

# The Magic (Therapeutic Benefits) of Nose Work for Companion Dogs



A thesis presented to The  
International School for Canine  
Psychology & Behaviour (ISCP)



In fulfilment of the ISCP Diploma in Canine Behaviour Course

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April 2020

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# Abstract

Providing enrichment in the form of Nose Work activity to our companion dog is good welfare. Nose Work activates the SEEKING system and allows them to express natural behaviours. Not all Nose Work classes are the same, how we introduce Nose Work in the beginning can significantly influence the emotional state of the dog. The magic of Nose Work comes from promoting a positive emotion state in the dog.

## Introduction

Dogs have been living and working along side with humans as early as 33,000 years ago. Whether they have been working along side with our ancestors to hunt down prey or in the modern world where they sniff out diseases, the dog's supreme scent of smell has benefited humans.

Wild dogs spend about 80% of their waking hours hunting and scavenging for food, while the modern day companion dogs spend most of their time sleeping while we are away at work all day. And when we come home, they are served with free food in a bowl and no effort required from them. The result is dogs get bored, often overweight and have too much energy and that is the the recipe for behaviour problems.

You probably heard the activity of Nose Work is good for our dogs. You might also hear stories of fearful and anxious dogs coming out of their shell after attending Nose Work classes. We sometimes say that is the magic of Nose Work. I am keen to understand from a scientific view how it is magical and why it is therapeutic for dogs.

What exactly is therapeutic for dogs means? How is Nose Work therapeutic for bored, anxious or reactive dogs? In this thesis, I seek to explore how the activity of Nose Work can activate the Seeking System and the flow on effect of the positive emotional state to the dog. I will briefly list how some of the beginner Nose Work classes are taught. And finally, what you should look for in a Nose Work class if your goal is to enhance the therapeutic benefits.

The Cambridge dictionary defines therapeutic as “causing someone to feel happier and more relaxed or to be more healthy”. So in our case, the bored dog will find the activity fun and enjoyable. It has an outlet. It is physically and mentally stimulating. For the anxious/fearful dog, it will feel much calmer and more confident in its surroundings. For reactive dogs, the triggers that cause the reactivity is absent and the dog is relaxed and comfortable with its environment.

## The SEEKING System

Jaak Panksepp was an Estonian neuroscientist and psychobiologist who coined the term “affective neuroscience”, the name for the field that studies the neural mechanisms of emotion [11].

According to Panksepp and his colleagues, there are seven basic core animal emotional systems, they are SEEKING, RAGE, FEAR, LUST, CARE, PANIC/GRIEF and PLAY. These emotional systems are rooted in deep sub-cortical areas of the primitive brain across all mammals. In other words, all mammals can experience these seven core emotions.

The SEEKING System is considered the master emotion of all. When an animal is in a state of exploration or anticipation, the SEEKING system is activated. When the SEEKING system is activated, it was found there is a huge release of neurotransmitter dopamine in the brain. This chemical release tells the brain that whatever it just experienced is worth getting more of. And that helps animals and people change their behaviours in ways that will help them attain more of the rewarding item or experience. It is the Mother nature way of motivating, giving a rush of energy and a feeling of buzz and excitement to the animal for the acquisition of resources. An example can be a tiger seeing a potential prey. The SEEKING system is activated as the tiger is anticipating the possibility of a meal. A rush of energy, excitement and focus is felt by the tiger. The tiger makes its move but the prey got away. The next time round, the tiger will be just as eager and

wanting to hunt for the prey because the SEEKING activity itself is motivating and it feels good. As soon as the tiger caught its prey and starts eating, the dopamine surge is over. For some individuals, the seeking/hunting/searching itself is more rewarding than the actual reward found.

If we want to understand what is going on in the dog's brain when the SEEKING system is activated, we need to understand the concept of "Emotional Drive". In the Operant world, we tend to just focus on changing the behaviour through consequences, only external events can influence behaviours, regardless of feelings. But as Andrew Hale wrote in his blog "Phantom of the Operant: Recognising the Emotional Drive to Behaviour" [8], he said if we look purely at the operant filter, "we run the risk of not recognising the emotional load that triggered the original behaviour, or the relief the animal is seeking by doing it".

