Group housing of horses – a potential source of social stress?

Denise V. Hebesberger, Jacob C. Dunn, Dawn Hawkins, Claudia A.F. Wascher

Anglia Ruskin University, Behavioural Ecology Research Group, Cambridge, UK
Equine-assisted interventions (EAI)
Welfare of equines in EAI

Quality of life, well-being

Physical
Mental

Boissy et al., 2007, *Physiol. Behav.*
Welfare of equines in EAI

**Group housing**

(British Horse Council 2017)

Freedom to express natural behaviour

Brambell Report 1965
Welfare of equines in EAI

Group housing

(British Horse Council 2017)

Allow positive experiences

Boissy et al., 2007, Physiol. Behav.
Dalla Costa et al., 2014, Anim. Welfare
Welfare of equines in EAI

Group housing

(British Horse Council 2017)

Freedom from fear and distress

Brambell Report 1965
Social interactions

Agonistic interactions
- Aggression
- Threats and physical conflict
- Defence and submission

(Briffa et al. 2013)

They can cause a stress response
Social interactions

Affiliative interactions

• Friendly interactions such as grooming, touching, sniffing, body contact


They can cause a positive emotional state

Cattle: Laister et al., 2011, Appl. Anim. Behav. Sci.;
Goats: Briefer et al., 2015, Anim. Behav.)
Research questions

Are agonistic interactions a source of stress?

Are affiliative interactions a source of a positive emotional state?
Method

- Recording heart rate during social interaction of group-housed horses
Study group

N = 19 different breeds, mixed sex groups

age: 17 ± 6 (Mean ± SD) used in EAI, riding lessons, hacks
Data collection

- Mobile heart rate monitor: (Polar V800 Equine)
- Video recordings in the field

Heart rate

Behaviour

time matched
Data collection
Behavourial variables

**Agonistic**
- Threats
- Bites
- Attacks
- Retreat

Total = 596 (14 horses)

**Affiliative**
- Sniff
- Touch
- Rub head
- Groom

Total = 416 (13 horses)
Total = 37 (8 horses)

**Locomotion**
- Stand
- Walk

Total = 15 horses
Heart rate variables
Heart rate variables

<table>
<thead>
<tr>
<th>PRE</th>
<th>INTERACTION</th>
<th>POST</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 seconds</td>
<td>during</td>
<td>10 seconds</td>
</tr>
</tbody>
</table>
Heart rate variables

<table>
<thead>
<tr>
<th>PRE</th>
<th>INTERACTION</th>
<th>POST</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 seconds</td>
<td>during</td>
<td>10 seconds</td>
</tr>
</tbody>
</table>

Mean | Mean | Mean
## Heart rate comparisons 1

<table>
<thead>
<tr>
<th></th>
<th>PRE</th>
<th>INTERACTION</th>
<th>POST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>10 seconds</td>
<td>during</td>
<td>10 seconds</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>Mean</td>
<td>Mean</td>
</tr>
</tbody>
</table>

During 10 seconds, the mean heart rate comparisons were made before, during, and after interaction.
Heart rate comparisons 2

<table>
<thead>
<tr>
<th>PRE</th>
<th>INTERACTION</th>
<th>POST</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 seconds</td>
<td>during</td>
<td>10 seconds</td>
</tr>
</tbody>
</table>

Mean | Mean | Mean |

Other behaviours

Standing
Walking
Head threat 1

Pre – During – Post

Friedman Tests:
Initiator: \( n = 13, X^2 = 1.85, df = 2, p = 0.397 \)
Receiver: \( n = 13, X^2 = 1.08, df = 2, p = 0.584 \)

Head threat 1 vs Standing

Friedman Tests:
Initiator: \( n = 13, X^2 = 2.1, df = 3, p = 0.552 \)
Receiver: \( n = 13, X^2 = 2.24, df = 3, p = 0.525 \)
Pre – During – Post

Friedman Tests:
Initiator: n = 14, $X^2 = 1.08$, df = 2, $p = 0.584$
Receiver: n = 13, $X^2 = 7$, df = 2, $p = 0.032$

Nemenyi Multiple Comparison Test:
Pre-post: $p = 0.02$, $r = -0.45$

6% higher post in receivers

Head threat 2 vs Walking

Friedman Tests:
Initiator: n = 14, $X^2 = 7.11$, df = 3, $p = 0.068$
Receiver: n = 13, $X^2 = 4.89$, df = 3, $p = 0.18$
Pre – During – Post

Friedman Tests:
Initiator: no analysis, low n
Receiver: n = 5, $X^2 = 6.2$, df = 2, $p = 0.046$

Nemenyi Multiple Comparison Test:
Pre-post: $p = 0.031$, $r = -0.68$

26% higher post in receivers
Short affiliative interactions

Pre – During – Post

Friedman Tests:
Initiator: n = 12, $X^2 = 4.77$, df = 2, $p = 0.092$
Receiver: n = 13, $X^2 = 0.727$, df = 2, $p = 0.695$

Short affiliative vs Standing

Friedman Tests:
Initiator: n = 12, $X^2 = 3.7$, df = 3, $p = 0.296$
Receiver: n = 12, $X^2 = 1.44$, df = 3, $p = 0.698$
Grooming

Pre – During – Post

Friedman Tests:
Partners: n = 8, $X^2 = 1$, df = 2, $p = 0.607$

Grooming vs Standing

Wilcoxon signed rank test:
Partners: n = 8, $V = 26$, $p = 0.046$, $r = -0.53$

HR 8% lower during grooming
Conclusion

• Agonistic interactions of low intensity did not facilitate a stress response.
• Short affiliative interactions did not affect heart rate.
• Grooming corresponded to lower heart rate and potentially a positive emotional state.
Thank you!
References & Picture Source


**Picture head threat 2**
https://equimed.com/health-centers/behavior/articles/my-mare-pins-her-ears-when-approached-what-can-i-do-to-put-her-in-a-better-mood