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Review

The horse–human dyad: Can we align horse training and handling activities with the equid social ethogram?

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ABSTRACT

This article examines the recently completed equid ethogram and shows how analogues of social interactions between horses may occur in various human–horse interactions. It discusses how some specific horse–horse interactions have a corresponding horse–human interaction – some of which may be directly beneficial for the horse while others may be unusual or even abnormal. It also shows how correspondent behaviours sometimes become inappropriate because of their duration, consistency or context.

One analogue is unlikely to hold true for all horse–human contexts, so when applying any model from horse–horse interactions to human–horse interactions, the limitations of the model may eclipse the intended outcome of the intervention. These limitations are especially likely when the horse is being ridden. Such analyses may help to determine the validity of extrapolating intra-specific interactions to the inter-specific setting, as is advocated by some popular horse-training methods, and highlight the subsequent limitations where humans play the role of the 'alpha mare' or leader in horse handling and training. This examination provides a constructive framework for further informed debate and empirical investigation of the critical features of successful intra-specific interactions.

Introduction

Many popular horse-training methods that identify themselves under the natural horsemanship banner feature anthropocentric labelling of human–horse interactions. Most commonly, these methods describe the human–horse relationship in terms of predator and prey, and maintain that mutual 'respect' is central to successful training.

The renowned horseman and educator Monty Roberts considers that humans can assume the position of 'honorary horses' with naïve animals through a system of body language he describes as *'Equus'* (Roberts, 1996). These and similar techniques convey an appealing message that horse training is simply a matter of demonstrating leadership or dominance in a manner analogous to that shown among horses to each other.

Anthropocentric labelling of human–horse interactions makes the interpretations by proponents of natural horsemanship sound irrefutably plausible and humane. Unfortunately, such labels can be misleading, contradictory and constitute potential barriers to effective training. They can also lead to misunderstanding, conflict and reduced welfare for human and equine participants. One of the potential dangers in adopting an anthropogenic framework to explain horse motivation is that the trainer/rider may assume that a horse knows what the human wants. This assumption permits humans to issue unclear cues, leading to frustration and even feelings of deception when they fail to produce the desired outcome in the horse.

For example, some practitioners insist that horses in roundpens signal to their human trainers as they would to high-ranking herdmates, and further that they are motivated to be with those humans simply because they 'respect' them. In contrast, it is possible that horses in roundpens are showing distance-reducing affiliative signals that are being misinterpreted (Goodwin, 1999). However, recent empirical studies suggest that the responses of horses to humans in confined areas, such as roundpens, are context-specific (Krueger, 2007) and may rely more on negative reinforcement than on innate equine social strategies (Warren-Smith and McGreevy, 2008). These findings prompt us to question the interpretations of horse responses to roundpen interventions commonly offered by practitioners and offer more scientific, measurable interpretations in horse handling and training.

It has been suggested that one reason a horse complies with the rider's requests is out of '*willingness to please*' (Skipper, 1999).

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Although appealing to some horse owners, the chief problem with this approach revolves around a requirement for higher cognitive skills in the horse for this to occur. Also it is questionable whether horses are motivated to please (as opposed to appease) other horses, let alone humans, or that human expressions of pleasure can be correctly interpreted by horses. Why should a horse wish to bring pleasure to itself or its rider by jumping a fence when its species-specific response is simply to avoid it?

Beyond mere compliance lies the implicit assumption that horses may actively cooperate and sympathise with riders to achieve shared goals (e.g., in play; see, Goodwin and Hughes, 2005). True cooperation would demand more complex cognitive skills, as the horse would have to know the outcome and want it for some reason. For example, to be considered 'cooperative', a racehorse would have to know that it is racing, presumably over a certain distance, and that it recognised the critical importance and benefits of being in the lead when running past the finishing post.

It is argued that dogs often respond to human interventions in the same way as they would when receiving analogous signals from another dog. This is why, for example, play bows by a human seem to be interpreted correctly by many dogs (Rooney et al., 2001). Apart from dogs, horses arguably have the closest physical and historical association with humans, so it is appropriate to explore the extent to which similar possibilities arise in equestrian contexts (Goodwin and Hughes, 2005).

