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Loading horses (*Equus caballus*) onto trailers—Behaviour of horses and horse owners during loading and habituating

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ABSTRACT

Horses are transported for many reasons, and loading habituation is potentially affecting animal welfare and human safety. Horses are neophobic but may be habituated and trained to perform complex behavioural tasks in novel environments. Before transporting, horses should preferably be habituated to the vehicle and transportation. However, not all horse owners know how this can be done or how to apply common ethological methodology. The aim of our study was to quantify loading problems experienced by horse owners through a survey, compare horse behaviour during the loading procedure at a veterinary clinic with at competition sites and to perform a controlled experiment to investigate the effects of a standardized loading habituation procedure. Part 1 of the study was a horse owner survey. In study 2 we observed horses loaded at competitions and horses loaded at a veterinary clinic to compare two populations with differing habituation levels. In part 3 of the study six 2–3 year-old Icelandic horses were observed during loading habituation and heart rate was measured during these procedures over three consecutive days. Swedish horse owners' written survey answers (n = 99) showed that 21% experienced problems when loading their horses. Loading at the veterinary clinic took significantly longer (5.8 min) compared to at the competition site (28 s) ($P < 0.0001$). Horses showed a significantly higher number of evasive behaviours when being loaded at the clinic (16.0 SE ±9.4) compared to the competition site (1.3 SE ±0.5) ($P < 0.0001$). The Icelandic horses had significantly higher heart rate inside the trailer (73 bpm) compared to before loading (59 bpm) and when outside the trailer again (57 bpm) ($P = 0.001$). The time taken to load decreased significantly with number of times being loaded during the 3 experimental days ($P = 0.001$). We conclude that training, in accordance with learning theory, reduce fear when being loaded.

1. Introduction

Understanding the fundamentals of animal learning facilitates horse-human communication (McGreevy and McLean, 2007). Generally, horse training includes increasing the threshold for unwanted natural reactions, such as flight, as well as increasing sensitivity and response to human signalling (Visser et al., 2003). Negative reinforcement, partly combined with positive reinforcement is the most commonly used method for horse training (McGreevy and McLean, 2007). However, in many cases horse-human communication seems to go wrong and accidents caused by horses are common (Keeling et al., 1999). One situation where learning deficiencies become very evident is when loading a horse onto a trailer.

Due to the natural behaviour of horses, loading is often challenging (McGreevy and McLean, 2007). Horses are innately neophobic and show a natural fear of crowded, dark spaces, which seems logical considering the horses' evolutionary background (Fazio and Ferlazzo, 2003; Houpt, 1986b; Waran, 2002). Evasive behaviour combined with the horse's size and strength may lead to loading problems being a potential risk of injury both to the horse and to the humans involved (Shanahan, 2003; Cross et al., 2008). Rearing, throwing themselves backwards or sideways, as well as kicking may be observed in horses who are "bad loaders" (Ferguson and Rosales-Ruiz, 2001; Shanahan, 2003). These behaviours are often, unconsciously, reinforced by the person handling the horse. If the horse, for instance, throws itself backwards and the person lets go of the rope, the throwing behaviour is reinforced (Ferguson and Rosales-Ruiz, 2001). Apart from the risk of injury, the relationship between horse and human may be negatively affected, due to unintentional learning in an overall stressful situation (Shanahan, 2003).

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Table 1
Survey questions distributed to horse owners. Questions could be answered with yes/no and there was a field allowing for free comments.

Do you perceive that you have problems loading your horse?
How often to you transport your horse?
Have you asked for assistance to train your horse to be loaded?
Do you use any aids when loading (several options)?
Have you been injured during loading?
Has your horse been injured during loading?
Have you had to cancel a scheduled training event or a competition due to the horse being impossible to load?

Loading and transporting horses include several stressors such as close confinement, social isolation, unfamiliar objects, noises, smells and locations, potential temperature stress, possibly lack of roughage and lack of water, as well as a general lack of opportunity to perform natural behaviour (Fazio and Ferlazzo, 2003; Cross et al., 2008). Horses' first reaction to a frightening stimuli is escape (McGreevy, 2012) but horses that are habituated to a variety of objects and environments, preferably as juveniles, may generalize and react more calmly to new stimuli (Waran and Cuddeford, 1995). Horses that have not previously been exposed to a variety of stimuli and handling react more strongly in unfamiliar situations (Waran and Cuddeford, 1995; Fazio and Ferlazzo, 2003).

