

Horses: Their Behaviour, Mental Abilities and Welfare

The unique relationship between people and horses

Horses were domesticated around 6000 years ago. Through breeding and training, they have been persuaded to assist in diverse fields of human endeavour. Horses have played a major role in human history, from providing draught power in agriculture and transport to influencing the outcomes of war. Today, they are valued for their use in recreation, competition and sport, whilst in many parts of the world they continue to provide an important source of draught power, meat and milk.

Whilst horses are undoubtedly one of the species most highly valued by humans, all too often the way in which we keep, train and use them can have serious detrimental consequences for their welfare. How much do we actually know about their natural behaviour and the inner workings of the horse's mind and how can this knowledge be used to improve their welfare?

The life of feral horses

Horses evolved to live on open grasslands. Today, there are no truly wild horses left but there are many herds of feral horses who have returned to living in a natural environment. Feral and free-ranging horses spend around 16 to 18 hours a day grazing on grasses and other plants, consuming over 50 different types of plant daily.

Horses live in groups consisting of one or sometimes more stallions, several mature mares and their young. Young males (colts) leave the group when they are one to two years old and form bachelor groups, whilst most young females (fillies) leave when they are one and a half to two and half years old and join other existing herds or form new ones with males from bachelor groups.

Membership of a herd is important to protect horses from predators. Each horse knows his or her place in the herd hierarchy and this helps to minimise conflict and keep the group together.

Horse 'friendships'

Horses form close 'friendships' called 'pair bonds', which can last throughout the horses' lives, especially for mares. Horses in pair bonds graze and rest together, groom each other and help to swish flies off each other with their tails. Domesticated horses may also form pair bonds with other animals such as donkeys or goats.

Mares also have very close bonds with their foals and are very protective of them. Foals stay very close to their mother for the first few weeks after they are born and then gradually they start to wander further and play with other foals. Foals of mares who spend lots of time together tend to play most with each other.

Play behaviour

Play is vital to the development of young horses and they devote a lot of their energy to playing. At first young foals play by themselves and with things they encounter as they follow their mum. Once they are about a month old, they start to play with other foals – running, frolicking and chasing each other and play fighting. A horse wanting to play may invite another horse to join in by

nudging, nipping and pawing at them and tossing their head. Even adult horses play, especially stallions.

How do horses see the world?

Horses have highly developed senses – essential for a prey animal that must be aware of its surroundings and ready to flee from a predator at any moment.

Vision

The ability of horses to see colours and fine details of objects, especially at a distance, is not as good as humans. Perfect human vision is often described as '20/20'. On the same scale, horses' vision is around 20/30, which means that horses can see the details of an object 20 metres away that humans can see at around 30 metres away. This is better than that of a dog (around 20/50) or a cat (20/75 to 20/100). However, horses can see much better than people can in dim light and have a much wider field of vision than humans, which allows them to spot predators approaching.

Hearing

Horses can hear sounds that are too high-pitched for humans to detect. The area of best sensitivity of hearing in the horse is broad and covers the range of the human voice better than a dog's. A horse's ears can be moved independently in the direction of the horse's attention.

Smell and taste

The horses' ability to detect odours and use them for identification is much better than that of humans and is more similar to that of a dog. Horses familiarise themselves with foreign objects by smelling them and odours are important for recognition of group members. Smell and taste are important in the early bonding of the mare and foal. Taste allows horses to tell different foods apart and they can learn to avoid a food if they become ill within a short time after eating it.

Touch

Horses are very sensitive to touch and react to pressures that are too light for humans to feel. This sensitivity is useful in detecting the presence of biting flies landing on the skin, which they vigorously try to dislodge by rippling their skin, swishing their tail, stamping their feet and biting at the area or shaking their head.

How do horses communicate?

Horses communicate mostly through body language and are extremely sensitive to subtle changes in the postures of their companions. Adopting certain body postures conveys a message about how the horse is feeling and can alert other horses to possible danger. Many parts of the body, including the tail, ears, face and legs, can be used independently or in combination to signal tension, excitement, arousal, fear, irritation, aggression, relaxation and pleasure.

Horses are also very adept at reading the body language of humans, whether or not the signals are intentional. An interesting example of this is Clever Hans, the horse who was apparently able to answer basic mathematical questions by tapping his hoof the requisite number of times. Investigation revealed that Hans was only able to answer correctly if the questioner or audience knew the correct answer and could be seen by the horse. The reason Hans was able to respond correctly was because he picked up unintentional cues from the body language of the observers.

Horses also communicate vocally and the meaning of individual sounds depends on the context in which they are used. Vocal communication can serve to maintain contact over long distances, to indicate a horse's feelings or by a mare to call her foal.

