The prevalence of abnormal behaviours in dressage, eventing and endurance horses in relation to stabling

P. D. McGreevy, N. P. French, C. J. Nicol

The behaviour of horses competing in different disciplines was studied and the relationship between the time they spent out of the stable and the prevalence of abnormal behaviour was examined. The owners of dressage, eventing and endurance horses were sent a questionnaire and a total of 1101 responses were received, giving data on 1750 horses. The behaviours studied were wood-chewing, weaving, crib-biting/wind-sucking and box-walking. The reported percentage prevalences of abnormal behaviour for the dressage, eventing and endurance horses were 32.5, 30.8 and 19.5, respectively. The relationship between the time spent in the stable and the prevalence of abnormal behaviour was examined by \( \chi^2 \) tests which showed that there were significant linear trends for the eventing group (P<0.001) and the dressage group (P<0.05). It is concluded that the time a horse spends out of the stable is related to the discipline for which it is being trained and in dressage and eventing horses the time spent in a stable is correlated with an increased risk of abnormal behaviour.

ABNORMAL behaviours including stereotypes have been recorded in populations of domestic horses (Houpt and McDonnell 1993) and captive wild horses (Boyd 1986). However, there have been no comparative studies of the extent to which the prevalence of these behaviours differs in horses used in different equestrian disciplines. This study estimated the proportions of horses with four abnormal behaviours in samples of dressage, eventing and endurance horses. The behaviours studied were the redirected behaviour of wood-chewing and the stereotypes, weaving, crib-biting/wind-sucking and box-walking. The amount of time horses spent out of the stable was also determined. The aim of the study was to determine how the behaviour of horses competing in different disciplines might vary and to examine the relationship between the time spent out of the stable and the prevalence of the abnormal behaviours.

Materials and methods

The prevalence of the four behaviour patterns, commonly described as ‘stable vices’, was investigated by a postal survey in the winter of 1992. The members of the British Horse Society’s dressage, eventing and endurance riding groups were surveyed by the inclusion of a questionnaire with their regular monthly mailing.

Study design

A self-administered one-page postal questionnaire was used to collect the data, and the following questions were asked:
- How many horses registered with the sporting group were owned?
- How many of the horses had the behaviours listed?
- Had the owners specifically tried to prevent these behaviours?
- How many hours per day did the horses spend out of their stables?
- Did the owners believe that horses could acquire these behaviours by imitation?

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Weaving</th>
<th>Crib-biting</th>
<th>Wind-sucking</th>
<th>Box-walking</th>
<th>Wood-chewing</th>
<th>All abnormal behaviours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dressage</td>
<td>9.4%</td>
<td>7.5%</td>
<td>3.8</td>
<td>20.0%</td>
<td>32.5%</td>
<td></td>
</tr>
<tr>
<td>Eventing</td>
<td>9.5%</td>
<td>8.9%</td>
<td>3.6</td>
<td>15.4%</td>
<td>30.8%</td>
<td></td>
</tr>
<tr>
<td>Endurance</td>
<td>3.9%</td>
<td>3.1%</td>
<td>5.5</td>
<td>8.6%</td>
<td>19.9%</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>7.36</td>
<td>6.09</td>
<td>-</td>
<td>17.02</td>
<td>13.66</td>
<td></td>
</tr>
</tbody>
</table>

Degrees of freedom: 2

\( P<0.025 \) \( P=0.048 \) NS \( P=0.0002 \) \( P=0.0011 \)

Disciplines with different superscripts were significantly different \( P<0.05 \)

Data analysis

Data for individual owners were calculated from the replies from each yard and entered into a database within SPSS 4.0 for the analysis of the relative frequency of the four behaviours and the determination of the interquartile ranges of the time spent out of the stable. \( \chi^2 \) tests (Epi-info, Dean and others 1990) were used to determine any differences between disciplines in the prevalence of abnormal behaviour and to examine the relationship between the time spent out of the stable and the prevalence of abnormal behaviour for each discipline. For the latter, a score was assigned to each quartile of the distribution of time spent out of the stable, and a \( \chi^2 \) test for linear trend applied.