There is a recognition that behaviour is emotionally driven and consequence led. Emotions can be positive/pleasant or negative/unpleasant, so it can also act as reinforcers or punishers. A dog that is being petted by a person that it has great relationship with will feel dramatically different when compared to being petted by a stranger.

One way of looking at emotion of an animal is using the dimensional view of the structure of emotion called the Core affect. It can be defined in terms of two dimensions [17], Emotional experiences are valence - they are positive/rewarding or negative/punishing (on the x-axis). Emotional experiences also vary in reported activation or arousal (on the y-axis).

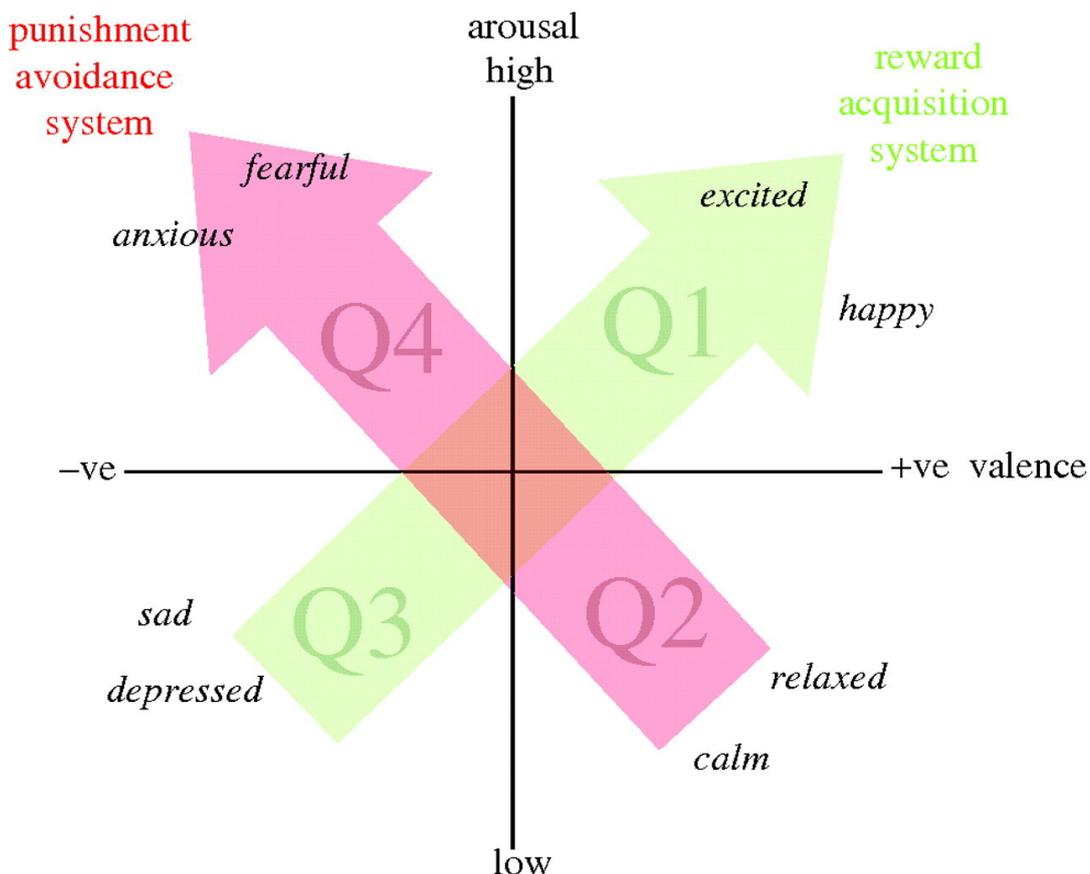


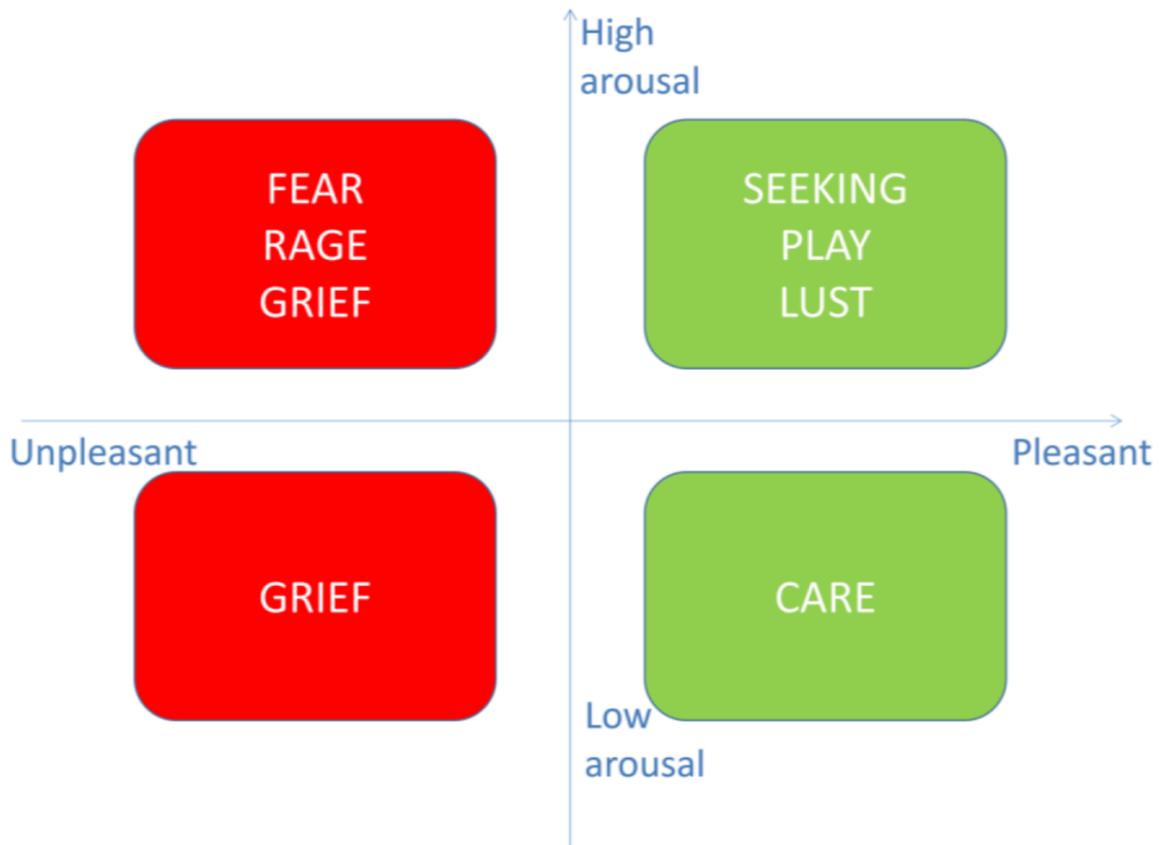
Figure above is the Core affect space - obtained from An integrative and functional framework for the study of animal emotion and mood [17]. Q1 represents quadrant 1. In this quadrant, we can say that the animal is having a positive emotion with high arousal. We can interpret this as excited and or happy. Dissimilarly, quadrant 3 represents as Q3, where the animal has a negative emotion and is low in arousal, this could mean the animal is sad or depressed.

From the figure above, the animal will prefer to feel in Q1 and Q2 and will try to avoid Q3 and Q4. An example is a dog is surrendered to a shelter, it is locked up in a small confined place with no interactions. The dog is in Q3. But when he is adopted in a loving family, his emotion will move to

Q1. Another example is a reactive dog sees another dog coming closer to it. It starts barking and growling. The dog is in Q4. As soon as the other dog has passed and out of sight, the “reactive dog” starts to relax and his emotion moves to Q2.

Another way of modelling emotion is by looking at discrete emotional states in more detail such as the seven core emotions described by Panksepp.

But when we combine the Core affect space with Panksepp’s core emotions we come up with the following representation (diagram taken from Animal Emotions course, Karolina Westlund, PhD).



We can deduce from this diagram that the animal will prefer to spend more time in SEEKING, PLAY, LUST and CARE. They will avoid FEAR, RAGE and GRIEF.

We noted earlier that Nose work activates the SEEKING system. We see the world around us, but our dog smells the world around them. SEEKING helps the animals learn about their environment. It learns to find out where the resources are and where to avoid aversive situations. It gives them a feeling of CONTROL. When an animal feels that it has control, it can counteract the negative feelings of FEAR. So SEEKING generally brings the animal to the resource, it learns what to do in the situation and the animal learns to predict what is going to happen in the situation.

