Fear testing of foals may contribute to increased safety in equestrian sports

In a recently published study, we found that it is possible to identify fearful horses at an early age – prior to weaning from the dam - by means of an objective fear test. This gives a better opportunity to ensure that the most fearful horses are trained by experienced people from the beginning. And this may help reduce riding accidents and improve horse welfare.

Fearfulness is an important aspect of horse temperament that is relevant for the horse's usability for various purposes and particularly also for the rider's and horse's welfare and safety. Fearful animals are often difficult and dangerous to handle. One of the most frequent causes of riding accidents is that the horse gets frightened. According to numbers from the Danish Accident Analysis Group at Odense University Hospital, riding is the most dangerous leisure activity when looking at the severity of personal injuries, and victims are often children and teenagers.

Some riding accidents are purely accidental, for instance when the horse stumbles and falls. This kind of accident can be hard to foresee. However, we can actually do something about the large number of accidents that happen when horses get frightened. If we can identify the horses that are most likely to show fear reactions early in life, we can place them in capable hands that can give them the correct training from the beginning. In that way, it will likely be possible to avoid many of the serious accidents.

In principle, all horses can be trained not to take flight when frightened. However, it takes a lot of training, time and knowledge about learning theory and appropriate habituation methods. Therefore, it often ends badly if the very fearful horse ends in unexperienced hands and thus is not met with the correct understanding and training.

A rare long-term study

The study was conducted over three years during which a group of stallions were studied from foal to adult. The aim was to study whether the behavioural and physiological fear reactions that foals show during a fear test when they are around five months old are similar to their reactions in fear tests during the horse's adult life.

The study included 25 Danish Warmblood stallions from a private stud. The foals were kept with their dams on large pastures until weaning and remained relatively unhandled until training for the first five-month's test. All foals were weaned together at the age of seven to nine months and were kept in groups in a loose housing system with stallions and mares together. At 1.5 years of age, the stallions were moved to another stable and were housed in littered boxes with five stallions in each box. The horses were still only handled for veterinary or farrier treatment.

The study is the first of its kind to examine fearfulness in horses over a period this long and from this early age. We were lucky to be able to study this relatively large group of horses housed together from foal to adult. When we do these kind of studies, it is crucial that the horses are kept under the same rearing conditions throughout. Otherwise, changes in housing, management and training could affect the horses' reactions and thus the results.

Test design

In the study, all stallions were introduced to a fear test – a so-called "novel object test" (NOT1) – three times at different ages: five months, one year and three years.

Before the test, the foals were trained to enter a test arena on their own and walk to their dam who was placed in the other end of the arena (Figure 1). In the NOT1 test, a white plastic cover with boxes of different colours was placed in the middle of the test arena. During the test, the foal should pass the test object on its way to the dam (in the five-month test) or to a feed container (in the one and three-year tests; Figure 2).

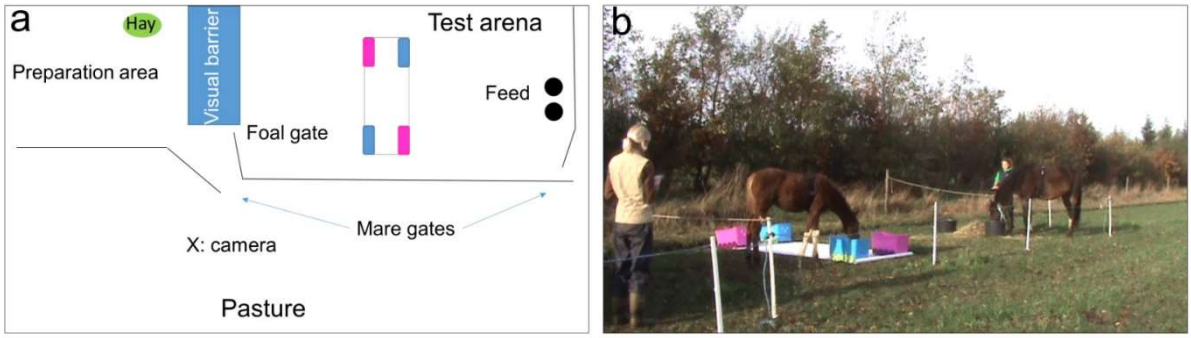

Figure 1. Test arena for the foal test at five months (NOT1 foal). The foals were habituated to the procedure incl. fitting of the HR monitor prior to the test, i.e. they would stay with a handler in the preparation area, while the mare was led to the opposite end of the arena. When the mare was in place, the foal was gently pushed into the arena where is was free to approach its mother. For the test, novel objects (white plastic cover and coloured boxes) were placed in the middle of the arena, whereby the foal had to pass around the objects to reach the mare.