The recent emergence of a comprehensive equid ethogram (McDonnell and Haviland, 1995; McDonnell and Poulin, 2001; McDonnell, 2003) has allowed us to consider the breadth of horse–horse interactions that may have analogues in human–horse interactions. Here we shall endeavour to meet part of the need for scientific discourse by exploring the impact and relevance of plausible analogues of the current version of the equid ethogram that may appear in human–horse interactions in common equestrian and stable-management techniques. The circumstances and disciplines covered in this review relate to riding, driving, roundpen training, lunging and leading as well as handling in the stable and paddock.

Predator and conspecific models

In the broadest sense, approaches to training and handling horses have been assigned to two categories, namely, the so-called cooperative approach based upon the belief that horses want to please their riders, handlers and owners, and an alternative approach based on human dominance and equine submission (Goodwin, 1999; van Dierendonck and Goodwin, 2005). Although this categorisation may seem to explain responses by the trained horse it overlooks the possibility that most naïve horses respond to humans as they would to conspecifics or predators and that, in moving away posturally or bodily, they avoid physical and psychological pressure (McGreevy and McLean, 2005). So we might refer to counter–predator responses as core elements of the *predator model*, and responses based on the equid social ethogram (Goodwin, 2002) as core elements of the *conspecific model*. It is unclear whether the two possible models are necessarily mutually exclusive.

There are several limitations to this binary interpretative framework. While it is convenient to identify the ethological relevance of a response, and tempting to assign an appropriate affective state to horses as they show them, the cognitive pitfalls are considerable. For example, it engenders the idea that horses use a functional classification (i.e., that anything to be avoided is a predator). There are interpretive problems with a functional species-based classificatory perceptual system in contrast to one based on more general stimulus qualities, which we know underpins many perpetual processes (e.g., stimulus configuration, and other simpler properties such as perceived velocity and size, which influence the response elicited).

The validity of the conspecific model can be tested as ethological data are readily available. We accept that the predator and conspecific models may apply in series, such that if the actions of the human do not continue to elicit counter–predator responses, then this deficit may stimulate an array of conspecific responses. Notwithstanding the arguments against such interpretive labels, this approach may be plausible, given that horses have shown some pre-adaptation for domestication by forming and maintaining inter-specific associations in the same way as zebra and wildebeest (Estes, 1991). This may manifest as an ability to interpret agonistic behaviours in their own and the accompanying species. Thus, the predator model may reflect a set of default responses but is succeeded by the conspecific model. We will consider later whether there may also be an important departure from either of these ethological models when horses are ridden.

Ethology is the study of evolutionary and adaptive behaviour. It is clear that horses did not evolve to be ridden any more than humans evolved to ride them. So as soon as a horse has been habituated to accept a rider astride, there are no sustained counter–predator responses and intra-specific analogues have little merit. It is clear that psychological approaches are more salient than ethological approaches when describing and defining riding interactions.

The distinction between intra-specific and counter–predator responses is inherently blurred since some counter–predator responses, such as biting and kicking, may be used in agonistic responses to other horses. Regardless of the respective order or exclusivity of the two proposed models, the waters become muddied by claims that horses operating under the conspecific model *trust* trainers and *accept* them as dominant members of the dyad (as discussed by Waran et al., 2002). This might be referred to as the *sympathetic model* and features in 'natural horsemanship' or 'sympathetic horsemanship'. Of course, these approaches are currently beyond the reach of scientific enquiry since some emotional qualities, such as trust, are difficult to define and measure.

One analogue is unlikely to hold true in all contexts. Even if horses deploy responses that align with the conspecific model more than the predator model, it would be unwise to imagine that the responses are stable or unvarying. For example, when a pony is groomed every day, it may make associations with humans that relate to the conspecific model but may react completely differently (e.g., with a flight response) when clipped once a year. We have to accept that the behavioural flexibility of the horse has contributed a great deal to its success as a domesticated animal, and it is important to note the influence and inevitability of experience (McGreevy, 2004). In addition, *Equus caballus* and *E. asinus* appear to habituate to stimuli far more readily than zebras; a feature that undoubtedly enhances our ability to use them safely (McGreevy, 2004).

