons funnier than those who held it with their lips. The reason is that there is a feedback loop triggering the brain to think one is happy. The bottom line is that if you are having a bad day, make an effort to smile and it will change your day. Another study did this with the whole body, rather than just the face. People were given body positions to practise for about 5 minutes before going in for a simulated interview. Those who had practised "power poses" did much better than those who had practised submissive body language.



Holding a pen between your teeth uses the same facial muscles as when you smile. People seeing cartoons find them funnier with the pen between their teeth than between their lips.

A huge amount of research has been done on Botox and empathy. Botox injections affect the muscles in the face and make it harder for those people to show empathy. Empathy is shown primarily by the listener mimicking the expressions of the speaker. Studies have shown that people who are not able to show empathy with their face also feel empathy a lot less. We need our own body feedback to tell us about the emotions we are experiencing. We need to be able to mimic the other person's emotion in order to feel it ourselves.

So, if a dog is slouched over and depressed, perhaps it could help if he could lift his head or get a better body posture. It does *not* mean we should forget about any behavioural plans we have in place, but it could well help. The dog may be stuck in a movement pattern that will keep him in a feedback loop of feeling depressed. Remember, proprioception has a huge impact on the brain. For a slouched dog, Els said she would not recommend treat searches with the head down, but rather those that involve stretching the head upwards (treats in trees, on poles etc.). Of course, there can be treats at ground level, but the dog can be encouraged by the best treats being a bit higher up. Interestingly, anything in the body that sags or works sub-optimally is called "depressed" – like joint depression or organ depression. Straightening up, like a timid dog Els talked about that finally reached for pâté on top of a pole, can affect the whole behaviour.

Stretching the paws upwards is also great because it stretches the whole abdominal area. When a dog is stressed or fearful, the first thing it does is contract its abdominal muscles.



A dog can be encouraged to stretch its abdominal muscles with a simple technique like a stool.

Els showed a picture of a Boxer bred to have its weight on its front legs, which gives these dogs a "power pose". However, in a social context, his body will be telling him that he is ready to engage rather than walk away. Els' approach to this would be to have the dog shift its body weight off the forelimbs, and to do this exercise regularly. However, Els admitted that for dogs bred this way, it has not been enough. What she also needs to focus on is their balance and stability, especially in the hind legs.

3: BEHAVIOUR AND PHYSICALITY

Stability and balance get priority over any other activity. In the 1980s, it became trendy in some schools to have children sit on exercise balls rather than chairs. This was supposed to be better for their backs, but the development of handwriting skills became very poor. This is hardly surprising, because if your body is not stable,

how can you do something that requires as much stability as handwriting? Overall school results also began to deteriorate. Most of the children's energy was being diverted to maintaining their physical stability rather than learning. Stability means safety, and even though we may not actively be paying attention to it, our body will be.



With this in mind, how does stability affect behaviour?

Most reactivity happens through a certain fear. Els shared that she sees a lot of problems with reactive dogs that may suffer from poor back conformation, including hip dysplasia and instability. This lack of stability may cause a dog to lose self-confidence, resulting in fear-related issues and other problems. Using exercises to improve stability may not totally resolve behavioural issues, but they can do a lot to help.

Els showed video of a small dog with instability in its rear. We tend not to notice this in small dogs; in a Great Dane, one would probably try to get help. The small dog in the video was wagging its hindquarters, but when Els slowed it down, it was shocking to see how wide a stance his back legs had adopted. When he was standing with his hind legs positioned normally, if he reached for a treat on the floor, his whole body would start leaning over. He would compensate by spreading out the hind legs. Interestingly, he was also aroused, because in order to maintain stability he had to tighten his abdominals.

What about pulling on the lead?

Sometimes, dogs lean into the lead because they have problems stabilising their front. Asking them to walk nicely on the lead could be something they are not physically able to do. If the dog has been pulling for years, it is unlikely that he has the physical ability to go slow. This will have to be done gradually.

The first thing Els looks at when she gets a behavioural case is how much balance there is in the physical body. And for that, the dog needs body awareness, so he can cope with outside stimuli without getting overstimulated.

