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COMBINING POSITIVE REINFORCEMENT AND NATURAL HORSEMANSHIP TO CONDITION AN PRZEWALSKI STALLION AT THE PRAGUE ZOO.

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Abstract:

Effective recognized behavioural modification technology includes ethical animal welfare considerations. Further to this, the utilisation of an animal's natural behaviour inclinations as motivation tools ensures efficient quick results. Positive reinforcement is an accepted tool in the field of animal training. Negative reinforcement is often misunderstood, however when used as the definition is intended, it is a valuable resource and a tool that can ensure fundamental success, particularly with prey animals where reduction of perceived pressure between con-specifics is potentially biologically reinforcing thus a primary reinforcer. The effective use of this methodology with horses is commonly dubbed - natural horsemanship.

This paper will provide a case history of the training of a Przewalski horse at the Prague Zoo. The goal of the training was to increase the confidence the horse had in the trainer and for the animal to follow the trainer to cue. The method that we used combined;

1) Clicker training based on positive reinforcement in the shape of food and

2) Negative reinforcement, in this case the reduction of unavoidable presence of trainer with appropriate body language movements that rewarded the animal when the desired behaviour was demonstrated.

Aim of training:

The case study is about a mature stallion called Len. He hailed from an open farm in Askania Nova in the Ukraine. Until he arrived at the zoo he had minimal contact with human beings. When training commenced he kept a minimum distance of three meters between himself and the keeper. He would not follow the keeper and would not voluntarily enter confined spaces such as stables, particularly in the presence of keepers. Our aim was for him to follow any of the horse keepers through a passage area into another paddock when cued with the stimulus of a bell. Further to this goal, it was also determined that the stallion must still keep a respectful distance of at least

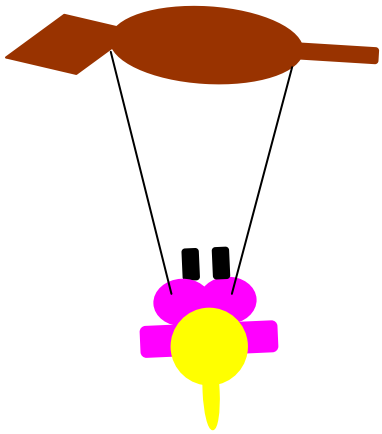
one meter between himself and the keeper and must not beg for rewards or be aggressive.

Methods:

We decided to use a combination of two methods – clicker training based on positive reinforcement and negative reinforcement. The use of negative reinforcement is widespread in natural horsemanship programs and thus a potentially successful tool in this scenario. Negative reinforcement must not be confused with punishment. Punishment is a response from a trainer that serves to reduce a behaviour from occurring in the future. With this animal, it was our intention to get him to engage with the trainer. The reduction of the perceived pressure in the shape of the trainer reducing his body posture and thus rewarding the animal for engaging is negative reinforcement. The trainer's body is already in the animal's area, and thus was not added to the scenario as a punisher. In natural horsemanship, the horse, particularly one that is not desensitized to human beings, will sense the very presence of the human being as pressure. It was our intention to teach the animal, using appropriate trainer posturing, to face and follow the trainer. When this process was mastered, we planned to shape the behaviour using a clicker. There have been reports of horses "mugging" trainers when they use food as reinforcement. If we experienced any of this type of potential aggression, our plan was to use increased body stature to discourage the behaviour.

The training took place from 12th of October to 9th of December 2010 at 07h30-08h00 in the morning three or four time a week. At the time of training the stallion was being housed alone in the paddock exhibit. This exhibit is a semicircular shape about 35 meters in diameter.

When practising natural horsemanship, it is possible to balance the horse by positioning one's body, face on, and perpendicular to the side of the horse.



Using this posture one is able to direct the horse either forward or backward, depending on the position of the trainer relative to the horse's scapula. Standing facing towards the head of the horse behind the scapula will push the horse forward. When the trainer entered the paddock in the initial encounter, the horse moved away in flight. The trainer responded by maintaining this "face on" pressure on the animal with their body language. This pressure is gentle and at a distance away from the animal. The horse circled around the paddock in response to this pressure. Whenever the horse turned his head to look directly at the trainer, ideally with his

ears pricked and facing the trainer, thus expressing his will to cooperate, the trainer removed the pressure by facing his chest away from the horse thus decreasing his body stature, and walking in a direction away from the horse. This decrease in pressure provided the horse with the impetus to follow the trainer.

At the moments when the horse was compliant, at the same time as reducing the pressure by moving away from the horse, the trainer would sound the clicker and reward the animal by tossing food, a primary reinforcer, in its direction.

