

Equine stereotypic behaviours: A discussion on theories of how they come about, why they exist and their function

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Introduction

Stereotypies are defined by Mason (1991) as “repetitive invariant behavior patterns with no obvious goal or function”. They have previously been associated with suboptimal conditions that cause stress, such as social isolation, physical confinement or food deprivation (Fureix *et al.*, 2013). Stress is defined by Broom (1983) as “The process by which environmental factors over-tax control systems in an individual, thus activating responses whose effects are prolonged and ultimately detrimental to that individual” and thus “cause a reduction in fitness”. It has been suggested that stereotypies are a mechanism by which an animal copes with its surroundings or, conversely, are a sign of the animal’s inability to cope with these surroundings (Cooper & Albentosa, 2005). Due to the habitual nature of stereotypies (Mason & Latham, 2004) and their ability to cause physical harm to the animal in some cases (McGreevy & Nicol, 1998), stereotypies are of great importance when assessing the welfare of horses. This paper looks at three studies (Leme *et al.*, 2014; Furiex *et al.*, 2014; Benhajali *et al.*, 2014) and discuss theories on how and why stereotypies come about, and their possible function.

Discussion

Leme *et al.* (2014) conducted a study in 10 Brazilian equestrian centres and looked at the effect of a variety of husbandry practices and their potential correlation with the frequency of stereotypic behaviours in 197 horses. The outcome of the study showed that the amount of time the animals spent in their stalls, what they were fed and how much exercise they received were directly correlated with the prevalence of stereotypies in the sample group. Animals that spent the most time confined in their stalls, received the least amount of exercise and were fed on lower-fibre diets demonstrated the highest instances of stereotypic behaviours. The group that fell into all three of these categories was the rodeo horse. This is potentially an area of welfare that the rodeo industry should investigate. It is possible that these animals showed the highest prevalence of stereotypies because they were being kept in conditions that are most in contrast to the free-roaming and grazing conditions under which horses naturally live. The assumption is that the suboptimal conditions are placing stress on the animals. However, this does not discern whether the horses showing stereotypies are better able to cope with these conditions due to these stereotypic behaviours, or if the presence of stereotypies is a sign of the horses’ inability to cope.

One hormone associated with stress is cortisol. Furiex *et al.* (2013) conducted a study to ascertain whether animals exhibiting stereotypies had higher concentrations of plasma cortisol in their blood and cortisol metabolites in their faeces. The second technique is arguably more effective for assessing cortisol concentrations as the collection method is non-invasive, so this technique would be unlikely to increase cortisol concentrations in the animal. Results from this study showed that there were no statistically significant differences in the cortisol or cortisol metabolite concentrations between the control group and the group of horses showing stereotypies. There could be two reasons for this. The first is due to the habitual nature of the stereotypies (Sarafchi & Blokhuis, 2013). A horse may not be currently experiencing the suboptimal conditions that caused it to develop the stereotypy, but will continue to express stereotypic behaviours, possibly for the rest of its life, regardless of its surroundings.

The second possible explanation for these results is that the stereotypic behaviours are not linked to the release of cortisol. The stereotypies may instead be linked to the release of endogenous opioids such as endorphin; this is seen in a range of species, including humans who self-harm. This explanation would support the “coping” theory but also provides a potential explanation to the habitual nature of stereotypies, as self-harming humans can become addicted to the subsequent opiate release (Sandman & Hetrick, 1995).

The ability of an animal to produce offspring is a good indicator of its fitness, with low reproductive rates being associated with poor fitness (Benhajali *et al.*, 2014). This study on the effects of stereotypies on conception rates in mares (n=31 stereotypic mares and n=83 non-stereotypic mares) showed that there was a significant decrease in the conception rates of mares exhibiting stereotypic behaviours (Benhajali *et al.*, 2014). Stress has been shown to lower conception rates in dairy cows (Dobson & Smith, 2000). “Stress is revealed by the inability of an animal to cope with its environment,

a phenomenon that is often reflected in a failure to achieve genetic potential” (Dobson & Smith, 2000). This would support the theory that stereotypies are a symptom of inability to cope and not a way of coping. However, because the horses would have been under stress at some point to need a coping method, the two are not mutually exclusive. This potentially indicates that stereotypies are not an effective coping mechanism for stress.

Aurich *et al.* (1996) showed that endorphins could control luteinising hormone secretion, reducing ovarian activity and thus reproductive fitness. This provides potential evidence to support the “coping” theory through the release of endogenous opioids.

Conclusion

Further research is required into the habitual nature of stereotypies, notably on how and when horses are most likely to develop such behaviours. To prevent stereotypies from developing, it would be beneficial to understand when horses are at greatest risk of developing them, such as during weaning or training, and how these potentially high-stress events can be conducted in a manner that does not induce stereotypic behaviours.

The exact function of stereotypic behaviours is still unclear. It is possible that they may be used to better allow the animal to cope with its environment. Further research is required to ascertain whether these seemingly purposeless behaviours are of any benefit to the animal by allowing it to cope with the conditions it has been placed in or whether they are an indication of poor welfare conditions that the animal is unable to cope with.

References

- Aurich, J.E., Hoppen, H.-O., Hoppe, H., Aurich, C. 1996 Endogenous opioids and reproductive functions in the horse. *Animal Reproduction Science*, 42, 119-129.
- Benhajalia, H., Ezzaouia, M., Lunela, C., Charfic, F., Hausberger, M. 2014 Stereotypic behaviours and mating success in domestic mares. *Applied Animal Behaviour Science Journal*, 153, 36-42.
- Broom, D.M. 1983 The stress concept and ways of assessing the effects of stress in farm animals. *Applied Animal Ethology*, 11, 79.
- Cooper, J.J., Albentosa M.J. 2005 Behavioural adaptation in the domestic horse: potential role of apparently abnormal responses including stereotypic behaviour. *Livestock Production Science*, 92,177-182.
- Dobson, H., Smith, R.F. 2000 What is stress, and how does it affect reproduction? *Animal Reproduction Science*, 60, 743-752.
- Fureix, C., Benhajali, H., Henry, S., Bruchet, A., Prunier, A., Ezzaouia, M., Coste, C., Hausberger, M., Palme, R., Jengo, P. 2013 Plasma cortisol and faecal cortisol metabolite concentrations in stereotypic and non-stereotypic horses: do stereotypic horses cope better with poor environmental conditions? *BMC Veterinary Research*, 9:3 doi:10.1186/1746-6148-9-3
- Leme, D.P., Parsekian, A.B.H., Kanaan, V., Hötzel, M.J. 2014 Management, health, and abnormal behaviors of horses: a survey in small equestrian centers in Brazil. *Journal of Veterinary Behavior*, 91-92.
- Mason, G.J. 1991 Stereotypies: a critical review. *Animal Behaviour*, 41, 1015-1037.
- Mason, G.J., Latham, N.R. 2004 Can't stop, won't stop: is stereotypy a reliable animal welfare indicator? *Animal Welfare*, 13, 57-67
- McGreevy, P.D., Nicol, C.J. 1998 Prevention of crib-biting: a review. *Equine Veterinary Journal*, 27, 35-38.
- Sandman, C.A., Hetrick, W.P. 1995 Opiate mechanisms in self-injury. *Mental Retardation and Developmental Disabilities Research Reviews*, 1, 130-136.
- Sarrafchi, A., Blokhuis, H.J. 2013 Equine stereotypic behaviors: Causation, occurrence, and prevention. *Journal of Veterinary Behavior*, 8, 386-394.