Inner balance and outer balance

Els makes a distinction between these two. People or animals on unstable surfaces, like balancing boards, are not focusing on their body but on their environment. A dog on a wobbly surface cannot concentrate on his posture; he is just concerned that the surface beneath

him is unreliable. He will not be building that much body awareness. The little dog Els showed us had been doing balancing-board exercises for years, and they hadn't helped.

How can we get a dog to focus on what is going on inside his body? A very good way is to have the dog on a stable beam. If the dog can trust the surface not to do anything funny, his focus can be on what he is doing and how. The surface does not have to be high up, but it needs to make the dog concentrate on what he is doing.

Els showed video of a dog that was overactive, pulling on lead, and often pushing into and nipping people. She had very poor body awareness and was wholly incapable of walking nicely on lead, because everything in the environment overstimulated her. Walking on a beam helped her to focus.

Once the dog understands how to get onto, stay on and walk on the beam, the person can then start walking around him, or using some other mildly distracting stimuli. The dog will understand that he can stay on the beam during this time; that is body awareness.

A common complaint from owners is difficulty getting a harness on their dog. He will just not stand still! The dog may be so excited he's going out, and being touched, that he can't cope with the stimuli. The dog may simply be unable to stabilise himself in that situation. Els' dog, a Labrador, had a similar situation. When they came back from a walk he was frequently wet, so she would have to towel him off. For a long time, it was a struggle to get him dry, because he could not stand still. Els practised doing it on a beam, perhaps five times over a period of three weeks, and she never had to do it again.



Many issues can be resolved by helping the dog find its balance. In this case, towelling off on a beam.

Another really good exercise is to get a dog to step over the rungs of a ladder placed on the ground or slightly higher. The moment the dog is standing on one hind leg to lift the other over the ladder rung, he needs to stabilise his pelvis.



Els showed another video of a larger dog that had very severe hip dysplasia. It was so bad, one hip had to be removed. He was a perfect example of how instability in the body and fear are closely intertwined. Noise phobia was a constant in his life. The owner brought him for physical treatment, but Els could not touch the dog; it was too overwhelming for him. One way that Els helped him find his own body again was to squeeze his front paws. Els used to work with people with dementia. When people (and possibly dogs) get dementia, they start losing their body awareness. Physiotherapists and occupational therapists look for what kind of stimuli they need, so they can get some sense of their own body back. For these people, having no body awareness is very frightening and especially disorienting. It could be why they start shouting, because it gives them input. It could also be why they start walking around, because it helps their proprioception. They may also rock for the same reason.

When this dog was overwhelmed by sound stimuli, what they did was give him some alternative input. Squeezing the paws helped him orient himself. The owner had done a lot to manage their home to help him, but the answer came when they really squeezed his paws. The squeeze had to be quite hard, because he needed a lot of input. After he started with the beam, the owner no longer had to squeeze his paws. He didn't do the beam exercise that "well" in that his back legs were not on the beam most of the time, but it was enough. It was perfect for him. He quickly learned to walk on the beam, but neither it nor squeezing the paws was needed any longer to deal with his noise phobias.



Use of a sharp-edged beam is important. Using a round-edged beam does not give as much input. Walking on a beam gives proprioception, but the edges of a beam provide tactile input as well.

Another case that Els had involved a dog that had done a lot of trick training and obedience. She was constantly trying to offer behaviours to her owner. The dog was highly stressed and very tense physically. In order for her to stretch out her body, Els put pâté on soft poles stuck into the ground quite close to each other. The dog had to walk around and between them. This calm activity was great for her flexibility and state of mind. The pâté was smeared onto the posts both closer to the ground and higher up.

Surgery can have an effect on body awareness, because the cutting severs some of the connections from that part of the body to the brain, even if it is only skin deep. There is a lot of information missing from a limb when a dog has surgery there. They need to rewire their neurological circuitry. Classical physiotherapy is still too focused on getting muscles to work again. But it is much more about how the brain will adapt. A dog that had had several operations on its knees was helped by first doing the ladder exercise and getting the limbs to move more normally. A proper neuromotor pattern had to be re-established before the dog could be put through any other physical exercises. Getting the dog to walk over ladder rungs helped her both lift her legs and keep a fairly narrow posture.