Analysis of the equid social ethogram

An exploration and analysis of elements of the equid social ethogram that may be analogous to interactions with humans in the domestic context are shown in the tables. Activities for which a naturally occurring analogue exists appear in Tables 1a and 1b, which is sub-divided into activities for which naturally occurring analogues exist in both directions: human–horse and horse–human (Table 1a), and activities for which a naturally occurring analogue exists in only the horse–human direction (Table 1b). For clarity, we distinguish between horse–human and human–horse interactions, the latter and more common of these being

Table 1a
Activities for which naturally occurring analogues exist in both directions: human–horse and horse–human.

Horse–horse interaction (McDonnell, 2003)	Human–horse interactions	Horse–human interactions	Biological correspondence	Stability/ context dependence	Attractiveness of the proximate outcome for the horse	Extent to which the horse may have control over the interaction
Alert	Staring at horse while standing within its visual field	=[a]	+/?	+	–	+
Approach	Walking/running directly up to horse	=	++	+	–/?	+
Avoidance/retreat	Withdrawal (e.g., during roundpen training or simply moving away from horse)		+	+	+	–
		Horse avoiding being caught	++	++	++	++
Balk[b]	Stopping suddenly while walking		–	–	–	–
		Horse ceasing forward movement while being led	++	++	++	++
Bite threat	Rapid turning of the head towards horse		++	+	–	–
		Horse threatening to bite handler	++	+	+	++
Boxing	Hitting a horse with fists, hands or whips		+/?	–	– –	–
		Horse rearing and paddling forelegs at handler	++	+	+	++
Chase	Running after horse to catch it or harry it away from given spot[c]		+/?	+	–	–
		Horse chasing human out of the stable, paddock or roundpen	+	–	+	++
Grasp	Neck twitch or so-called 'gaucho' twitch		+/?	+	–	–
		Horse grasping handler	++	+	?	++
Head bump	Head- (or possibly hand-) to-head contact with horse's head or neck		–	–/?	?	–
		Head-to-head contact with human	+	?	+	+
Head on neck, back or rump	Head- (or possibly hand-) to-head contact with horse's neck, back or rump		–	–/?	?	–
		Head-to-neck, back or rump contact with human	+	?	+	+
Head-bowing	=	Horse bowing towards handler	++	+	?	++
Herding and driving	Moving horse(s) from behind with mildly aversive stimuli		++	+	–	+/?
		Horse causing human to move in one direction	+/?	–	+	++
Interference[d]	Human in paddock or stable with more than one horse, attempt to 'split up' fight		+	+/?	–	–
		Mare protecting foal	++	+	++	+
Kick	Some humans do kick horses[e]		+/?	+	– – –	–
		Horse kicking handler	++	+	+	++
Kick threat	Threaten to whip or sound the whip[e]		+/?	+	–	–
		Horse threatening to kick handler	++	+	+	++
Lunge	Moving rapidly towards horse		+/?	+	–	–
		Lunging towards handler	+	+	+	+
Mutual grooming	Grooming/scratching a horse's lower neck/withers	=	+	+	+	+
		Nuzzling	+	?	+	+
Mounting	Mounting-to-ride		–	–	+/–	–
		Attempting to mount human	?	–	–	–
Nip	Brief pinching of skin (often lip) as punisher		–	–	–	–
		Horse nipping handler	++	+	+	++
Olfactory investigation	Nose-to-nose exchanges as advocated by some trainers		+/?	+	?	+
		Responses to novel human-borne odours	+	+	?	++

Table 1a (*continued*)

Horse–horse interaction (McDonnell, 2003)	Human–horse interactions	Horse–human interactions	Biological correspondence	Stability/ context dependence	Attractiveness of the proximate outcome for the horse	Extent to which the horse may have control over the interaction
Parallel prance	Leading in-hand at the trot (as in in-hand showing)		+/?	+	?	+
		Prancing alongside handler	+/?	+	?	+
Push	Moving horse with pressure on shoulders or flanks		++	+	–	+
		Barging	++	+	+	+
Stomp	Stamping foot near horse		+/?	+/?	?	–
		Stomping at handler	+/?	+	+	+
Trekking[f]	Leading a horse without rein pressure		+/?	+	–	+
		Following a horse (e.g., in long-reining)	?	+	–	–

Notes

[a] The sign denotes the existence of a corresponding activity in the opposite direction to the usual.

