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Assessment of relationships between reactions of horses during everyday use

Ocena powiązań między reakcjami behawioralnymi koni w trakcie codziennej
obsługi i użytkowania

Abstract. The aim of the study was to assess whether observations of a horse's reactions during everyday activities can be used to predict its behaviour during riding. The study was conducted on 60 horses of the Malopolski breed, aged 5 to 15 years. The horses were kept in three riding stables, in a box system. The data were obtained from an interview conducted with a person responsible for the daily grooming and handling of the horses. Observations covered at least half a year of daily contact with the horse. The horses' behaviour was analysed before feeding, during preparation for riding, and during riding.

The research shows that aggressive behaviours before feeding may be a marker of inappropriate reactions before and during recreational riding. Initial activities preparing the horse, i.e. approaching the animal, grooming, bridling and saddling, can be used as a 'test' to evaluate and predict the quality of the ride. Problems with these procedures also suggest significant problems during riding. The behaviour of the animal before feeding and during preparations for riding should be considered an important indicator of riding safety and comfort.

Key words: horse, leisure horse, behaviour

INTRODUCTION

Horse riding is currently one of the most popular forms of recreational activity, enjoyed by people with diverse physical abilities and of different sexes and ages, including

children. Many of them have little experience in dealing with horses or knowledge of their psyche. Therefore, it is very important that such people are able to respond appropriately to the signals given to them by their animals. At the same time, horses are animals characterized by fearfulness and excitability, which given their weight poses a significant threat. Knowledge of the psychology of horses and the ability to read signals are essential to work safely with these animals. The predictability of their behaviour is also crucial. Assessment of the temperament of horses using behavioural tests is undoubtedly one of the most important elements in evaluation of these animals [Kozak et al. 2018]. For tests to be reliable, however, they should meet certain conditions. It is unquestionable that frequent time spent with a horse provides an excellent opportunity to assess its personality. Thus increasing the safety of those who handle animals or those who use horseback riding lessons.

Hence the aim of this study was as to whether observations of a horse's reactions during everyday activities can be used to predict its behaviour during riding

MATERIAL AND METHODS

All procedures used during the research were approved by the II Local Ethics Committee for Animal Testing at the University of Life Sciences in Lublin, Poland (Approval No. 8/2015 of 8 April 2015).

The study was conducted in 2016 on 60 horses of the Malopolski breed, aged 5 to 15 years. The horses were kept in three recreational riding stables, in a box system. The horses received roughage and concentrate feed twice a day. They were kept in the paddock for 3 to 8 hours a day. The animals were ridden from one to three hours per day, by an individual who was also the handler of a given horse. The horses showed no health problems and were used only for recreation. The data were obtained from an interview conducted with a person responsible for the daily care and handling of the horses. Observations covered at least half a year of daily contact with the horse. The 3 groups of features defined in Table 1 were analysed.

Table 1. System of evaluation of individual horse behaviours

Group of traits	Observations		Scoring system	Number of individuals exhibiting the behaviour
Behaviour associated with feeding	stereotypies	windsucking, weaving, cribbing, tongue play, movements making work impossible	0–1 system 0 – no reaction observed, 1 – at least one of the reactions was observed	0 – 35 1 – 25
	aggressive behaviours	attempts to bite the person or the horse in the next box, kicking the wall of the box, or attempting to kick the person	0–1 system 0 – no reaction observed, 1 – at least one of the reactions was observed	0 – 42 1 – 18
	agitation	intensive vocalization or walking around the box	0–1 system 0 – no reaction observed, 1 – at least one of the reactions was observed	0 – 20 1 – 40