Studies show that loading problems can be attributed to problems related to leading the horse, such as the start and stop signals not functioning reliably (McGreevy, 2012). Ethology is a well validated scientific subject when studying animal motivations, however it does not give the complete picture and hence physiology is a valuable complementary tool (Visser et al., 2002; Jensen, 2009). Heart frequency has been used to estimate fear levels in horses during transportation (Schmidt et al., 2010). The normal heart frequency in a resting horse is 44 bpm, with a range of 23–70 bpm (Fraser et al., 1991). This is, however, not always correlated with increased physical activity but instead with preparedness for a flight reaction (Waran and Cuddeford, 1995; Cross et al., 2008) and hence has a potential to be used as a parameter to measure stress during the loading procedure per se.

The aim of this study was to investigate horse owners' perception of loading, evaluate the loading situation by studying two groups of horses with differing levels of habituation and to perform a controlled experiment to demonstrate the effects of habituation.

2. Material & methods

This study was divided into three parts. Firstly a survey was distributed to horse owners. Secondly we carried out observations of loadings at competition sites and at a veterinary clinic and thirdly we studied behaviour and physiology of young horses during habituation to loading.

2.1. Horse owner survey

Surveys were distributed at eight different horse related events, the largest horse fair in Sweden, one veterinary clinic and six competition sites (local-regional competitions), in the beginning of 2009. In total 99 surveys were handed out and all were filled in and returned at the site. See Table 1 for the survey questions.

2.2. Loading of horses with varying habituation

The loading of 68 horses and 37 ponies at five competition sites and one veterinary clinic in south west Sweden was observed during March–April 2009. Five observational days were located at competition sites (competitions up to regional level) and five at a horse veterinary clinic. We were aiming for observing at least 10 loadings on each of the five observation days. At competition sites, observations were carried out for 3 h. Time of observation varied due to the competition schedule. At the veterinary clinic observations were carried out at 09.30–11.30 and 13.30–15.30, since a pilot study had shown that these time periods had the highest loading frequency. Loadings were observed using the ethogram shown in Table 2, using continuous observation. All observations were carried out on loadings into the type of trailer carrying 1–3 horses, loaded from behind, and pulled by a normal private car. This is the smallest kind of transport vehicle and the most common type for horses in Sweden. Loading was defined as starting when the person started leading the horse/pony towards the trailer and ending when the horse/pony had both its hind legs inside the trailer. Recording continued even if, for example, loading was delayed since the trailer had to be moved to, e.g. a stable door. The horses were equipped with a lead halter and a rope. This was hence not included in "aids", however deviations from this standard equipment was noted. All aids used were noted (lunging rope, whip, roughage, candy and a broom). Use of aid, including the signalling using the lead halter and the lead rope was registered in five different categories: positive reinforcement, negative reinforcement, positive punishment, negative punishment and other. Loadings were observed chronologically as they were performed by the horse owners. At the veterinary clinic, horse owners were informed about the project through a note on the entrance door. The owners of the competition horses were informed at the competition arena by the observer. Before observations were carried out the owners gave their consent to participate.

Table 2
Ethogram of horse behaviour during loading.

Behaviour	Description
Forward[a]	The horse moves towards the trailer
Backwards	The horse moves away from the trailer
Sideways	The horse moves sideways in relation to the trailer
Still	The horse's four legs are standing still on the ground for a minimum of 1 s.
Forceful evasion (T/A)	The horse makes a sudden jump or throws itself towards (T) or away (A) from the trailer
Rear	The horse rears with its front legs
Kick	The horse kicks, one or two legs is lifted and moved rapidly and forcefully
Whinnie	The horse vocalises
Defecate	The horse drops manure
Other	Any other behaviour

[a] The behaviour "Forward" was not registered when loading young horses (study 3).

2.3. Loading habituation in young horses

Six, privately owned, Icelandic horses were used. They were 20–36 months of age and kept in an open barn system. They had as foals been loaded and transported 2–3 times with their mothers, but were not considered fully habituated to loading and transportation. Before habituation started all horses were trained to be lead forward and to stop at a halter/rope signal. During this experiment the data was collected when habituating the horses to the loading situation. The horses were loaded using a standard halter with a halter rope. The trailer used was a two-horse two axle trailer, with straw on the rubber floor. The inside measurements were; height 230 cm, width 160 cm, length between the bars in front and back 180 cm and total length 310 cm. In the upper front were two small windows.

The loading staff wore safety equipment; helmet, protective shoes and gloves. Horses were loaded without any other horse present. Loading was started at a marked site five meters behind the trailer. The horse was led forward in a standardized way. Negative