[b] Abrupt halt or reversal of direction with movement of the head and neck in a rapid sweeping dorsolateral motion away from an apparent threat while the hindlegs remain stationary. The forelegs lift off the ground.

[c] Loose jumping sometimes involves this interaction.

[d] One or more horses may simultaneously interfere with an ongoing agonistic encounter between conspecifics. Disruption of combat occurs by moving between the fighting individuals, pushing, attacking or simple approaching the combatants.

[e] Hitting, using a whip, is a closer analogue of a kick than a bite, since it causes sharp pain and is the result of a movement that extends toward the target but does not involve teeth.

[f] Two or more animals moving together, typically following one another.

Table 1b
Activities for which a naturally occurring analogue exists in only one direction: horse–human.

Horse–horse interaction	Horse–human interactions	Biological correspondence	Stability/context dependence	Attractiveness of the proximate outcome for the horse	Extent to which the horse may have control over the interaction
Arched neck threat	Flexed necks are favoured in dressage competitions	–/?	–	–	–/?
Bite[a]	Horse biting handler	++	+	+	++
Circling	Horse being lunged or worked in a roundpen	+/?	+	–/+	–
Dancing[b]	Horse attacks human Circus/ Pignonesque tricks	–/?	–	–	–
Ears laid back/pinned	Ear threat towards human	+	+	++	++
Erection	Erection while being groomed, shod or otherwise handled	+/?	+	?	++
Flehmen	Responses to novel human-borne odours	+	+	?	++
Head threat[c]	Horse threatening handler	+	+	++	++
Neck wrestling[d]	Same as dancing (above)	+/?	+	+	+
Pawing	Pawing in presence of handler	+/?	+	?	+
Posturing[e]	Posturing towards handler	+/?	+	?	+
Rearing	Rearing towards handler	+	+	+	++
Rump presentation	Presenting rump towards handler	+/?	+	?	+
Snapping[f]	Foal or young horse snapping towards human	+/?	+	+	+
Receptive and non-receptive female responses	Mare displaying to human	+/?	+	?	+

Notes

[a] Arguably, bite has analogues in pinching and whip use.

[b] Two stallions rear, interlock the forelegs and shuffle the hindlegs while biting or threatening to bite one another's head and neck.

[c] Head lowered with the ears pinned, neck stretched or extended toward the target and lips often pursed.

[d] Sparring with the head and neck that may involve one or both protagonists dropping to one or both knees or raising the forelegs.

[e] Posturing describes a suite of pre-fight behaviours that includes head-bowing, olfactory investigation, stomping, prancing, rubbing and pushing, all with neck arching and some stiffening of the entire body.

[f] Moving the lower jaw up and down in a chewing or sucking motion, with the mouth open and lips drawn back.

where the human initiates the interaction. We have clustered these analogues together in Table 1a to highlight where characteristics such as 'attractiveness of outcome for the initiator' differ depending on the direction of the interaction.

In our analysis of the equid social ethogram, we have assumed that horse–human interactions are motivated by proximate outcomes rather than a learned goal. Thus, horses that threaten humans do so to move the humans away, even though it is possible

Table 2
Elements of the ethogram that do not appear in horse–human dyads (horse–horse activities, but not horse–human or human–horse).

Maternal licking (although sponging may equate)
Suckling (although equivalent may appear as hand-stripping prior to bottle feeding)
Blocking (defined in ethogram as foal stopping in front of and perpendicular to mare)
Mutual insect control (although a human may swat flies away from horse, and may also be target of tail swishing from horses, these two activities rarely occur simultaneously, so it seems inappropriate to call it 'mutual')

Table 3
Activities for which no naturally occurring analogues exist (things horses never do to each other) (i.e., no biological correspondence).