Using a ladder helps keep the hind limbs within a normal lateral range, while also encouraging the knees to bend.

Els told us about a fearful dog with kidney problems. The kidneys and fear often go together, because the psoas muscle, a deep core muscle, is closely linked to the kidneys. With every breath they slide over the psoas muscle. Problems in the kidneys can cause tension in the psoas and will have an influence on the stability of the hips. This can cause fear. In humans, many people who have had kidney problems for a long time will end up with hip replacements. Improving stability in this region can have amazing effects.

One little dog that has patellar issues and was very timid benefitted immensely from walking on a beam — despite the fact that the owner did not do it the way Els had asked. Instead of the dog walking on the beam and turning on it at each end, he was turning around in the middle and not walking to the ends at all. But it worked,

and the owner was astounded at the behavioural changes in this shy little dog. He has gained a lot of self-confidence and does not jump up every time the owner gets up from her chair. She had tried using the hand signal for a very long time, but it hadn't worked. This did.

A Rottweiler that was very reactive to other dogs, and whose owner was not particularly invested in changing that behaviour ("because it's what Rotties do"), changed significantly after doing exercises on a beam for two weeks. The dog loved tracking but had significant instability in the back legs, and Els had insisted that this be dealt with first.

It is all about changes in the brain. It is about changing the neuro-motor pathways, not so much the muscles.

How do we go about it? It has nothing to do with quantity, but everything to do with quality. Unlike muscular training, there is no fatigue of the muscle. Also, it is important not to fatigue the brain. A fatigued brain will revert to its old habits. What is important is to get new *connections* in the brain, and it takes a lot of concentration.

GO SLOW!

Going slowly is so important. It is all about concentration and stability. Learning a new skill doesn't happen fast. It has to be integrated into the brain so that neuro-motor patterns can develop.

But don't be afraid to try! Less is more only when "more" is too much. Just observe carefully.

QUESTIONS

Several members of the audience asked questions afterwards.

The first question was whether Els talks to the dog when doing the exercises. She said no, hardly at all. It's important to let the dog focus.

Another question was how Els gets a balance between concentration and luring. If the dog is focused on the treat, how can it concentrate? Els replied that she also uses treats to get calmness. With one dog she was constantly rewarding him so he wouldn't get frustrated and try to produce alternative behaviours. Els has not yet come across a dog where she cannot use treats. It depends on *how* they are used. In fact, getting the treats is already a concentration exercise in itself. In some cases, it is best for the dog to get the treat a bit further on. It really all depends on the dog. For stretching, Els prefers to use e.g. pâté that she can smear on something to make the dog stretch.

Someone asked whether the beam exercise is good for an old dog with arthrosis. Els replied that it depends so much

on what kind and where the arthrosis is. The ladder could be a good start, but that depends on whether the dog can bend her knees. It also depends on the size of the dog and how high the rungs are raised. There are so many variables, there is not a single answer.

An excellent question was about the width of the beam. The small dogs walk on 10cm-wide beams and the larger dogs on 20 cm.

Finally, the issue was raised about water therapy. Els said the hydrotherapy has its place. In her opinion, however, at present it is overhyped. Hydrotherapy is excellent for a dog that has had surgery and has not been weight-bearing for a while. Water is the best way to start. It will carry the dog's weight, and the water depth can gradually be diminished. But what does water do for body awareness? How "normal" are movements in water, and how does it relate to moving in air? One little dog that Els showed a video of had been doing a *lot* of hydrotherapy. Once she became weight-bearing after her surgery, she was still undergoing hydrotherapy instead of normal weight-bearing exercises. What Els does see in dogs that do a lot of hydrotherapy is a big increase in muscle bulk,

possibly because they are moving against resistance. But once they stop doing it the muscle bulk goes away, so there was no functional gain in the long run. Increased muscle bulk does not stop the instability. Running on a treadmill at the gym feels different to doing it in real life. So, if we want to change our stability by running on a treadmill, it won't apply to our situation in an everyday environment or normal walking. The pathways in the brain will be different.

