Investigating the Effects of Fly Masks on Equine (*Equus caballus*) Affective States and Social Communication

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INTRODUCTION:

- Fly masks are a mesh covering for the equine face used to avoid distress in response to insect nuisance. However, there is almost no published research investigating the efficacy or welfare benefits of fly masks, nor any research exploring potential negative impact (Machtinger, *et al*., 2012).
- Eyes, ears and head orientation are widely recognised to be indicators of equine affect (Hall, *et al*., 2018), but also social attention (Wathan, *et al*., 2015). Horses are known to signal affective states through their facial expressions, and perception of these states informs other individuals about the intention of the signaller (Cozzi, *et al*., 2010; Hall, *et al*., 2018). This exchange of socially relevant information via facial and head signals is crucial for social cohesion, and the adaptive benefits conferred by group stability (van Dierendonck, 2006; Wathan and McComb, 2014; Mellor, *et* al., 2020).
- **Research Questions**: i) Do fly masks influence the affective state of horses; ii) If fly masks occlude facial signals, could they diminish the ability to communicate socially relevant information between conspecifics?

METHOD:

- Subjects – 7 mature geldings from an adult riding centre.

Individual affective behavioural observation

- 20 minute video recording of individual horses in the stable under four conditions
- Conditions: baseline behaviour, hands moved around the head imitating the application of a fly mask, fly mask, post fly mask.
- Intervals of 1 minute and ethogram of 8 behaviours measured.

Social communicative behavioural observation

- 45 minute live observation of pairs in the field.
- Conditions: baseline, fly mask worn by one individual, post fly mask.
- Intervals of 1 minute and ethogram of 12 behaviours, including proximity and orientation.

- Data were analysed using Friedman test of differences, Wilcoxon signed rank test, Chi-square test of independence and repeated measures Analysis of Variance where appropriate.

RESULTS:

Individual affective responses

- Vertical axis head position– frequency of head up/down behaviours not significantly influenced by the fly mask ($p=0.06$).
- Horizontal axis head position– no significant impact of the fly mask on frequency of head left/right ($p= 0.51$).

Conspecific interaction responses

- **Proximity**– statistically significant difference between conditions ($f = 8.027$, $p= 0.001$). Pairs move further apart when fly mask worn by one individual compared with when both are unmasked ($p = .003$).
- Orientation– no significant effect of the fly mask on number of changes in orientation by the masked horse ($p= 0.72$), or the unmasked horse ($p= 0.19$).
- **Affiliative behaviours** (i.e. nose-nose interaction, friendly body contact/touching, stand/rest together)- Compared with both horses unmasked, there was a significant reduction in frequency of affiliative behaviours when one was masked ($x^2 = 11.06$, $p= <0.001$). *See Figure 1.*
- **Play behaviours** (i.e. play, play fight)- frequency of play behaviours also significantly reduced by the fly mask compared to both unmasked ($x^2 = 4.42$, $p= 0.04$). *See Figure 2.*

Fig 1. Comparison of **affiliative behaviours** in the unmasked and masked horse across the baseline and fly mask conditions.

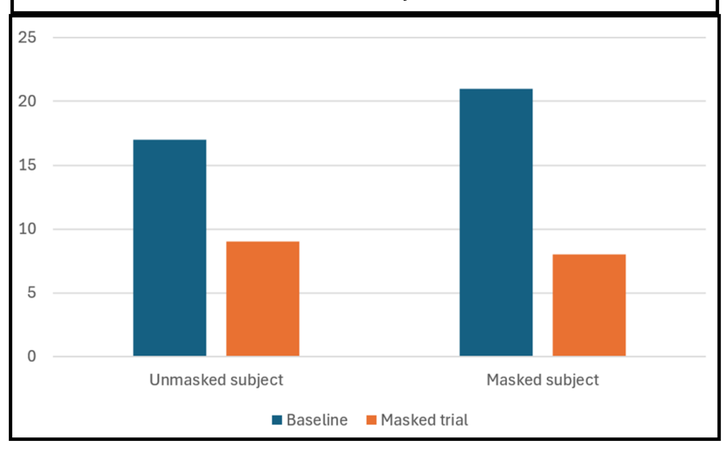
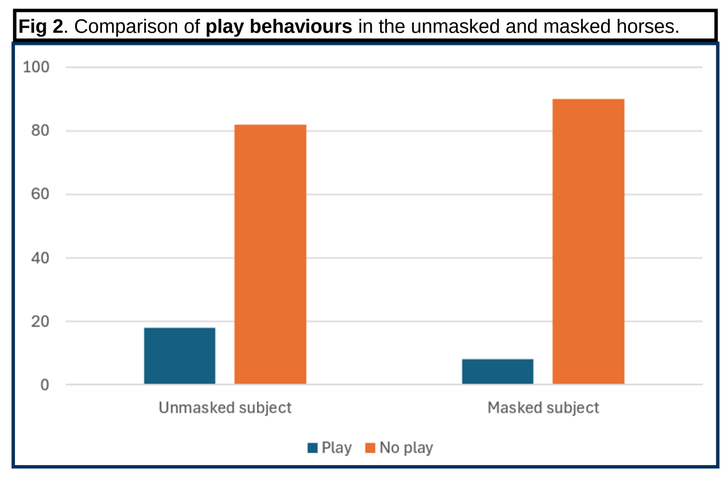


Fig 2. Comparison of **play behaviours** in the unmasked and masked horses.



DISCUSSION & CONCLUSIONS:

- Wearing a fly mask could lead to heightened emotional arousal (Mendl, Burnman and Paul, 2010; Forkman, *et al*., 2007; Smith Thomas, 2011). This needs replication with a larger sample.
- Fly masks lead to increased distance between pairs and therefore could inhibit social communication and bonding with conspecifics (Bartlett, Cameron and Freeman, 2022).
- Fly masks may contribute to compromised welfare through reducing the frequency of interactive behaviours. Lack of affiliative and play behaviours have been linked to chronic stress and development of stereotypies (van Direndonck, 2006; Christensen, *et al*., 2002).
- Further research into this area may yield clearer conclusions as to the welfare impacts of fly masks on equines– larger samples, with horses to whom the fly mask is novel, and other measures e.g. heart rate and vocalisations (Reid, *et* al., 2017; Althobati, *et* al., 2019; Stomp, *et al*., 2018; Briefer, *et al*., 2017).

REFERENCES:

APPLICATION TO INDUSTRY:

- Why has this not been observed before?
  Owners may be more likely to notice lack of emotional responses to the fly mask in the stable, but may not observe horses in the field to recognise the impacts on social behaviour.
- Owner awareness of the potential impacts of fly masks can be increased in order to make informed choices surrounding the products or methods used for insect relief, and how these affect the emotional and social welfare of their horses.
- Retailers of fly masks should consider funding further research into fly mask impacts and efficacy in order to maintain their position as responsible stakeholders in equine welfare.

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