Human–horse interaction	Attractiveness of outcome for horse	Extent of horse's control
Picking feet up, hoof trimming and shoeing	+	+
Leading into trailer or box	+/−	+/−
Trailer loading without leading	+/−	+
Feeding by hand or from bucket	++	+
Invasive veterinary work (e.g., injecting and suturing)	−	−
Grooming inguinal, ventral and perineal regions	+/−	+/−
Pulling hairs from the mane and tail	−	+/−
Spraying against flies	+/−	−
Clipping	+/−	−
Branding	−	−
Driving in close proximity to other horses (e.g., driving horses side-by-side demands tolerance of breached individual space)	+/−	+/−
Mounting-to-ride	+/−	+/− − −

Other actions humans train horses to do include: bowing, hyperextension, capriole, jump over another horse, walk on hindlegs, tolerate predator on back, vaulting, towing, jumping, racing, driving, showing/parading, treadmill training, semen collection.

that some horses learn to be aggressive and threatening for different ultimate goals (e.g., these responses may have been inadvertently reinforced at feeding time by offers of food). Such outcomes are not considered within this framework because we are seeking to focus entirely on the most ethologically plausible proximate functions of responses. Solitary activities are not listed because they lack relevance here.

Elements of the ethogram that do not arise in horse–human dyads (interventions humans never undertake with horses) appear in Table 2. These include licking, suckling and mutual fly-swatting. Activities for which no naturally occurring analogue exists (interactions horses never engage in with each other) appear in Table 3.

Discussion

Taken together, the tables strongly suggest that interactions between humans and gentle, unridden horses are informed more by the conspecific model than by the predator model. For example, there are some highly specific behaviours that horses do to other horses and never to predators, but which they may show to humans. Examples include foal snapping, head lowering (Goodwin, 1999), mutual grooming, vocalisation and oestrus display. At times when horses exhibit these behaviours to humans, it seems unlikely that they are perceiving us as predators.

Compelling scientific evidence in support of the conspecific model comes from studies showing that stroking or vigorous grooming of the withers or back by humans can have similar effects to allogrooming (Feh and de Mazieres, 1993). In addition, many naïve horses attempt to reciprocate wither grooming by humans (McGreevy, 2004). But there will always be *some* difference when human substitutes for horse in horse–horse interactions (e.g., no teeth in mutual grooming); human ears will always be immobile and we will never have tails to swish.

Feh and de Mazieres (1993) showed that heart rates fall in horses groomed at the withers. It seems likely that this is a difficult region to autogroom, being situated so far from the hindfeet and so close to the head, the body parts used for autogrooming. It may be that grooming the forehead and the pectoral region has a similar effect on cardiac responses**,** even though it is far less common to see allogrooming at these sites. The biological correspondence, proximate benefits and context-specificity of such interactions between horses and humans merit consideration. However, even the correspondent behaviours in Table 1a may lose relevance for horse members of a dyad because they are of inappropriate context, consistency or duration.

We now need to consider examples of diminished relevance. The *context* of sending a horse forward (as one might in-hand or under-saddle) may be ethologically inappropriate if aversive stimuli are ahead of it. Meanwhile, *consistency* may be lacking when humans in a roundpen chase horses one minute and then expect them to approach the next. *Duration* may be inappropriate because a human grooming a horse may persist in this activity for much longer that any conspecific. That said, the duration of events may be of less consequence than we might imagine because we have no evidence that horses are able to project into the future (McLean, 2004) and so cannot know that an activity is going to carry on; instead, they focus on the present and associate the present set of stimuli to innate responses.

If there is a transition from predator to conspecific models, it may be that deliberately evoking conspecific *responses* in a horse (i.e., not merely behaving *toward* a horse like a conspecific) can accelerate a reduction in counter–predator responses. So, for example, stimulating the mutual grooming response in foals at a stage where they would not tolerate general handling/touching is an effective way to lessen the motivation to flee from the handler, allowing subsequent desensitisation to touch to proceed more rapidly than if the handler attempted first to habituate the foal to being touched (e.g., on the face).