In water, the tactile information the dog gets is quite different to that outside the water. How the dog maintains its balance in water is not the same as in air and the neuro-motor pathways are not the same. All the things that help a dog gain body awareness are different in water than in air. Els stressed that she is not against hydrotherapy, but that it needs to be used only where necessary, in order to move on to something else when the dog improves.

Thank you Els for this amazing talk! We probably all rushed out to get wooden beams and ladders after this weekend!



Analysis of calming signals in domestic dogs – Are they signals, and are they calming?

Chiara Mariti, Italy

Chiara Mariti graduated in veterinary medicine in 2003 at the University of Pisa, where she also obtained a Masters in Behavioural Medicine and a Ph.D. in horse behaviour. At present she is a researcher at the University of Pisa, where she focuses most of her research on pet behaviour and welfare and on anthrozoology. She is a diplomate of the ECAWBM subspecialty in Animal Welfare Science, Ethics and Law. She is a board member of ESVCE (European Society of Veterinary Clinical Ethology) and founder of AVEC (an Italian association of veterinary behaviourists).



Chiara began by saying that the first thing that came to mind when she was asked to do a presentation was that when people talk about dog behaviours, they want to know the meaning behind these behaviours. Is the dog trying to communicate something to other dogs or to people? People's understanding is often based on observations, which can be biased.

Regular observations are nonetheless very useful, because they form the basis for research. An observation can be used to form a hypothesis, which is then tested to (hopefully) eliminate the bias.

For example, say you want to buy a new car and you have already decided it is going to be a Toyota. Then a friend suggests a Peugeot instead. Your first reaction is that there are very few Peugeot cars around, so Peugeot must be bad. But when you go out, you start noticing that there are Peugeots everywhere! Before someone suggested a Peugeot, you never paid attention to them, so you didn't notice them. Now you are giving much more relevance to your observation. Perhaps now you will decide to get a Peugeot, but there aren't any more or less of them than before someone suggested it. This is normal psychology.

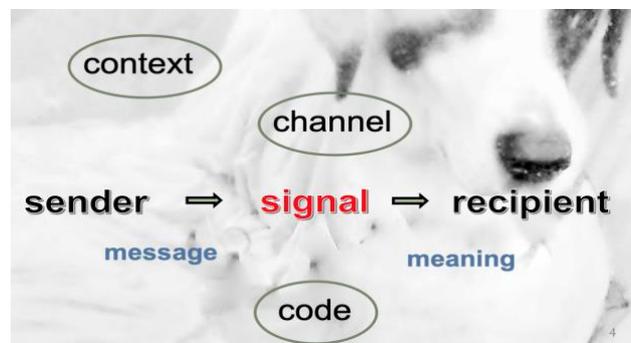
Another common bias, both in everyday life and in research, is the so-called confirmation bias. This is the approach where a person forms a hypothesis or belief and collects information that confirms that belief (which they then consider to be relevant and reliable), while dismissing information that contradicts it. One way this occurs, for example, is collecting information through a questionnaire but only highlighting those answers that are consistent with our hypothesis.

To avoid this bias there must be a proper study design. This is not as easy as it seems.

INTRODUCTION

Chiara's talk focused on a study she had set up based on Turid Rugaas' observations on calming signals.

We know that domestic dogs are social animals, so communication is essential. There are many different definitions of communication. Chiara chose the following: For practical purposes, communication can be defined as the transfer of information that occurs when an individual (sender) sends a signal that MAY modify another individual's behaviour (recipient) (Landsberg et al. 2013). The degree of influence depends on how the message is transmitted and how it is interpreted at the receiving end. Also, the message is not necessarily intentional. There can also be many different signals for the same message, depending on the channel. Dogs use many different channels, even at the same time. Visual communication is a physical channel, whereas olfactory communication is a chemical one. The meaning of the signal, however, is determined by the recipient.



