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## **Arousal, attachment, and affective state**

### **Is the horse in a learning frame of mind?**

How the horse responds during training can be influenced not only by its affective state (mood) and arousal (alertness) level, but also by how attached it feels to the trainer.

Andrew McLean, PhD, Director of the Australian Equine Behaviour Centre (AEBC) and Professor Paul McGreevy of the University of Sydney, Australia, co-presented the plenary 'Arousal, attachment, and affective state' discussing the complex combined impact that mood, alertness, and bond with the human can have on training.

McLean opened the plenary, with a brief recap of the basics of operant conditioning, giving common horse-training examples, before delving into the topic of attachment. Starting with basic physiology, McLean explained how horses possess the largest amygdala of all domestic animals, and noted its effect on the horse, "... they have a very significant flight response...they are very fearful animals." Understanding this innate quality of the horse, and what possibly might temper such fear could be of value to those who wish to create attachment with their horses.

One way to modify this fear may be in how we touch the horse. McLean pointed out that, historically, horse training hasn't involved much touching of the animal, yet horses find security with one another through touch. Recent studies have shown the positive effects of allogrooming on lowering heart rate. McLean proposed that such primary positive reinforcement may be another tool in the training toolbox that can be used to overcome fearful insecurity in the horse.

Touch may be an important way to develop attachment between human and horse, but not in the way some people currently practice it. "Patting – rather than stroking - may not be the positive reinforcer we think it is" said McLean, citing unpublished data from an AEBC student collected during the 2012 London Olympics. The data showed that two-thirds of horses accelerated upon being patted, whereas horses stroked on the withers displayed more affiliative behaviour, which McLean proposed may be more conducive to developing attachment.

McLean also discussed previous attachment research in monkeys and humans then touched on both empirical and anecdotal research into the human-animal bond and stressed the need for scientists and researchers to explore further attachment styles between humans and animals.

McGreevy then discussed how arousal and affective states may enhance or hinder training. "What we are trying to achieve is an awareness of how these three A's - Affective, Arousal and Attachment - might influence operant conditioning, and may explain why it works better sometimes than others."

Paying attention to how the horse feels about the training environment may be a good place to start when considering training. McGreevy explained how, through classical conditioning, a horse may come to associate a fearful situation or environment with the trainer, stressing that during training “We really want to keep animals in a positive emotional state”. Ensuring the horse creates positive associations between the trainer and the environment may magnify the ‘safety effect’ referred to earlier by McLean, which could affect attachment.

McGreevy delved into new research on cognitive bias, as a potential way to ‘climb inside an animal’s head’, and determine how each animal in our care is feeling. Cognitive bias – a term from psychology - describes how individuals can create a distorted perception of their world, affecting attributes of behaviour, memory, attention, expectations, risk perception and more. In essence, it captures whether the individual sees “the glass as half full or half empty”. The cognitive bias of a wide range of species is currently being studied, with links between cognitive bias and personality showing evidence of pessimism in animals that display stereotypies or separation distress. Being mindful of an animal’s level of optimism or pessimism could help humans enhance an animal’s welfare. Affective state may act as an early warning system for animals at risk of behaviour problems, or may allow trainers to predict which animals are better able to cope with demanding training regimes.

Utilizing revolutionary 3-D landscape [graphs](#) that he has developed in a recent [paper](#) with one of his PhD students, Melissa Starling, McGreevy demonstrated the range of possibilities that may occur when a horse undergoing different levels of arousal and affective states is asked to complete various tasks. Such visual constructs may allow horse owners to see why and how a horse’s current state of

arousal and mood influence training. McGreevy pointed out that horses in different states are going to respond differently to the four training quadrants, stressing that trainers can't expect all techniques to work equally well, regardless of the animal's affective state: "For a prey animal, it's so important we avoid aversive experiences, rather than just focusing necessarily on rewarding experiences. In general terms, what this means is that positive reinforcement is going to be most effective when the emotional valence of the animal is positive. Negative reinforcement is going to work if the animal is alert enough to attend to the stimulation, but not overexcited...Punishment, as we know, is going to fare poorly in almost all the landscapes".

As to the possible positive implications further research may have, McGreevy mused, "Is this all about training for effectiveness, or does it have a role in the horse's welfare? I would say both. It's definitely both; one follows the other".

In support of this plenary view, there is a free journal article '*Response landscape graphs conceptualising the effects of arousal and affective state on training outcomes of operant conditioning in animal training*'. <http://www.mdpi.com/2076-2615/3/2/300>

The manuscript contains graphs which are best viewed as a series of interactive three-dimensional conceptual graphs which require the Wolfram CDF Player to view. This free software can be downloaded from: <http://www.wolfram.com/cdf-player/>

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The International Society for Equitation Science (ISES) is a not-for-profit organisation that aims to facilitate research into the training of horses to enhance horse welfare and improve the horse-rider relationship. [www.equitationscience.com](http://www.equitationscience.com)

For more information contact:

ISES President

[presidents@equitationscience.com](mailto:presidents@equitationscience.com)

ISES Media Officer

[media@equitationscience.com](mailto:media@equitationscience.com)