It is worth exploring whether this difference is due merely to the fact that the foal is positively reinforced for allogrooming the human or whether an additional factor comes into play when the touch elicits the desire to reciprocate the action *as if the human were a conspecific*. Foals make excellent subjects for this sort of enquiry since they are behaviourally naïve. They should be used to test the hypothesis that allowing the horse to reciprocate in full by grooming the human reduces avoidance faster than simply grooming but not allowing any reciprocal contact.

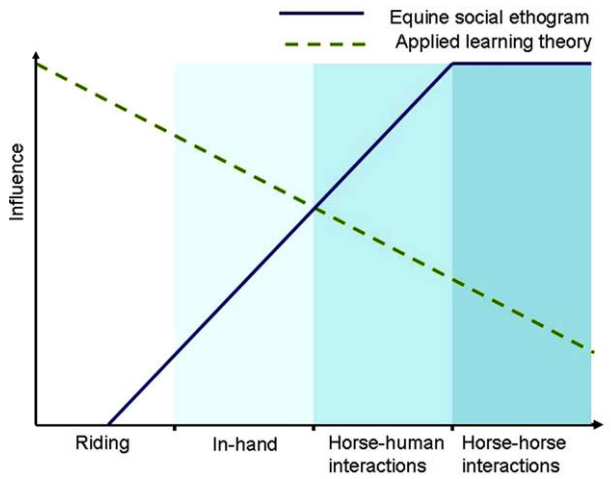

Fig. 1. A conceptual framework illustrating the relative importance of the equine social ethogram and learning theory in various horse–horse, horse–human and equestrian activities.

Perhaps the most profound intervention we undertake with horses is the requirement of tolerating potential predators (humans) on their backs. It is significant that, within the social ethogram, mounting-to-ride could be the only activity for which a naturally occurring analogue exists in only one direction, namely, human→horse.

Horses mount other horses primarily in juvenile play and subsequently courtship and copulation. However, it is likely that mounting-to-ride is not perceived by horses as sexual, otherwise ridden mares would offer reciprocal sexual gestures. The duration of a human presence on a horse's back during foundation training ('breaking in') is far longer than any intra-specific mounting activity. Furthermore, a distinct sex difference would be seen during foundation training (i.e., mares would differ to geldings and stallions in that they would respond as they do to a stallion mounting, either rejecting or acquiescing). Mounting-to-ride may therefore belong in Table 3 as an activity for which no naturally occurring social analogue exists. If this is the case, it implies that riding has virtually no biological correspondence and that the only intra-specific interactions that we do to horses are those they also do to us (see Fig. 1). In other words, the horse's social repertoire delineates interactive behaviours that humans can offer horses and receive from them in-hand but that once humans are astride, socially relevant interactions may be limited to wither scratching.

The tables suggest that relevant analogues of horse–horse interactions are far more likely to be useful when handling horses and training them in-hand than when riding them. Rider/trainers are obliged to apply learning theory and use novel inter-specific signals. The tables also emphasise that the proximate benefits (to horses) of most interactions decline as their control over the interactions decreases. For most ridden training and competition, the horse has negligible autonomy. This and the fundamental role of negative reinforcement in the ridden horse underpin rider safety. Nevertheless, time spent training horses in-hand seems to pay dividends even in the ridden horse (McGreevy and McLean, 2005), presumably through a process of generalisation.

Achieving stimulus control in-hand seems to facilitate stimulus control under-saddle (McGreevy and McLean, 2007). Inter-specific communication may help the horses overcome fear and therefore reduce their tendency to use counter–predator responses. It is important that the translation of trained responses from cues in-hand to cues under-saddle is better understood by practitioners. It may simply be that an unconfused horse in-hand is a better prospect for training than a confused one. In any case, correctly identifying the effects of reduced confusion and fear and distinguishing stimulus control from mere compliance may allow us to describe and even measure the bonds that form between horses and their trainers.

Responses of ridden horses deserve special attention since these can most directly affect the usefulness, commercial value and, indirectly therefore, the welfare of the horse. They also have a direct effect on the safety of the rider. It may be that at their most dangerous (e.g., when bolting and bucking), ridden horses have simply reverted to responses within the predator model. This, in itself, is interesting because it suggests that no matter how ethologically parallel in-hand work may be, a ridden horse can later revert to these counter–predator responses, seemingly confirming that ridden work is emphatically not within the horse's ethogram.