Preparation for riding	reaction to human being	reaction to the person approaching the horse	calm, without showing fear or aggression – 1; clear signs of anxiety – 2; aggressive behaviour – 3	1 – 39 2 – 21 3 – 0
	reaction to grooming	reaction to cleaning the coat or touching the sole of the hoof with a hoof pick	calm, without showing fear or aggression – 1; clear signs of anxiety – 2; behaviour making it difficult or impossible to carry out the procedures – 3	1 – 26 2 – 16 3 – 18
	reaction to bridling	reaction to putting on the bridle	calm, without showing fear or aggression – 1; clear signs of anxiety – 2; aggressive behaviour – 3	1 – 34 2 – 26 3 – 0
	reaction to saddling	reaction to putting on the saddle and fastening the girth	calm, without showing fear or aggression – 1; clear signs of anxiety – 2; aggressive behaviour – 3	1 – 26 2 – 19 3 – 15
Riding	disobedience	bucking	0–1 system 0 – no reaction observed, 1 – reactions observed	0 – 31 1 – 19
		rearing	0–1 system 0 – no reaction observed, 1 – reactions observed	0 – 45 1 – 15
		bolting	0–1 system 0 – no reaction observed, 1 – reactions observed	0 – 30 1 – 30
	causing difficulty	skittishness	0–1 system 0 – no reaction observed, 1 – reactions observed	0 – 23 1 – 37
		biting	0–1 system 0 – no reaction observed, 1 – reactions observed	0 – 33 1 – 27
		kicking	0–1 system 0 – no reaction observed, 1 – reactions observed	0 – 42 1 – 18
		headshaking	0–1 system 0 – no reaction observed, 1 – reactions observed	0 – 27 1 – 33
Total – during riding	sum of scores for disobedience and causing difficulty		max. – 7 if horse obtained 1 for each trait min. – 0 if horse obtained 0 for each trait	
	sum of scores for preparation for riding		max. – 4 if horse obtained 1 for each trait min. – 0 if horse obtained 0 for each trait	

The occurrence of a specific reaction in the group of behaviours observed during preparation for riding and during riding was attributed to the horse when it appeared at least once a week. Otherwise, the reaction was considered to be sporadic; it could have been related to a specific situational context and not due to the horse's personality, and therefore the animal was considered not to exhibit the specific behaviour. In the case of reactions associated with feeding, the handler observed specific reactions consistently with every feeding, or at least once a day.

Spearman's rank correlations between individual behaviours or groups of behaviours were estimated. For each trait, a horse showing undesirable or inappropriate reactions had a higher position in the ranking.

RESULTS

Correlations between the behaviour of horses just before feeding and their behaviour during preparation for riding and during riding are shown in Table 2. In the case of the group of behaviours associated with preparation for riding, aggressive behaviours and agitation were shown to be correlated with the reaction to a human being. In the first case the correlation was 0.4, while in the second case it was negative and amounted to -0.25 . A correlation was also observed between aggressive behaviour before feeding and bolting during riding.

Table 2. Rank correlations between the behaviour of horses before feeding and behaviours associated with preparing the horse for riding and with riding

	Activity	Behaviour before feeding		
		stereotypies	aggression	excitement
Preparation for riding	reaction to human being	-0.02 <i>0.86</i>	0.40 <i>0.01</i>	-0.25 <i>0.05</i>
	reaction to grooming	0.02 <i>0.89</i>	0.23 <i>0.09</i>	0.04 <i>0.78</i>
	reaction to bridling	-0.08 <i>0.53</i>	0.10 <i>0.47</i>	0.06 <i>0.65</i>
	reaction to saddling	-0.02 <i>0.86</i>	0.13 <i>0.34</i>	-0.02 <i>0.86</i>
Riding	bucking	0.14 <i>0.30</i>	-0.11 <i>0.42</i>	0.00 <i>1.00</i>
	rearing	0.21 <i>0.11</i>	0.07 <i>0.60</i>	0.21 <i>0.10</i>
	bolting	0.05 <i>0.68</i>	0.32 <i>0.01</i>	0.07 <i>0.60</i>
	skittishness	-0.07 <i>0.59</i>	0.01 <i>0.91</i>	0.11 <i>0.43</i>
	biting	0.09 <i>0.51</i>	-0.09 <i>0.50</i>	-0.11 <i>0.42</i>
	kicking	-0.01 <i>0.92</i>	-0.06 <i>0.66</i>	-0.07 <i>0.60</i>
	headshaking	0.18 <i>0.18</i>	-0.06 <i>0.68</i>	-0.13 <i>0.32</i>

Behaviours of horses observed during preparation for riding proved to be correlated with behaviours occurring during riding (tab. 3).

The reaction to an approaching human being and to saddling was found to be significantly correlated with an attempt to bite during the ride. The correlations were 0.30 and 0.25, respectively. There was also nearly 30% agreement between the reactions of horses during grooming and bolting during the ride. A significant correlation was found between the overall behaviour of the horse during preparation for the ride and behaviour during riding. This correlation was 0.40.