Results

A total of 1101 responses were received, giving data on 1750 horses. From the dressage group 465 replies were received giving data on 744 horses (16.3% per cent of the registered population); from the eventing group 471 replies were received giving data on 796 horses (13.3% per cent of the registered population), and from the endurance group 165 replies were received giving data on 211 horses (39.1% per cent of the registered population).

The percentage prevalences of any of the abnormal behaviours were 32.5, 30.8 and 19.5 for the dressage, eventing and endurance groups, respectively.

The endurance group reported significantly less abnormal behaviour overall (P<0.01) than the other two groups (Table 1). The relative frequency of abnormal behaviour within each population followed a consistent pattern. For each of the behaviours except box-walking, the endurance group reported significantly fewer than the other two groups. Some horses performed more than one behaviour, and as a result the total percentage prevalences of the four behaviours exceeded 100.

The endurance horses spent significantly more time out of their stables than the horses in the other two groups (one way analysis of variance P<0.001). There was also an association within each discipline between the time spent out of the stable and the prevalence of abnormal behaviour. The time spent out of the stables by each group was expressed in quartiles (Table 2) which were then used to determine the relationship between the time spent out of the stable and the prevalence of abnormal behaviour; this relationship was expressed as an odds ratio. The odds of an event occurring are defined as the ratio of the probability that it will occur to the probability that it will not. The odds ratio is the ratio of the odds of a horse in the quartile out of the stable for the shortest time performing an anomalous behaviour to the odds of a horse out of the stable for a longer period performing an anomalous
### Table 2: Relationship between the times spent out of the stable (expressed as quartiles) and the odds ratios of a horse performing an abnormal behaviour

<table>
<thead>
<tr>
<th>Time out of stable (quartile)</th>
<th>Quartiles limits (hours)</th>
<th>Odds ratio (dressage)</th>
<th>Quartiles limits (hours)</th>
<th>Odds ratio (eventing)</th>
<th>Quartiles limits (hours)</th>
<th>Odds ratio (endurance)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st (reference)</td>
<td>&lt;4</td>
<td>1.00</td>
<td>&lt;4</td>
<td>1.00</td>
<td>&lt;6</td>
<td>1.00</td>
</tr>
<tr>
<td>2nd</td>
<td>4-6</td>
<td>0.71</td>
<td>4-6</td>
<td>0.51</td>
<td>6-9</td>
<td>1.52</td>
</tr>
<tr>
<td>3rd</td>
<td>6-8</td>
<td>0.68</td>
<td>5-8</td>
<td>0.22</td>
<td>9-12</td>
<td>1.03</td>
</tr>
<tr>
<td>4th</td>
<td>&gt;8</td>
<td>0.62</td>
<td>&gt;8</td>
<td>0.31</td>
<td>&gt;12</td>
<td>0.97</td>
</tr>
</tbody>
</table>

*P < 0.05, ***P < 0.0001

behaviour. An odds ratio greater than 1 indicates an increase in risk whereas an odds ratio less than 1 represents a decrease in risk. \(^2\) tests for a linear trend were significant for the eventing group (P < 0.001) and the dressage group (P < 0.05).

Of the 1101 respondents, 793 (72 per cent) believed that horses could copy these behaviours, 287 (26 per cent) believed that they could not and 22 (2 per cent) did not have an opinion.

### Discussion

The time a horse spends out of the stable is related to the discipline for which it is being trained. It is not possible from these data to suggest a causal link between spending more than a certain time daily in a stable and the development of abnormal behaviour but the differences in management between the horses trained for different disciplines certainly merit consideration. Endurance horses are regularly ridden for more than three hours per day and often compete while being maintained at grass. Eventers are generally managed more intensively since it is considered important to control the amount of roughage they consume. Similarly dressage horses are thought to be less responsive to their handlers if kept at grass.