The next step was to have the stallion compliant from the start of the session, thus having the trainer respond only with positive reinforcement from the outset of the session. We rewarded the stallion for being closer to us and presented the reward in closer proximity to us. We also worked on having the horse follow us for longer and longer distances. When this was achieved we introduced a stimulus discrimination in the shape of jingle bells. We determined that the cue was working when we presented the sound on the outside the exhibit. The animal's obvious and compliant reaction confirmed that the horse understood the cue. The cue could then be generalised to other trainers. At this point we repeated the behaviour in new areas rewarding for the appropriate distance between trainer and the horse. In instances where the horse overstepped this distance, the trainer would respond by facing the horse, thus increasing the pressure on the animal, and then reaffirming the correct distance by averting their stance away from the animal when the appropriate distance was achieved. The initial training was done by the Prague Zoo's animal training specialist František Šusta with the assistance of other authors of this article.

Results:

13th October	**Training session two**	**The horse responded by facing the trainer head on as soon as the trainer entered the paddock.**
14th October	**Training session three**	**The horse actively followed the trainer**
19th October	**Training session five**	**No pressure at the outset of the training session. Immediate compliance and rewarding with positive reinforcement. Approximated closer distance and encouraged horse to follow for longer distances.**
20th October	**Training session six**	**Horse follows the trainer for a meter at a time anywhere in the paddock. Generalised the behaviour to the keeper of horses.**
22nd October		**The horse spontaneously followed aforementioned keeper while the keeper was cleaning the paddock for the first time.**
23rd October	**Training session eight**	**We introduced the jingle bells for the first time to use as cue for the future**
27th October	**Training session eleven**	**Introduced the jingle bells as the cue from outside the exhibit. This enticed the horse to the fence of the paddock. The horse followed**

		the trainer up the stairs and through the narrow passage.
10th November	**Training session eighteen**	**A dominant mare Hara was introduced and worked at the same time as the stallion. Each animal had a defined position in relation to the trainer to minimize aggression between the two animals. The mare's nature is gentle and compliant with humans; however she was at this point in the training, dominant over the stallion. The stallion was much more willing to cooperate with the trainer in the presence of the mare than before the training had started. Interestingly, the mare appeared to become submissive to the stallion a couple of weeks after the training.**
11-27 th November	**Training session 19 - 26**	**Attempted to separate the stallion from the mare and have him follow the trainer to the adjoining paddock via the mare's usual holding area which would ordinarily be occupied by her during the sessions. This plan did not work. The stallion became nervous and began challenging the trainer. The trainer responded by facing the animal and applying the pressure as in the start of the training and this improved the rate of progress.**
9 th December	**Training session twenty seven**	**The trainer led both horses together to the adjoining paddock. The mare following first and the stallion behind. The stallion followed the mare the first time. The second time the stallion followed the trainer directly.**

From the 9th of December, the conditioning process was determined as complete. In subsequent training sessions the horse followed the trainer to the next paddock with the mare or on his own, and allowed the trainer to close the gate to the second paddock.

The behaviour was handed to the keeper to fulfil using only positive reinforcement. The distance between a person and the stallion is maintained at one meter. The keeper will apply the body language pressure if the stallion closes in on that distance. The animal has reacted favourably to this.

Discussion:

The question is, why use a combination of positive and negative reinforcement? In truth, through our posturing and body language with the horses, or for that matter any animal, it is safe to say that a measure of negative reinforcement occurs in our animal training program whether we consciously use it or not. In natural

horsemanship, the horses respond to our conscious use of body language. If we face them chest on, we are placing inherent pressure on them, which will affect the way the animal responds to us. With horses, it is possible that the reduction of pressure serves as a biological and thus primary reinforcer. This we have seen when they interact with each other. If an assertive horse postures in a particular manner, the less assertive animal will give way, and the more assertive animal will stop posturing.

If we used positive reinforcement alone, we would have been unconscious of how our body movements were affecting the stallion. Choosing to use the two together required us to be conscious of our body language, and even communicate using body language. The reduction of this body posture when the stallion did what was required is the trainer physically making his body smaller by turning away or even crouching down. This is negative reinforcement as it rewards the animal for doing what we wish. Positive reinforcement on the other hand provided us with the ability to quickly and clearly shape the behaviour of the stallion, and at the same time provide the horse with growing confidence in his trainer. The positive reinforcement used also allowed us to more easily generalise the trained behaviour to keepers who are not versed in natural horsemanship techniques.