For the signal to make sense, both the sender and the recipient have to share a common code.

The same signal can have different meanings depending on many factors. One of these factors is the context in which both the sender and the recipient find themselves.

Visual communication is important to maintain cohesion within the group, e.g. for conflict resolution. This has been studied in domestic dogs (Cools et al. 2008, Cozzi et al. 2010). The study of visual communication within the same species (intraspecific) started with wolves. Dogs and wolves show similarities, but their behaviour is widely influenced by both phylogenic (domestication) and ontogenic (living in a domestic environment) factors. Phylogenic factors are related to the whole species. For dogs, the most important process has been domestication. This brought changes in morphology and behaviour, which today are evident throughout the domestic dog species but are not found in the wolf. Ontogenic factors are related to the individual and depend on its socialisation, the environment in which it lives, and so on. Dogs usually live at home and wolves in another environment. There are a few wolves living in a home environment, and it is well known that they are not nearly as easy to manage as the domestic dog.

There are substantial differences between dogs and wolves, especially in their intraspecific (social) behaviour. There are differences in both the social structure and in aggressive behaviour. In the 1950s already, a study (Scott 1950) found that most dog breeds have a higher threshold for aggressive behaviour than wolves. This has an influence on body language in agonistic encounters.

Further, no other species show the wide range of differences as do dogs. The morphology of canines can be very different depending on the breed. This can have an impact on communication, especially in breeds that differ the most from the lupine (wolf) morphology, as Martin Fischer pointed out (see Part 1 of this report). In some cases, certain signals cannot even be displayed.

Paedomorphosis is a fancy word for the retention of juvenile characteristics in the adult, whether in the animal's behaviour or morphology (appearance) or both. Certain dogs tend to retain infantile appearance, and this also influences visual communication.

Putting all this information together, it is clear that drawing conclusions on the behaviour of dogs by observing wolves can be misleading. Therefore, if we want to know more about dog communication, we have to study dogs. This is what Chiara and her team did.

Aim

The aim of the observational study was to assess, based on Turid Rugaas' book 'Calming Signals', whether the so-called calming signals in dogs are really that. Is it a signal, and is it calming?

There were four hypotheses to be tested:

- 1) Signalling: Are calming signals really signals?
- 2) Reducing aggression: Are calming signals really calming? Do they reduce aggression?

- 3) Do calming signals prevent aggression?
- 4) Do they self-calm the dog that is displaying them?



Subjects, materials and methods

In order to carry out the study, the team set up encounters between dogs, two at a time. In each encounter, they focused their attention on one of the two dogs. This focal animal was called the sender (emitter) of the calming signal. Each sender met four different dogs (the receivers of the calming signals).

Subjects, materials and methods

Dogs meeting in couples.

Focal sampling on a dog, the sender, who met 4 receivers:

1. Familiar female dog
2. Familiar male dog
3. Unfamiliar female dog
4. Unfamiliar male dog

At least 5 times
1 in the last week
15 minutes
free to interact

Never met before

For each sender, there were four receivers. In all, there were 24 sender dogs. All of them were adults. In all, they observed 96 meetings.

Subjects, materials and methods

- ✓ 24 adult dogs, 12 ♀ (4 spayed) and 12 ♂ (2 neutered), 37.3±32.1 month old
- 96 meetings
- ✓ Standardized outdoor fenced area 5 x 5 m
- ✓ 2 min exploration
- ✓ off-leash, at the presence of the owners
- ✓ videorecording for 5 minutes, 2 videocameras

The environment was standardised by having a fenced-in area outdoors. Before each encounter, each dog was allowed to explore the area for two minutes. With the owners present, the dogs were off-leash and free to interact for five minutes. The encounters were recorded by two video cameras. The reason for using video recordings, rather than simply observing the dogs in the

field, was that 1) the human eye can easily miss subtle behaviours or 2) quick sequences of calming signals; 3) a video recording is more objective and 4) enables intra- and inter-observer reliability to be checked.

