



Application of Qualitative Behavioural Assessment to horses during an endurance ride

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ABSTRACT

Endurance horses are considered subject to a unique set of training and competing pressures due to the long distances travelled. The health and welfare of these horses could be compromised if they have not been adequately trained or are pushed beyond their limits, and there are increasing concerns regarding the capacity of horses to cope with the exercise demands placed on them, with high elimination rates for lameness and metabolic reasons. Veterinary inspections during these rides are important for assessing physiological measures, but the inclusion of behavioural assessments is also warranted. We investigated the application of Qualitative Behavioural Assessment (QBA) as a method for assessing demeanour in horses engaged in a 160-km endurance ride. We used a Free Choice Profiling (FCP) methodology to analyse footage of 10 horses collected during veterinary inspection (1) pre-ride, (2) midway through and (3) at the end of the ride. FCP allows each individual observer to develop his/her own unique set of descriptive terms for scoring the behavioural expression of animals. Observers ($n=22$) reached consensus in their assessment of the behavioural expression of the 10 horses ($P<0.001$). The first dimension of behavioural expression was characterised by terms such as 'calm', 'content' and 'relaxed' contrasting with 'agitated', 'angry' and 'annoyed'. Scores on this dimension did not differ between the three time points ($P=0.372$), but did demonstrate significant individual differences ($P=0.004$). This dimension may capture individual responses to the veterinary inspection procedures or the general endurance environment. On the second dimension, observers scored animals as more 'alert', 'curious' and 'excited' pre-ride and more 'tired', 'lazy' and 'sleepy' mid-ride and at the end of the ride ($P=0.001$), which seems to indicate a more general effect of the race on the horses' state. There were also significant differences between individual horses on this behavioural dimension ($P=0.028$). Interestingly, the behavioural assessment scores attributed to horses pre-ride on dimension 2 were correlated with the horse's final ride place ($P<0.01$), suggesting that observers detected behavioural expressions reflecting the horses' interest in the event. These results support the potential of QBA as a useful tool for evaluating horses' emotional and attitudinal response to endurance events.

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1. Introduction

Athletic competition can be stressful for horses (Cayado et al., 2006), and subsequently there is a need to

evaluate the effect of various types of events and common equestrian practices on horses. Equestrian competition is governed by strict rules based on the tenet that the welfare of the horse is paramount (Federation Equestre Internationale (FEI), 2011). However, welfare encompasses both physical and mental health (Broom, 1991; Dawkins, 2004, 2006), and while the physical health of horses may be monitored during events, there are few measures that

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assess the mental state of horses during competition. An animal's mental state can be expressed through their behaviour (Broom, 1991). Thus, in conjunction with the many measures taken during physical examinations (e.g. Cayado et al., 2006; Frazier, 2000; König von Borstel et al., 2011; Munsters et al., 2011), behavioural assessments should be recognised as important for evaluating the mental state of competition horses.

There are a number of methods of evaluating behaviour and welfare of horses at rest or in stables, including the use of ethograms (e.g. Hausberger et al., 2009; Lloyd et al., 2007) and the assessment of stereotyped behaviours as a psychological welfare indicator (Henderson, 2007; Mason and Latham, 2004). There are also measures of the response of horses to various tests, such as novel object tests (e.g. Visser et al., 2002). However, the focus on athletic performance may limit the repertoire of behaviours that can be assessed during competition, while human presence is also likely to influence how the horse conducts itself (König von Borstel et al., 2011; Visser et al., 2008). Qualitative Behavioural Assessment (QBA) is a method that uses human observers to assess and score the behavioural expression of animals (Wemelsfelder et al., 2000, 2001; Wemelsfelder and Lawrence, 2001). QBA takes an integrative approach by addressing the whole animal, where observers summarise all perceived details of an animal's posture and movement into descriptions of expressive demeanour (e.g. 'relaxed', 'anxious', 'playful', 'content'). Such terms do not describe what an animal is doing but how it goes about doing what it is doing – in other words, the animal's behavioural 'style' or 'body language' (Feaver et al., 1986; Stevenson-Hinde, 1983; Wemelsfelder, 1997, 2007). For example, immobility which is coupled with a rigid body stance, fixed, staring eyes and a tense mouth is very different from immobility associated with a lowered head and relaxed ears, eyes and tail (Minero et al., 2009). Integrating such subtle details can allow experienced animal workers to detect subtle shifts in demeanour, important for welfare assessment, that may be overlooked by isolating and quantifying individual physical behaviours (Meagher, 2009; Wemelsfelder, 1997, 2007; Whitham and Wielebnowski, 2009).