Initially it was attempted to train using only positive reinforcement. This was attempted by the horse keeper for six months after the stallion came to the Prague Zoo. The progress was slow and the horse was inconsistent in his performance. When we employed the natural horsemanship negative reinforcement principles in addition to the positive reinforcement, the training progressed significantly and the horse seemed more willing to engage with the trainer. Probably because he better understood what we required of him due to the clear use of body posturing.

Comparison of both methods.

Clicker training based on positive reinforcement	**Natural communication - natural horsemanship**
Rewarding the required behaviour with a positive reinforcer.	Using the animal's natural understanding of the reduction of pressure as a reward.
The trainer is unconscious of his position in the hierarchy. The trainer behaves as an external element, which is bringing the chance of reinforcement. If the food is used without the conscious posturing, it is possible that the horse will challenge the trainer for the food – which makes the trainer a part of the hierarchy – and reduces animals respect for keeper and potential compliance.	The person is consciously a part of hierarchy. He is at the leading position. This has the potential to make the horse feel safe in the presence of the trainer. Just like a horse would find allegiance with a more dominant animal in the herd, so too will the horse find security in relationship with a clear trainer using sound natural horsemanship leadership principles.
Positive reinforcement rewards desired behaviour. Unwanted behaviour is not corrected, only ignored. Does not use any kinds of pressure or cue to	The reward for horses is a pause which is a reduction pressure. Pressure is in the shape of the trainer posturing with body movements. Food is generally not used, because subordinate horses do

discourage undesired behaviour.	not eat in the presence of superior animals.
Useable universally for all animals (particularly good with predators)	Designed for horses. Has been used successfully for bovid and camels too. Has great potential for some other prey animals or animals, who eat all day, and thus do not have a competitive food drive.
An artificial method of communication developed between animals and trainers.	A method of communication that has its foundation in the natural behaviour of the animals.

It can be said that these methods at face value appear to be antagonistic. However, when we look deeper, there are some fundamental principles that the two techniques have in common.

- Both methods when used properly provide the animal with choice about whether they wish to participate.

- Both methods can be used with successive approximation.

- Both methods can be used with great success.

- Both methods require excellent timing in order for success to occur. The clicker indicates the exact moment of desired behaviour. Reduction of pressure too needs to be done at the exact moment that the required behaviour has been achieved.

Arguments against the use of negative reinforcement have been that it is punishing. This has some validity as we are punishing the behaviour that we don't require, however, when used sensitively, the animal is not responding out of fear, as the pressure is so slight, that it simply becomes a cue. Arguments against positive reinforcement using food on prey animals that do not have an opportunistic food drive, detail that the animal is working for the food, and being taught to be predatory. Once again, if the food is used wisely and the animal does not get rewarded for being aggressive in its attempt to get to the food, then the trainer can maintain its leadership role. To negate both arguments, it is our experience than when applied effectively, and together, the animal understands what is required and feels secure and does not aggress as a result of the reinforcement protocols. The combination of methods provides the animal with very clear communication. This communication provides the clarity in relationship between animal and trainer clearly demarcating the trainer as leader, and this allows the animal to feel safe, and ensures that the training progresses quickly. Positive reinforcement clicker training helped us to generalise the behaviour to all keepers, and shape the behaviour more effectively. Natural horsemanship helped us to commence clear communication with the horse, and keep the animal at a good distance.

CONCLUSION

All animals respond to our body language, whether we are conscious of this or not. Consciously choosing to use negative reinforcement, primarily with the use of our body language, meant that we were conscious of what our bodies were telling the

animal. This enabled us to more effectively use the positive reinforcement. Not only to maintain respect between the trainer and the horse, but also to speed up the learning process effectively. Negative reinforcement, when applied ineffectively becomes punishment. Punishment by definition reduces the occurrence of a behaviour occurring. Negative reinforcement on the other hand increases the chance of a behaviour occurring. Punishment creates a fear response. A fear response breaks down relationship between trainer and animal. Fight or flight is instinctive and classic fear response where the animal is not thinking, merely reacting, and in essence, seeing the trainer as the fear stimulus. The correct use of negative reinforcement as was our experience in this scenario resulted in a thinking animal that was engaging with the trainer. There was no fear response. With natural horsemanship, our objective is to build relationship between the horse and the trainer. This was clearly the result. The use of positive reinforcement fine tuned the behaviour, and cemented the relationship between the trainer and horse.

Video you can find on http://www.zoopraha.cz/en/about-animals/animals-are-learning

Pic1 – Trainer is making press to the horse on the beginning

Pic2 – Horse is presenting his willingness to cooperate

Pic3 – Trainer stops press and lets the horse to follow him. At the same time he uses clicker and gives reinforcer.

1)

2)

3)