Chiara showed a video sequence in slow motion of two dogs in a 'playful' interaction. One of the dogs was licking the other's mouth, making itself lower and smaller, turning the head etc. It took Chiara longer to describe what was going on than even the slow-motion clip in its entirety. In the trial, they observed the videos frame by frame.

Another advantage of video work is its objectivity. Chiara showed two stills of a dog with the same body posture but very slight changes in the position of the mouth. What was clear was that since we didn't know the context, most of us were guessing the dog's emotions. The only thing we all agreed on was that the dog was alert and somewhat stiff, but possibly starting to relax a bit in the second picture. This was us trying to interpret the picture, but the point of the exercise was really whether the dog had an open mouth or not. Chiara had asked "what do you see?" and we all tried to understand the dog's emotion rather than simply observing that its mouth was open.

Another still of a dog with its front paws stretched in front of it. Again, some in the audience said it was a play bow, others said it was a stretch, some said the dog was worried and others that it was relaxed. We were still trying to interpret the picture! That is why videos are so important, because the same behaviour can be looked at many times, and the differences measured between observations. Even the same person will make different observations. The level of agreement in our setup was so low it was useless for research. When Chiara showed the video clip (i.e. the context), it becomes clear that the dog was just stretching.

There were two video cameras: one fixed in one corner, and the other hand-held in the opposite corner. This helped with measuring the distance between the dogs in the enclosure. The handheld cam provided more detail on the dogs.

Managing risk

Having dogs meet off leash always has a certain element of risk. To minimise this, dogs were excluded that showed any signs of overt aggression towards other dogs. The participant owners were interviewed by a vet behaviourist to exclude any problems like deafness, blindness etc. Big size discrepancies were also avoided. Seven small dogs were used together, and 17 medium- to large-sized ones.

Owners were always present within the enclosure. They were instructed not to interact with the dog; they had to remain silent and not stare at the dog. However, they

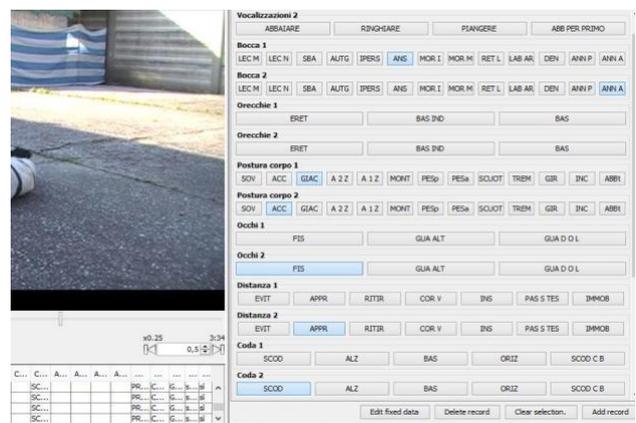
were to intervene if they or the researcher felt it was necessary.

There were no more than two encounters per day, and a break of at least 10 minutes was taken between meetings.

A list of calming signals was compiled based the book by Turid Rugaas (2006) and tabulated along with detailed descriptions of each signal. The only one they did not have was splitting (dogs going between other dogs) because only two dogs were in the enclosure.

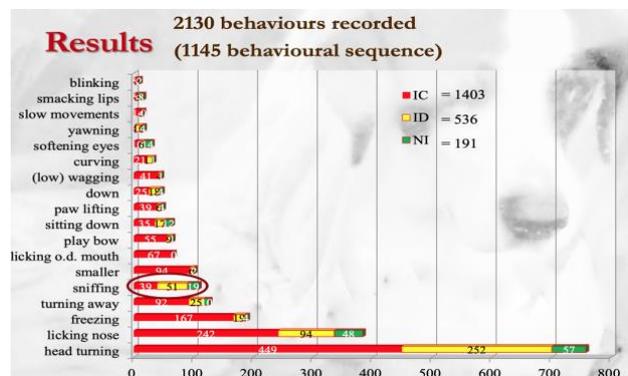
Hypothesis 1: Signalling?