Nose-to-nose sniffing is an important part of greeting rituals between horses. Odours are used for communication over time through marking behaviour, in courtship and in establishing the mare-foal bond.

Touch is used for communication at close range. It promotes and maintains pair bonds during mutual grooming and can be a form of social support in stressful situations. For example, foals may press their body against their mum if something frightens them.

Intelligence, learning and memory

Horses excel at simpler forms of learning, which is not surprising considering their ability to learn through training by people. Horses are also able to solve more advanced mental challenges involving understanding categories and concepts.

There are two major types of learning: 'non-associative' learning and 'associative' learning. In non-associative learning, the horse is exposed to a single stimulus to which they can become habituated or sensitised. A 'stimulus' is anything which causes a reaction in the horse. This type of learning is important in horse training and early handling. When faced with new experiences, many horses react with fear but, by introducing a potentially frightening stimulus gradually, the horse becomes accustomed to it and learns to accept it. This means that the horse has become habituated to the stimulus. This approach can also be used to re-train horses who have become fearful of a particular handling procedure or event through past negative experience. Sensitisation is the opposite of habituation and is the means of achieving responsiveness and lightness to riding and handling aids. Through repeated application of the aids, the horse can learn to respond to the slightest pressure.

In associative learning, the horse learns to make associations between different stimuli (classical conditioning) or between a stimulus and a response (operant conditioning).

Horses, like most animals, learn easily through classical conditioning, where an initially unimportant stimulus is regularly paired with a stimulus that initiates a response. For example, horses spontaneously learn that certain stimuli, such as the sound of the feed room door opening or the sound of grain pouring into a bucket, are signs that they are soon to be fed and, much to the dismay of their owners, may make a lot of noise and kick their stall door in anticipation.

In operant conditioning, the horse learns to perform an action to obtain a reward. This type of learning is central to horse training. The reward is referred to as 'reinforcement' because it reinforces the behaviour by making it more likely that the horse will perform it again. Reinforcement may be positive (receiving something desired such as a food reward) or negative (removing something unpleasant such as pressure on the reins or from the rider's legs). Negative reinforcement is not the same as punishment because it enables the horse to control the experience.

Horses can learn that one stimulus and not another will result in a reward. This is called 'discrimination learning'. This may involve simple discriminations or more complex discriminations based on categories. For example, horses can learn to categorise shapes as 'solid' or 'open-centred'. They can also develop concepts such as 'larger than' and 'smaller than' and use these to solve tasks. So, for example, they can learn that by choosing the larger of two objects, whatever size, shape and colour those objects might be, they will receive a reward.

It appears that horses are able to understand that a three-dimensional object can be represented by a two-dimensional image because at least some horses are able to recognise photographs of three-dimensional objects as well as recognising objects previously represented by photographs.

Horses have very good memories, which is important for learning. Once horses have learned to negotiate a maze to obtain a food reward they are able to remember it on subsequent occasions, even when tested two months later. Similarly, when horses have learned to make the correct selection (the one for which they are rewarded) from twenty pairs of visual patterns, they get about 85% correct when they are tested again six months later.

Improving the welfare of horses

Many horses are kept on their own, fed inappropriate diets (with too little high-fibre forage such as grass or hay) and given insufficient opportunity for exercise. These conditions are far removed from the natural environment of the horse and can lead to poor welfare and abnormal behaviour.

Many stabled horses develop 'stereotypies' - apparently functionless repetitive behaviours which are considered to indicate poor welfare. These include 'weaving', 'crib-biting' and 'box-walking'. Stereotypies are linked to the feeding of low fibre/high grain content feeds and lack of social contact with other horses.

Since horses have evolved to live in social groups and to spend the majority of their time seeking and eating a wide variety of plants, it is unsurprising that denying them the opportunity to express these behaviours is detrimental to their welfare.

The welfare of domestic horses could be significantly improved by meeting the horses' need to perform important natural behaviours. This can be achieved by allowing horses more time in paddocks with other horses. When horses are stabled, stereotypies can be reduced by feeding high-fibre diets and maximising opportunities for social contact.

Our knowledge of the natural behaviour and mental abilities of horses should also be used to inform our actions during handling, riding and training. For example, by copying how horses communicate and interact, it is possible to manage previously unhandled horses without coercion.

Despite the long history of our relationship with horses, it appears that we have progressed little in the techniques used to train horses. Most training techniques used today are still based on traditional methods that use negative reinforcement. Through the application of our knowledge of the natural behaviour of horses and their mental abilities, more innovative methods that take into account the natural behaviour of the horse and use positive reinforcement are slowly developing. By appreciating why horses behave the way they do, we can manage them more sympathetically.

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