During equitation, tactile contact between horse and human lasts much longer than occurs between either conspecifics or during attempted predation. It may be that conspecific and predator models are not mutually exclusive or that the association changes from the former to the latter as soon as a rider leaves the ground and mounts the horse. Perhaps, during foundation training, horses simply learn that humans are ineffective predators. Naïve horses are usually frightened of being handled by humans but are seldom actively aggressive, usually preferring to avoid contact (McGreevy, 2004). This is the customary response of a prey species and is central to early roundpen training. Horses that have learned that being ridden does not lead to extreme discomfort rapidly learn to generalise their habituation to various pressure cues and may even begin to associate it with positive outcomes (e.g., as a prelude to meeting other horses, or as an opportunity for exploration).

Tables 1a and 1b includes 'parallel prance', one example of moving together, but the equid social ethogram has other examples of moving or standing in *groups* (e.g., stampeding and huddling). So, beyond dyadic interactions, it is worth considering two synchronised activities not explicitly mentioned in the current tables, namely, 'standing and/or lying together' and 'moving together in a coordinated way' (not leading, driving or following).

As noted by Wasilewski (2005), social grooming may be associated with initiating bonds, whereas resting in close proximity may strengthen newly formed ones. The way in which humans *move* in relation to horses may be just as important in shaping their responses and 'attitudes' to us as what we *do* to them. This aspect of horsemanship is often less obvious and may be harder to describe and measure than the interactions themselves, but it should not be overlooked.

Similarly, it is important to acknowledge that predictions about the nature of relationships cannot be made with confidence for all horses and all humans. Differences arise as a result of a human's demeanour (which may be characterised by the quiet but purposeful manner of those with an inherent 'horse sense' or otherwise), their attitude towards horses (Chamove et al., 2002), and the horse's experience.

Given the importance of timing and consistency in animal training, the value of bonding with horses as pseudo-conspecifics may have been overstated by popular practitioners. Ultimately, humans seek to refine horsemanship for either competitive success or empathy or both. It may be that the useful competitive horse simply has to respond consistently and appropriately to stimuli. Meanwhile, companion horses can behave with the autonomy that prevails in a free-ranging herd. In some contexts, horses may regard us as neither predators nor conspecifics, but perhaps more closely akin to 'objects' in their environment. This may occur, for example, when we dispense food treats, or when we exert mysterious forces on them via ropes. Nevertheless, the consistency of the dialogue between horses and humans positively correlates with relaxation and rapport, which suggests that

research should be focussed on identifying and measuring the totality of signals and responses in successful horse–human relationships as a way of perfecting it in the establishment of optimal training models. In the meantime, there is a clear need for a ridden horse ethogram that will facilitate accurate observations in the laboratory and in competition.

Whereas there are shortfalls to both the conspecific and the predator models, for the time being we should adhere to simply describing what the horse does. So, without guessing how the animal interprets the human protagonists, we could simply state whether it showed approach, avoidance, or affiliative behaviour. In adopting this framework, it is however important to acknowledge that context is critical when describing approach and avoidance since, for example, in play transitions between the two, diametrically opposite responses can be rapid.

Conclusions

Riding involves horses and humans in an activity for which neither species has evolved and, given the casualties on both sides, one could argue that it is not an adaptive behaviour for either and relies on both responding to the cues of the other and adapting their signalling channels; only those with an aptitude for inter-specific communication will do well. Given the tremendous breadth of horse–horse interactions, it is striking how few signals from humans are required to cue elaborate equine responses (such as those shown under-saddle in various elite events). The gulf in our ability to integrate the equid sociogram into riding technique explains some of the difficulties faced by both species in equitation and has profound implications for rider safety and horse welfare. We hope that we have provided a starting point for debate over the extent to which horses respond to interactions with humans as stimuli or recognise their actions as attempts to communicate.

Conflict of interest statement

None of the authors of this paper has a financial or personal relationship with other people or organisations that could inappropriately influence or bias the content of the paper.

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