In each case, the observer recorded their observations by clicking the appropriate box on the software interface. This was done every time a calming signal as defined in the table was displayed by the "sender dog", or a sequence of up to 3 signals. For example, "Dog turning head".



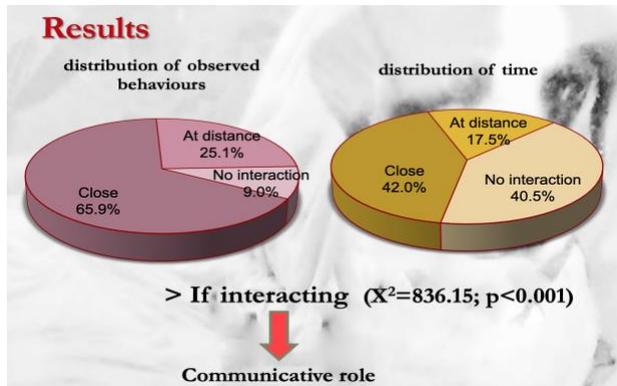
Part of the software interface for frame-by-frame examination of video clips showing interacting dogs.

Types of interaction were IC (close up), ID (distance greater than the dog's length) and NI (no interaction). NI could involve a dog emitting calming signals but there was no direct interaction between the dogs.



Over 2000 behaviours were recorded and over 1000 behavioural sequences, which is quite a good number. By far the most prevalent signal was head turning, followed by licking the nose, freezing, and turning away. Most of

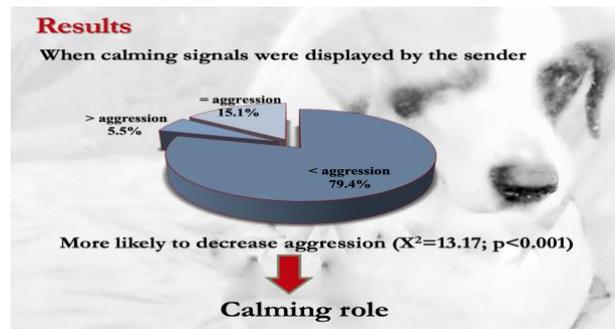
the behaviours were displayed during close interaction, but there was some even when the dogs were not openly interacting. The exception was sniffing the ground, which was displayed more when dogs were at a distance from each other.



If we look at the proportion of all the behaviours together, it was found that just 9% of cases the behaviour was performed when the dogs were not interacting. In the vast majority of cases, the dogs were interacting and emitting this behaviour. Is this enough to say they were signals? No, but it was much more likely that a behaviour would be displayed when the dogs were interacting. The researchers measured every single second and did a time distribution. What they found was that the dogs spent 40% of the time NOT interacting with one another, and 42% of the time they were close up. So, there is a huge discrepancy from the pie chart on the left. However, when they did a statistical test, it was found that the behaviours were much more likely to be displayed when dogs were interacting than when they were not. This suggests a communicative role.

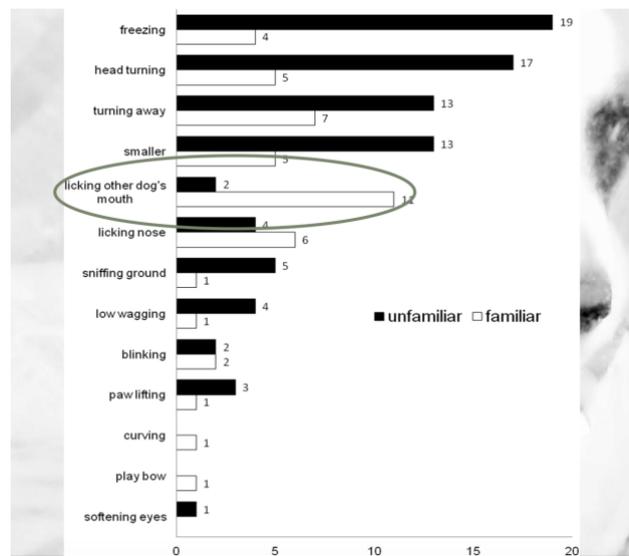
Hypothesis 2: Reducing aggression?

