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Learning performance in relation to fear in young horses

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Introduction

Fear has negative effects on welfare, health and reproduction in animals (Boissy, 1995). In horses fear is additionally problematic, because fear reactions can cause serious injury to both horse and human. Investigations have shown that the major cause of horse-human accidents is unexpected fear reactions (Keeling et al., 1999). Throughout life the domestic horse has to habituate to a range of situations, which are very different from natural conditions, e.g. loading into a horse trailer. These unnatural situations are often perceived as frightening at the first introduction. However inconvenient it might be for the human-animal relationship, domestic horses tend to respond in much the same way as their wild ancestors in frightening situations. The ability of a horse to habituate to a range of otherwise frightening stimuli greatly increases safety in the horse-human relationship, and finding appropriate methods for reducing fear in horses has important practical applications.

The aim of this study was to investigate which of three different training methods, based on learning theory, was the most effective for horses to learn to be calm in an otherwise frightening situation.

Materials and Methods

A total of 26, 2-year old Danish Warmblood stallions from a large stud were used in this study. Most of the colts were born at the stud; others were purchased after weaning at six months of age. All colts were kept on pasture with the dam before weaning and were subsequently housed in large groups in straw-bedded boxes with access to outdoor areas during the winter. The colts received a minimum of handling, only for necessary veterinary or farrier treatment. During the summer (May - October) the colts were pastured in a large enclosure (30 ha).

Within the 30-ha enclosure, a smaller capture enclosure (1-ha) contained a fenced waiting area (50 m^2). Next to the waiting area a test arena (10 m in diameter) was constructed out of straw bales (1.2 x 1.2 x 2.4 m^3) in two layers, making the height of the walls of the arena 2.4 m. The set-up enabled the horses to hear, but not see their group mates during the tests. The arena was equipped with a feed container, placed in the middle of the arena, with a mixture of alfalfa and the horses' usual winter feed (oat, barley, soybeans, minerals and molasses). Prior to the experiment, the stallions were habituated to being isolated and feeding from the container inside the test arena.

Test stimulus and training methods

The test stimulus was a white paper bag (1.2 x 0.75 m) which was raised from a folded to an upright position by use of a string, which was pulled from outside the arena. The horses were trained according to three different methods. In the first method (***Classic habituation***), the horses (n=9) were exposed repeatedly to the full stimulus until they met the predefined habituation criterion. In the second method (***Gradual habituation***), the stimulus was divided into several less

frightening steps, i.e. the intensity of the movement was lower during the first steps, and the horses (n=9) were habituated to each step, before the full stimulus was applied. In the third method (***Associative learning***), the horses (n=8) were trained to feed from the bag, i.e. to associate the stimulus with a positive reward, before they were exposed to the full stimulus.

Five training sessions of 3 minutes were allowed per horse per day. Behavioural responses were registered using a handheld computer (Workabout, PSION PLC, UK). The observer sat quietly on top of the straw wall next to the start box, and the horses were used to the presence of the observer from the initial training. Subsequently the data were transferred from the PSION to a PC, using the software PSION Manager, version 1.1. Heart rate (HR) was recorded with Polar Vantage (Polar Electro OY, Kemple, Finland), which consisted of an electrode belt with a built-in transmitter and a wristwatch receiver. Water and exploratory gel were used to optimise the contact between electrode and skin. The HR monitoring equipment was fitted on the horse in the waiting area prior to testing, and the receiver stored data from the transmitter (every 5 sec). Subsequently, data were downloaded via a Polar Interface to a PC, using the software Polar Precision Performance^{TM} SW 4.

Results and discussion

Horses that were trained according to method 2 (Gradual habituation) needed fewer training sessions (ANOVA, mean±se; Met2: 2.6±0.8 vs. Met1: 4.3±2.1 and Met3: 10.3±2.7; $F_{2,23}$=4.05, P=0.03) in order to learn not to react to the test stimulus, and they tended to show less flight responses (ANOVA, mean±se; Met2: 1.0±0.5 vs. Met1: 1.7±0.7 and Met3: 4.1±1.5; $F_{2,23}$=3.00, P=0.07). Horses, which were trained according to method 3 (Associative learning) needed the highest number of training sessions, which was due to the fact that the horses needed a lot of time to learn to feed from the bag.

Surprisingly, there were no significant differences between the methods in heart rate and latency to return to the food during the first training session, i.e. the horses did not react more to the full stimulus (Classic habituation) than to the slower, less moving test stimulus (Gradual habituation) during the very first presentation. This result indicates that horses react to any new movement, regardless of the intensity.

Although there were no significant differences in behavior and heart rate responses during the first exposure to the test stimulus, the weaker and gradually increasing movement intensity of the test stimulus in method 2 (Gradual habituation) had a positive effect on the speed of learning in the test horses.

The data analysis has not yet been completed.

Conclusion

We conclude that gradual habituation is the most effective training method for horses in frightening situations.

References

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