# Nose Work and Positive Emotion State

We know that promoting a positive emotional state for our dogs is through giving them good welfare. When an animal is in a stressful situation, the body releases the hormone cortisol to respond to a stressful event. But if it happens too often and for too long, it can impact their health, weaken their immune system and cause anxiety.

New scientific research by Dr Charlotte Durant and Dr Alexandra Horowitz concluded that dogs who participate in Nose Work have increased optimism, a positive judgment bias test, compared to dogs that just do heel work [15]. This is an interesting piece of research looking at the emotional state of our dogs. It is believed that when our dog is confronted with a new situation, the behaviour and perception of the dog is determined by its emotional state, ie a positive emotional state leads to optimistic reactions; negative states lead to pessimistic reactions. The test is also called cognitive bias test and is often used in applied ethology to study and evaluate captive animals' welfare.

The cognitive training involved the dogs being trained to know that one bowl in one location always contains food, whereas a bowl in another location is always empty. The test involved an empty bowl placed in a new location where they measure the length of time the dog takes to get to the bowl. How fast the dog gets to the bowl would reflect the dog's optimism. There were 20 adult dogs that took part in the studies and they were divided into two groups. The first group was trained to do heel work for two weeks and the second group was trained to do Nose Work for two weeks. Immediately before and after the two weeks of activity, each dog took part in the cognitive bias test. Prior to the activities, there were no differences between the two groups of dogs in the cognitive bias test, but at the end of the two weeks, the latency for dogs in the Nose Work group to reach the bowl was significantly shorter. No difference was found in the heel work group.

Although this is a small study, what could have made the Nose Work group of dogs to be more optimistic in just two weeks of training? Lets look at the Nose Work activity conducted in the two weeks. The dogs started with finding a treat in a box, then expand to one of the three boxes and in the second week, more boxes were put on chairs and further apart to make it more challenging. In the two weeks, they were just given the opportunity to use their olfaction to find their favourite treats.

Dogs in both groups had a chance to earn food rewards, so why the difference? I believe the following factors may have contributed to the dog's positive emotional state.

- 1) The dogs in the Nose Work group were given the choice and control in how they move around to find their food reward. The important aspect of this is that they are in control (ie. no human telling them what to do) and they use their senses to discover the environment around them. Dr. Susan Friedman once said "Control is a primary reinforcer and it is a basic need. Behaviour and learning are the evolved mechanisms to meet that need". When a fearful or anxious dog is given the choice and control to leave the area when he/she is not comfortable with the environment, it is more likely that the next time round he/she will want to explore the area as he/she knows that there is an escape route and a choice to leave. That experience is crucial to build confidence in the dog. When the dog is able to use its senses to investigate, problem solve and find their favourite food, this made the activity fun, enjoyable and builds positive emotion to the game. When the game is fun and they have the choices on how they want to do it, it makes them happy and wanting to do it more. This gives meaning to the phrase "behaviour is emotionally driven and consequence led".
- 2) SEEKING system is activated, hence the therapeutic benefit from releasing the feel good neurotransmitter dopamine in the brain. SEEKING will overwrite the emotion of FEAR. The reverse is also true, fearful animals will not seek. The best way to utilise the SEEKING system in our dogs is through engaging in an activity that come naturally to them. Wild dogs use their sense of smell to track down prey and we can engage in a similar activity with our companion dog to hunt for their favourite food in the game of Nose Work.