It was found that box-walking was relatively common among endurance horses. Possibly these horses may be motivated to keep moving through some form of physiological reward. Alternatively, the stable may be more aversive to endurance horses than to others because they receive less of their daily food ration there or because they are less habituated to being confined. Thus, box-walking could be a redirected escape response to the aversive stimuli represented by the stable.

A number of possible limitations of the study were considered. First, since there was a consistent pattern across the disciplines in the relationship between the time spent out of the stable and the odds of a horse performing an abnormal behaviour and since this consistency showed a significant linear trend in the eventing and dressage groups, the relationship between the time spent out of the stable and the prevalence of abnormal behaviour was unlikely to have occurred by chance. However, because some owners had more than one horse, there may have been a clustering effect, that is a lack of independence, which was not accounted for in the analysis. Secondly, the link between the time spent out of the stable and the prevalence of stereotypes could have been confounded by some unmeasured variable associated with this period, for example, the quality of grass ingested, or fatigue resulting from ridden exercise. The relative importance of behaviours performed out of the stable and their relationship to the prevalence of stereotypes therefore merits further study.

Thirdly, the frequency of wood-chewing in all three populations should be considered.

Wood-chewing is more variable than a stereotype because an individual horse may chew more wood from different sites within its stable. This behaviour was included to minimise underreporting of early oral-based stereotypes which are often poorly defined (McGreevy and others 1995b).

The question in the survey asked how many of the owner’s horses regularly chewed wood in the stable. However, the reported relative frequency of wood-chewing may have been overestimated because of its expense to the owner.

It is known that equestrians in different disciplines favour different breeds or types of horses. Classically, this is demonstrated by the prevalence of Arabs and Arab crosses in endurance riding.

thoroughbred crosses in eventing and warmbloods in dressage. However, these breeds are all considered to be among the more reactive of breeds (Kiley-Worthington 1983) and could all be expected to demonstrate a relatively high level of abnormal behaviour in response to confinement. The results of this survey may indicate that the aversiveness of being housed in a stable may be different for different breeds of horse. For example, if there is a critical period of daily confinement necessary for the development of a stereotypic behaviour, this critical period may be shorter in genetically predisposed horses. Alternatively, it is possible that all horses find the stable environment aversive and that stereotypes represent a coping response which only certain breeds or individuals are able to perform.

Most respondents believed that horses were able to copy abnormal behaviours, despite the lack of evidence to support the possibility of observational learning (Baer and others 1983). This may explain why horses with stereotypic behaviours are often unpopular and are regularly isolated from normal companions.

The length of time that dressage and eventing horses spent in a stable daily was correlated with an increased risk of their performing an abnormal behaviour. This must be considered in the light of recent findings in thoroughbreds trained for flat racing which showed that factors related specifically to the management of the horses in their stables were strongly associated with stereotypic behaviour (McGreevy and others 1995a). Further work is required to investigate the extent to which the type of abnormal behaviour performed by a horse depends on its breed or on the discipline in which it competes. Work in other species (Cook and Odberg 1991) suggests that, once established, stereotypes can become dissociated from their initiating causes. As a result, attempts to eradicate an established stereotype by increasing the time that a horse spends out of the stable may have little effect on its behaviour in the stable.

### Acknowledgements

The cooperation of members of the dressage, endurance and horse trials groups of the British Horse Society is gratefully acknowledged. This work was supported by the RSPCA, the Agricultural and Food Research Council and the Horserace Betting Levy Board.

### References


### Haematological changes in racing greyhounds

ARTERIAL blood samples were obtained from six greyhounds when they were at rest, and just before and five minutes after a 704 m race.

The plasma volume, 10 per cent just before the race, and the total circulating volume and numbers of red blood cells (RBC) increased by 60 per cent; there were also increases of 25 to 30 per cent in the blood volume and packed cell volume (PCV). Five minutes after the race the plasma volume was 21 per cent below the resting value and the circulating volume of RBC had increased by 73 per cent, accompanied by an increase of 40 per cent in PCV. The increases in blood volume and PCV due to the contraction of the spleen.