HOW THE SCIENCE OF ANIMAL BEHAVIOUR WORKS

By Jenny Barns

Your vet is about to arrive and you are already anticipating the show about to unfold – the leaping, the plunging, the banging, the twitching, the chaos. Your wonderful steady Eddy will blow up at the first sign of the vaccination needle. You always wonder why your Fjord is so disturbed by this routine event. Is it because a vet roughly handled him earlier in his life? Is it because he had a needle break in his muscle? Is it because he was allowed to be a bully when he was a foal? What if it didn't matter why or how? What if the only thing that mattered was what occurred today and what you want to occur tomorrow? What if you could change the future without knowing the past? Well, you can!

Welcome to the wonderful world of the Science of Behaviour. The ABC's of Learning Theory allow us to understand the relationship between the Antecedent, the Behaviour, and the Consequence. By understanding how animals, including humans, learn we can create programs with which to modify, or change, behaviour. In our example, we could teach the horse to be less afraid of the needle and the vet- perhaps even to look forward to or eagerly await this type of intervention.

In this series of articles we will first become familiar with principles of Learning Theory and acquire a universal language. This will enable us to achieve the following training and management goals:

***efficient**:* to quickly and effectively get to the root of the behavioural issue in question and establish a program to modify it

***consistent*:** create systems so that our training programs can be applied in the same manner by anyone

***replicable**:* any one training program could be used for similar behavioural problems

***measurable*:** to be able to measure (the frequency, duration, intensity) of behaviours to assess if the training outcome or the behavioural modification pro-gram has been effective

From there we can explore some of the typical stable management and horse training problems we often face by creating behaviour modification programs. With practice you will be able to design your own behaviour modification protocols for any problem you might find with your stable, your horse, or any other animal, or your human in fact!

Now let's jump into the world of the Science of Behaviour where we observe, evaluate, measure, and modify.

LEARNING THEORY: a way to describe how learning occurs - how we observe a behaviour change over time and assume that learning has occurred and, further, that there has been a change in the brain itself.

CLASSICAL CONDITIONING: the environment acts upon the animal – "process by which a previously neutral stimulus (the CS) predicts the occurrence of the unconditioned stimulus (the UCS) and can elicit the same or a similar response as the UCS." (Hetts p. 30)

Classical Conditioning paradigm: the wheel-barrow has become CS paired with UCS (the hay). Ponies approach upon seeing the wheelbarrow.

Remember good old Pavlov's dog? Turn on a light, feed the dog… repeat. In time, turn on the light and guess what? The dog is salivating! The light, the CS, has taken on the value of the UCS.

DESENSITIZATION: exposing the animal to a stimulus that elicits a problematic behavior at a low intensity so that it does not elicit the problem response. Gradually increase the intensity of the stimulus while ensuring the problem behavior does not occur. Think about the dog who barks and lunges at people passing on the street. What if we walked farther from people at a safe distance and slowly got closer and closer until eventually we could walk side by side all the while making sure we never got too close too fast to elicit the barking and lunging response? This is desensitization.

COUNTERCONDITIONING:"a stimulus (UCS) that was previously associated with unpleasantness becomes a CS that predicts good things" (Hetts p. 30). Ever have a horse that was afraid of a plastic bag to then discover that he is soon eager to see that white, rustling thing appear in his stall after a few trips to the barn with a bag full of goodies in it? You just counterconditioned the plastic bag!

OPERANT CONDITIONING: the animal acts on the environment. Thorndike's Law of Effect – behaviours that have a positive outcome will increase in frequency and those that have a negative outcome will decrease in frequency. Your cat scratches the door, you open the door, the cat returns to the warm basket of laundry. Upon returning to the door after her next visit outside, she is faster to scratch the door and perhaps you are faster to open it. Kitty has just applied Thorndike's Law of Effect and interrupted your quiet evening to her benefit.

The four quadrants of Operant Conditioning are often where confusion sets in as terms like reward, punishment, reinforcement, etc. are tossed around on a daily basis in many walks of life without much care to their scientific definitions. If we follow their scientific definitions, it is very simple. There are only two constructs in opposition: positive (add) /negative (remove) and punishment (decrease behaviour) and reinforcement (increase behaviour). Really and truly the concept is this simple.

Negative Punishment (P-): Remove an aversive to decrease behaviour.	**Negative Reinforcement (R-):** Remove a good consequence to increase behaviour.
Positive Punishment (P+): Add an aversive to decrease behaviour.	**Positive Reinforcement (R+):** Add a good consequence to increase behaviour.

SOME EXAMPLES:

P-: You want your horse to walk forward. You squeeze with your legs until he moves off then you release the pressure. From the horse's perspective, his walking removed the uncomfortable squeezing on his ribs.

P+: You are speeding and are pulled over by the police and given a ticket and points against your insurance. You don't speed in that area again. The loss of money by having to pay the fine and increased insurance premium decreased your speeding behaviour.

R-: Your puppy jumps on your new white slacks with muddy paws. You retreat behind the door out of puppy's reach. When you walk back around the door, the puppy keeps her feet on the floor. Removing your wonderful presence when the puppy jumped

on you led her to increase her "feet on the floor" behaviour when you came back.

R+: You clap enthusiastically when your toddler picks up a toy and puts it in the toybox. She quickly picks up the rest of the toys and puts them away. Your enthusiastic praise increases your child's "toy picking up" behaviour.

Operant Conditioning paradigm: R+

The frisbee ia used for novice dog to increase duration (number of poles) of weaving behaviour.