Figure 2. The setup for the NOT1 test conducted when the horses 1 year (left) and 3.5 years of age (right). The horses were again carefully habituated to the test procedure prior to testing, i.e. they walked calmly to the feed containers when no objects were present in the arena. Careful habituation is the only way we can ensure that fear reactions towards novel objects are separated from other reactions.

Two additional types of novel object tests were conducted at one and three years of age in which novel objects different from those in the NOT1 test were used (Figure 3).

Figure 3. Setup used for the NOT2 test, which was conducted with the 1 year-old horses (left), and a horse sniffing the object during the NOT3 test conducted with the 3.5 year-old horses (right).

Video was recorded of all tests, and equipment for measuring the heart rate was mounted on a girth. The following recordings were made:

- Heart rate
- Latency to reach the dam/feed container
- Alertness (vigilant position with elevated head/neck focusing on the object)
- Sniffing at the test object
- Touching the test object

The study tested the associations between the various types of behaviour and the heart rate as well as the association of the test results between the various ages. We found that behavioural reactions and heart rate correlated within tests and that there was coherence between the tests at the various ages. It also showed that foals' behavioural reactions towards novel objects was the best predictor of their fearfulness later in life. Thus, fearfulness in horses appears to be a relatively stable trait, which is testable from a young age and remains a characteristic of the horse's temperament, also in adulthood.

A piece of the puzzle

The result is a step on the way to increase safety during riding and handling horses. As fearfulness is inheritable, breeders could benefit from using a standardised fear test to avoid breeding on the most fearful horses. There has been a tendency to breed dressage horses with extreme movements like high front leg lifts during trot, as this used to be rewarded with high marks in dressage competitions. Unfortunately, exaggerated movements are possibly connected to fearfulness, as we also know from other prey species, e.g. gazelles, where frightened animals display exaggerated movements. When breeding for horses with very big movements, we can end up with fearful and stress sensitive horses, which is unfortunate for horse welfare and safety.

It is not only in breeding that we could benefit from testing horses' fearfulness. For example, an objective fear test can be developed and adjusted for use by veterinarians for horse trade examinations. Should this be introduced, future horse owners will have more objective knowledge about a horse's temperament, and whether the horse will be an appropriate match for them, before buying the horse.

Rearing environment and education are also important factors

The foal's rearing also plays an important role for the level of fearfulness. Previous studies have shown that foals learn readily from their dam. If the mare is trained to react calmly towards a variety of objects, it will influence the foal to also react more calmly towards novelty. It has also been shown that young horses display less fearfulness towards novel objects if they are grouped with a calm and experienced horse. General stimulation of the foal and habituation to a variety of objects early in life are important factors when it comes to training a safe riding horse.

In addition, the education of the rider is yet another important area: Understanding the horse's behaviour and fear reactions are crucial to reduce the number of accidents. The more knowledge the rider has regarding how horses learn, and the better trained the horse is – the higher safety we will obtain.

More information

Funding

The study was supported by Centre of Companion Animal Welfare (Skibsreder Per Henriksen, R. og Hustrus Fond) and the Independent Research Fund Denmark, Technology and Production.

Link to the full scientific article:

Development and consistency of fearfulness in horses from foal to adult: https://www.sciencedirect.com/science/article/pii/S0168159120301945?via%3Dihub

Other sources and references:

Scientific article: Early-life object exposure with a habituated mother reduces fear reactions in foals: https://link.springer.com/article/10.1007/s10071-015-0924-7

Scientific article: Attenuation of fear through social transmission in groups of same and differently aged horses: https://www.sciencedirect.com/science/article/pii/S0168159118301059

Contact

Janne Winther Christensen, Department of Animal Science, Aarhus University

Email: jwc@anis.au.dk