Are calming signals really calming? To test this hypothesis, the researchers recorded every time the RECEIVER dog displayed an aggressive behaviour like biting, snapping, growling or aggressive barking. When such an episode occurred, they analysed whether the SENDER dog had emitted a calming signal. Fortunately, due to the exclusion criteria they had put in place, such events were rare. Using Shepherd's Ladder (2009), they observed whether the signals were increasing or decreasing. Out of 109 aggressive episodes, in 30% of cases the sender dog (the one being observed for calming signals but receiving the aggression) did not send a calming signal. But in two thirds of cases it did emit at least one calming signal. From a statistical point of view, it can be said that after having received an aggression it is more likely that a dog is displaying a calming signal than not. And in 80% of cases this succeeded in reducing the level of aggression of the other dog (see following figure).



Therefore, from a statistical point of view, it is more likely that after a dog displays a calming signal, the aggressor dog reduces its level of aggression.

This supports the hypothesis that calming signals do indeed have a calming role. The behaviour most encountered in this context were freezing when the other dog was unfamiliar or licking the other dog's mouth when it was familiar (it would be rather risky trying to do it to a stranger!). Aggressive episodes were more likely to occur between unfamiliar dogs.



One interesting result was that in many cases it was the same dog that was receiving aggression. It seemed it was provoking the others by sniffing them insistently. After a while, the other dogs responded aggressively in order to get distance from it.

Overall, when a calming signal was not displayed, in three cases there was an aggressive response, and in seven cases if the other dog kept doing the same thing, the aggression stayed the same or increased. However, if the irritating dog moved or danced away, the level of aggression decreased. After all, the aim of aggressive behaviour is to increase distance (Beaver 1999). Therefore, if you receive an aggression and you increase the distance, you may reduce the aggression.

Hypothesis 3: Preventing aggression?

Do calming signals prevent aggression? Although it was observed that the recipient of an aggression had not displayed a calming signal, and that calming signals reduced aggression, it cannot be known for certain whether calming signals play a role in preventing aggression altogether. However, it cannot be ruled out. In that case, calming signals would be effective or specific than the cutoff signals described by Fox in 1972.

Discussion and Conclusions

The results support the hypothesis that calming signals play a significant role in canine communication, namely reducing aggression and thereby calming the receiving dog. However, we cannot generalise these results to overt aggression, because the study excluded dogs that had this tendency. This is what can happen in e.g. dog parks, because owners tend to stay away if their dog has aggression issues.

The second thing that can be discussed is that these behaviours are signs of stress, but it is not contradictory to their calming role. Let's say that you are stressed. Because of that, you are displaying a certain behaviour. Another person can see this behaviour and will change their behaviour accordingly. There is a kind of feedback loop between you. This happens also in dogs. Remember that communication does not have to be intentional.

Chiara said that in her opinion, a dog that is stressed is behaving in a certain way and communicating to the other dog that it is stressed, with a consequent reduction in aggression.

Hypothesis 4: Self-calming?

Do calming signals have a self-calming function? Chiara said she simply doesn't know. In the study she did not have parameters that she could use to measure what the dog was feeling. The only thing she could say was that some colleagues of hers have published a paper that looks at stress in horses while measuring the heart rate. They found that horses that displayed certain behaviours had an activation of the parasympathetic system, so it was a way of coping. However, there is no data in dogs.

Chiara finished with a well-known saying: "Every morning in Africa, a gazelle wakes up. It knows it must run faster than the fastest lion or it will be killed. Every morning a lion wakes up. It knows it must outrun the slowest gazelle or it will starve to death. It doesn't matter if you're a lion or a gazelle. When the sun comes up, you'd better be running."

Chiara adapted it as follows:

"Every morning a dog trainer wakes up. He/she knows he must understand dogs, or he will be bitten. Every morning a dog wakes up. He knows he must communicate the best he can to be understood and avoid punishment. It doesn't matter whether you're a dog or a trainer. When the sun comes up, you'd better communicate."

Thank you, Chiara, for this fascinating topic, showing us the value of proper and well-planned research!