- 3) Relating to the above point, they have the opportunities to use the most important senses and express their normal behaviours. We know that a lot of the behaviour issues in our companion dogs are caused by boredom and/or no outlet for their excess energy.
- 4) Sniffing lowered the dog's pulse rates and in turn reduces stress. A team of researchers in France monitored the pulse rates of 61 dogs on walks. They found that when the dogs were allowed to sniff during their walk, their pulse rates were lowered [5]. This lowering of pulse rates is similar to another instinctive behaviour that lowered the dogs' pulse rates, it is "shaking it off". We know that the shake-off behaviour can be the dog's response in dealing with stress.
- 5) Classical conditioning 101 - What is a better way to shift the Core affect space with Panksepp's core emotions from left to right, ie. from FEAR, GRIEF and RAGE emotions to pleasant/positive emotions than with classical conditioning. In the game of Nose Work, we are basically associating the game and the environment (including all the setup in the search area and people) with something the dogs' enjoyed, like their favourite food. Sometimes we hide food on novice objects or doing the search in a novice environment. Associating novice object and novice environment with something the dog loves reduces fear of the object and environment and in turn builds their overall confidence. After all, we use procedures like desensitisation and counter-conditioning by pairing the stimulus with food to reduce fear and anxiety in our dogs.
- 6) We can't look past the Dog/human bond and trust when we evaluate the dog's welfare and the dog's emotional state. There is no doubt that positive reinforcement training improved the dog/human relationship. But I believe properly run beginner Nose Work sessions will further enhance that bond and trust. There is no "criteria" or expectation on the dogs part to perform. The human is relaxed and starts to appreciate what the dog can do rather than focusing on the negative behaviours. When there is no pressure, the dog also starts to enjoy the activity with their human companion.

## Beginner Nose Work Class

As dog trainers, we know there are many ways to train a dog to do the same thing. Modern dog trainers use positive reinforcement (+R) based training and avoid punishment types of training. Even within the realm of +R Nose Work training, there are many different approaches and techniques that the instructor can use in the beginner class. If your reason for attending Nose Work class with your dog is to have fun and receive the therapeutic benefits of Nose Work, then it is more important to look at these variation in techniques and approaches each instructor has on offer and decide if that is the right one for you and your dog.

In the professional detection training world like the Customs and Police detection dog training, the technique used is some sort of scent tubes (just google scent tubes and you can see various types of scent tubes) and lay them out in a row or in a wheel with one of the tubes having the target scent in it. When the dog put its nose in the target scent tube, the reward is delivered through the tube. I have seen Nose Work instructors using a similar approach with the companion dog in the beginner class. I have also seen a slight modification of the technique above where instead of using scent tubes, the target odour is put in a small tin or a tea strainer and holding that on one hand. The other hand is holding a treat. The dog is sitting and facing the trainer and the trainer present both hands. Initially, the dog will try to nudge the hand with treat. The trainer ignores that behaviour, but eventually, the dog will investigate the other hand and its nose touches the target container, it is marked and the reward is given. I've also seen instructors tether the dog on a door handle. Target scent tube is presented and food is used to lure the dog away from the tube. If the dog moves away from the tube, no reward is given. If the dog ignores the food lure and put its nose in the target scent tube, the reward is given. Some instructors only use food in the beginner Nose Work class. Various sizes of cardboard boxes are used to hide the dog's favourite food. The classes are run indoor in a secure area. The dog has the freedom to move around to find its reward. Some classes run one dog at a time while the other dogs are crated away from the search area. Other classes run in groups where other dogs can see each other. You can also see various combinations of techniques and approaches mentioned above. For example,

some beginner classes start with pairing target odour with food. As you can see, the range of approach and technique vary tremendously. An incompatible Nose Work class approach and technique for your dog can not only be unhelpful in improving the dog's emotional state, but can increase the dog's reactivity and anxiety.

So what are some of the ingredients that can make the Nose Work class magical? Below are some of the important considerations when you enrol your companion dog to a Nose Work class, especially the fearful, anxious and reactive ones.

### **1) The dog must feel safe**

In order to activate the SEEKING system and receive all the therapeutic benefits that come with it, the dog must somehow feel safe in the environment. This includes a safe and relatively quiet area in the parking lot where the dog can be crated and rest. There should be a safe place for the dog to potty and a well thought out and safe route from the rest area to the search area. Ideally, the individual dog will not meet another dog in the class environment.

### **2) Only one dog works at any given time and sufficient rest in between runs**

This is another key component when we setup the working area for the dog to feel safe. The presence of other dogs in the working area can cause undue stress and arousal for some dogs. Dogs that are waiting for their turn or have just completed the run should be resting in between. Some research has shown that dogs perform much better after learning a new task when they are given time to rest/sleep [16].