These examples vary across species to demonstrate that Learning Theory is not magic nor is it scientific mumbo-jumbo; it is simply a way to describe how learning is occurring so that whether you are a Fjord horse owner, a manager at work, a dog walker or a parent, you can employ Learning Theory to understand how to get the most behavioural change in the most efficient manner.

A quick note about a couple of the finer points:

Extinction: In Operant Conditioning, this is the process by which a behaviour that is no longer reinforced no longer occurs. In Classical Conditioning, this is the process where a CS (the light and Pavlov's dog in our example) is degraded when the UCS (the food) is no longer paired with it.

We see this often with those difficult to catch horses. We decide to lure her in with a bucket of grain. After several days of toting a bucket of grain out to her, she comes dutifully in every time. Then one day we decide that she has left this poor behaviour in her past so we elect to terminate the grain bucket cold turkey. After a few days we are back to square one and she no longer comes to us. We inadvertently put her "coming in" behaviour through extinction.

Extinction Burst: A very important concept to understand in Operant Conditioning is that the animal will attempt to try harder and harder to gain reinforcement for the behavior, and this is often where it is easy to determine that the protocol has failed when in reality this phenomenon is occurring.

Think about the kitty scratching the door in our example. For some reason one day you don't go to the door when the cat scratches. The kitty doesn't immediately give up. Instead she scratches the door with greater fervour. Is anyone thinking of an experience at Vegas? Just one more pull of the one-armed bandit should pay off, right? Casinos actively employ Learning Theory to determine just how long we humans will play without reinforcement!

Spontaneous recovery: You know that frustrating feeling you get when your horse seemingly does something totally out of the blue that he's never done before? It's possible he's never done it before but it's also possible he did the behaviour even once a long time ago and was reinforced for it at that time. Something once learned is never unlearned. Beware spontaneous recovery; be consistent in your program, and as long as you don't reinforce the unwanted behaviour when it occasionally appears, it likely won't occur again for a long while.

Lastly, keep in mind that, outside of the laboratory, Operant and Classical Conditioning rarely occur in isolation. Remember our example of the P+ and getting a speeding ticket? After your first

ticket have you ever noticed what happens when you see lights behind you or a police car just happens to be following you? Perhaps your heart rate increases or maybe you get a little sweaty? Guess what? The police car and its lights became a CS as they were paired with the UCS of paying those fines!

Further, training in the real world where there is a handler, not a benign box or neutral sterile testing environment, is a two way street. Remember our example of P- where from the horse's perspective, when he walked we stopped squeezing? Well guess what? From the rider's perspective the same scenario is R+. The rider will be more likely to squeeze the horse with his legs to have him walk because our horse started walking last time we used that behaviour.

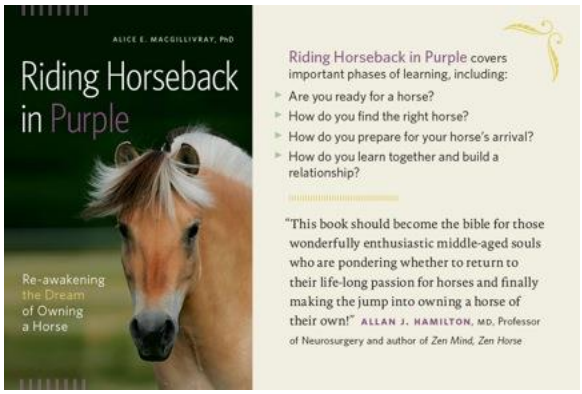
One of the great animal trainer behaviourists of our time, Bob Bailey, likes to say: "training is simple but not easy" and I wholeheartedly agree. I hope this brief piece has caught your interest. In the next newsletter, I want to share just how you can use Learning Theory to efficiently manage some of the everyday challenges of stable management: feeding, turn out, and grooming problems. From there we'll go on to discuss how we can improve our rides and drives using Learning Theory.

In the meantime I encourage you to become active observers, unsentimental assessors of your animals', your children's, your spouse's, and your coworkers' behaviour. You just might be surprised to see that Learning Theory can describe much of what you see!

References: Hetts, Suzanne (1999) Pet Behavior Protocols: What to say, what to do, when to refer. AAHA

Reid, Pameal J. (1996) *Excel-erated Learning: Explaining how dogs learn and how best to teach them.* James and Kenneth

Editor's note: A lifelong horsewoman, CFHA member Jenny Barnes has an eclectic animal training background beginning with 3 degrees in Psychology and including a dissertation proposal on the topic of Animal Assisted Therapy as an adjunct treatment to young offenders and at risk youth. Her moment of clarity that confirmed her vision and training direction came after trying every traditional trick in the book to teach her first Fjord gelding to get flying canter lead changes with no success. After stumping every professional horse trainer she knew and with nothing to lose, hardly believing it herself, she taught him lead changes with a clicker and a pocket full of treats. Jenny sees Learning Theory as a construct with which to think outside the box so that when traditional horse training practices fail she is not without an option.



READ ALL ABOUT IT!

CFHA MEMBER Alice MacGillivray has written a book that is a must read for beginner equestrians, middle aged horse women, Fjord owners, those considering purchasing their first horse... the list goes on. It's a practical book filled with important items to ponder. It traces Alice's own journey towards Fjord ownership in a well researched and easy to follow sequence. It is available as a paperback or e-book through thousands of outlets including traditional bookstores and Amazon, but because it is so new, you may need to ask. **Editor's note: It's a great read!**