QBA builds on scientific approaches developed for assessing individual differences, temperament and personality, and extends these to the assessment of experience and welfare (Wemelsfelder, 2007; Wiseman-Orr et al., 2006). Body language descriptors such as 'content' and 'anxious' have an emotional connotation that refers to the animal's affective experience of its surroundings, and could potentially provide information that is highly relevant for the evaluation of an animal's well-being. The use of such terms may formalise skills that animal care professionals acquire through their daily work with animals, learning to filter large amounts of information to judge the wellbeing of individuals (Whitham and Wielebnowski, 2009). QBA has been shown to have merit as part of welfare assessments for a range of species, including horses (Minero et al., 2009; Napolitano et al., 2008), cattle (Brscic et al., 2009; Rousing and Wemelsfelder, 2006; Stockman et al., 2011, 2012a, 2012b), pigs (Rutherford et al., 2012; Temple et al., 2011; Wemelsfelder et al., 2000, 2001, 2009c), sheep

(Wickham et al., 2012), poultry (Wemelsfelder, 2007) and dogs (Walker et al., 2010). QBA scores are also correlated with quantitative measures of behaviour (Minero et al., 2009; Napolitano et al., 2008, 2012; Rousing and Wemelsfelder, 2006) and with physiological indicators relevant to welfare (e.g. heart rate, core body temperature, plasma glucose and the neutrophil: lymphocyte ratio; Stockman et al., 2011, 2012b; Wickham et al., 2012).

Importantly, QBA is a method that can either be applied retrospectively, e.g. to assess animals on video footage and determine differences between treatments, or has the potential for immediate use, for example in on-farm welfare assessments (e.g. Brscic et al., 2009; Rousing and Wemelsfelder, 2006; Temple et al., 2011). With horses in endurance events, QBA could be used as part of the assessment of animals at regular observation points during competition, as well as a tool to evaluate differences in horse responses to training, competition, riding style, speeds, gear, environments, etc.

This study reports the application of QBA to horses involved in a 160-km competitive endurance ride. Endurance rides impose considerable physical and mental challenges to some horses, due to the distance travelled and the long duration of the event (Bergero et al., 2005; Frazier, 2000). Endurance competitions around the world are increasing in speed, and high elimination rates for lameness and metabolic reasons (Marlin et al., 2008; Nagy et al., 2010) have sparked concerns regarding the capacity of horses to cope with the exercise demands placed on them. In this study, our aim was to investigate the effect of endurance rides on the expressive demeanour of horses to see if, and how, application of QBA might reveal differences between individuals and across time that could potentially reflect the performance and welfare state of these animals.

2. Methods

2.1. Animals and experimental design

This study was based on video-footage of privately-owned endurance horses (of 20 senior competitors), collected during a 160-km endurance ride event at Colliie, Western Australia (WA). The endurance ride was conducted under the rules set by the FEI governing endurance competitions (FEI, 2011), whereby the same horse and rider compete over a set course and distance against the clock. The total ride distance is separated into multiple phases or loops. Before being allowed to start the ride, between the loops, and at the end of the ride, the physical health and recovery of the horses is stringently evaluated at veterinary inspections to ensure the horse is fit to continue. The ride was conducted as vet-gate-into-hold (VGIH), where the arrival time is recorded for each leg of the ride and the rider has up to 30 min to present the horse at the 'vet gate' for veterinary inspections; the actual time taken to present is added to the ride time. Riders brought their horse for veterinary inspection once they judged that the horse had recovered sufficiently (heart rate and recovery criteria). Under VGIH, there is a subsequent compulsory rest period ('hold'), ranging from 30 to 60 min,

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