### **3) The dogs hunt/search for the high value food in the beginning**

When we humans talk about doing Nose Work with our dogs, what comes to mind is teaching our dogs to look for certain scent or target odours. It does not have to be that. As long as your dog is engaging in an activity that involves using its nose, that is Nose Work. So it makes sense to start with something the dog naturally enjoys and will hunt for, ie. their favourite food. It is much more vital to start with a food search if we want to improve the therapeutic benefits and shift the emotional state from left to right in the core affect space. Some anxious or reactive dogs may feel uncomfortable with a new environment, new flooring, new people and new objects. While they are unnerving, it is most important that we are not asking them to learn something new, ie hunt for a new novice odour, but to give them an experience that they enjoy - classical conditioning 101. Teaching them to look for a target odour is a very simple process when the dog has plenty of positive experiences searching for food in various environment and setups.

### **4) Obedience free in the class**

"Don't kill the SEEKING system with a barrage of "leave it!", "come here!" and "stop that!" Peta Clarke wrote in her blog "Anticipation - The Sweetest Smell of All" [13].

To received the maximum benefits, we want to allow the dog to have the freedom to explore whatever he/she desires in the search environment (when it is safe to do so). Allowing the dog to interact with its environment without putting rules on what they can or can't do builds confidence and independence searching.

A skilful instructor will setup the search environment as safe and secure as possible for the dog to run. If possible, I will use an indoor venue for the search environment.

### **5) Dog has the choice and control in what to do in the search area**

Having the freedom to move around in the search area gives the dog a sense of control (ie. working off leash if that is safe to do so). We know that control is a basic need and having the ability to control and interact with its environment will reduce fear, anxiety and frustration. A social dog first coming into the class might want to interact with everyone in the class. Not allowing that can cause frustration and hence fail to provide the most positive experience from the therapy point of view.

Having the choice and control to leave the search area is as important. An anxious dog coming to a new environment might freeze or keeps orienting towards the exit. Failing to recognise that need and not allowing the dog to leave will also greatly reduce the positive experience needed in reducing fear and anxiety.

**6) The instructor has the ability and skill to read canine body language and modify the setup (antecedents arrangement) to meet the dog's needs and/or change the consequences (ie. food rewards)**

This is the value adding when you take your dog to a well run Nose Work class. The instructor has the knowledge and skills to read basic canine behaviour. A skilful instructor will identify calm signals coming from an anxious or fearful dog. He/she will try to change the environment and/or setup to make the dog feel comfortable. Whether it be moving people further away from the search area or changing the sizes of the boxes or the instructor giving space, not facing and staring at the anxious dog, by changing the environment and removing fearful/uncomfortable stimuli, we can greatly improve the first-time experience and build confidence and fun in the game. If the dog is not focusing in the game, an experienced instructor can help to identify if the environment is too distracting, the hide is too hard to source or the value of food is not high enough.

**7) This is the dog's game**

Having the right philosophy and mind set in this activity helps to build human/dog relationships. I always remind my students in the class that this is the dog's game. They are the expert in sniffing so let us be the student in their game and learn and understand their olfactory world. There is no expectation or criteria on what they (the dogs) have to do to perform for us. If we take all that away, we take away the pressure we put on our dogs and the relationship will flourish. A positive relationship with their carer promotes the dog's positive emotional state.

## **Conclusion**

The dog's most important senses is its nose. It uses its nose to discover and learn about the world around them. It learns about how to get to resources as well as move away from aversive situations. It is believed that SEEKING will counteract or offset the negative emotion of FEAR. We can use this knowledge to create an environment where our companion dog can express its natural behaviours and improve welfare. Not all Nose Work classes are the same, the magic of Nose Work can only occur when we give our companion dog a sense of control so they can feel safe and have the courage to explore and find something they naturally enjoy.

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## Appendix

A video showing the magic of Nose Work - Toby's transformation from a slightly anxious dog to a much more confident dog.

Toby's carer wanted Toby to be more confident and less fearful in a new environment. In the first class, you can see that Toby's was a little reluctant to move away from his carer. His body was stiff and when he was taking food, his body was lowered and elongated. What I wanted to show in this short video is that at no stage we are asking Toby to perform. The carer is standing at the door way, she just let Toby explore on his own, ie Toby has control over his environment and can move away if he wanted to. I am also very conscious of how much space I am giving Toby. The first few classes is always building the positive emotional state in the game through their favourite food and that is the magic of Nose Work.

<https://www.youtube.com/watch?v=H-BiNpqTB0E&feature=youtu.be>