Table 3. Rank correlations between behaviours associated with preparation for riding and behaviour during riding

During riding		Preparation for riding				Total – preparation
		reaction to human being	reaction to grooming	reaction to bridling	reaction to saddling	
Disobedience	bucking	0.01 <i>0.91</i>	0.06 <i>0.67</i>	0.26 <i>0.05</i>	0.23 <i>0.09</i>	0.20 <i>0.13</i>
	rearing	-0.10 <i>0.46</i>	0.00 <i>0.98</i>	0.03 <i>0.84</i>	0.06 <i>0.66</i>	0.02 <i>0.87</i>
	bolting	0.16 <i>0.23</i>	0.29 <i>0.03</i>	0.13 <i>0.32</i>	0.02 <i>0.89</i>	0.21 <i>0.12</i>
Causing difficulty	skittishness	-0.04 <i>0.77</i>	0.03 <i>0.80</i>	0.17 <i>0.21</i>	0.07 <i>0.59</i>	0.10 <i>0.45</i>
	biting	0.30 <i>0.02</i>	0.23 <i>0.09</i>	0.08 <i>0.52</i>	0.28 <i>0.03</i>	0.25 <i>0.05</i>
	kicking	-0.02 <i>0.86</i>	0.09 <i>0.49</i>	0.23 <i>0.07</i>	0.03 <i>0.80</i>	0.09 <i>0.52</i>
	headshaking	0.10 <i>0.47</i>	0.07 <i>0.61</i>	-0.08 <i>0.55</i>	0.09 <i>0.51</i>	0.03 <i>0.81</i>
Total – during riding		0.24 <i>0.05</i>	0.27 <i>0.04</i>	0.32 <i>0.01</i>	0.30 <i>0.03</i>	0.40 <i>0.00</i>

Connections between behaviours in individual groups were also examined to determine whether certain reactions occur simultaneously (tab. 4, 5 and 6).

No correlations were found between the behaviours of horses just before feeding. Significant correlations were found between reactions observed during preparation for riding (tab. 5). The reaction to a human being was significantly correlated with behaviour during grooming, bridling and saddling. Behaviour during saddling was also significantly correlated with behaviour during grooming and breeding. The highest agreement was found between the horse's reaction to a person and its behaviour during grooming (0.47) and between the animal's reactions to saddling and grooming (0.54).

Table 4. Correlations between reactions observed before feeding

Behaviour	Stereotypies	Excitement	Aggression
Stereotypies	*	-0.13	0.04
Excitement	0.34	–	-0.01
Aggression	0.77	0.93	–

*Above the diagonal – rank correlation values; below the diagonal – significance level p

Table 5. Correlations between reactions observed during preparation for riding

Behaviour	Reaction			
	to human being	to grooming	to bridling	to saddling
Reaction to human being	*	0.47	0.29	0.43
Reaction to grooming	0.00		0.19	0.54
Reaction to bridling	0.03	0.15		0.34
Reaction to saddling	0.00	0.001	0.01	

*Above the diagonal – rank correlation values; below the diagonal – significance level p

Table 6. Correlations between behaviours observed during riding

Behaviour		Disobedience			Causing difficulty			
		bucking	rearing	bolting	skittishness	biting	kicking	headshaking
Disobedience	bucking	*	0.36	0.13	0.04	0.14	0.33	-0.16
	rearing	0.01		0.15	-0.02	0.32	0.35	-0.14
	bolting	0.31	0.27	–	0.08	0.04	0.16	-0.24
Causing difficulty	skittishness	0.78	0.86	0.56	–	-0.06	0.10	0.04
	biting	0.30	0.01	0.78	0.63	–	0.42	-0.01
	kicking	0.01	0.01	0.22	0.43	0.00	–	0.09
	headshaking	0.22	0.29	0.05	0.75	0.95	0.52	–

*Above the diagonal – rank correlation values; below the diagonal – significance level p

The behaviour of horses during riding can be divided into two groups: behaviour involving disobedience, which often makes riding impossible, and behaviours that make riding difficult. The study found a significant relationship between behaviours classified as disobedience and those that cause difficulty. Attempts to kick were found to be significantly correlated with bucking, rearing and attempting to bite. These correlations ranged from 0.33 to 0.42. A similar correlation was recorded between attempts at biting and rearing. A slightly lower and negative correlation was noted between a tendency to bolt and uncontrolled head movements during the ride (-0.24).

DISCUSSION

The analysis showed that the behaviour of horses at various moments associated with their use and handling are related. The correlations rarely exceeded 0.5, but they indicated a tendency towards concurrence of specific reactions.

A fact of practical importance is that the occurrence of aggressive and unwanted behaviours at various moments of contact with the horse is an indicator of problematic behaviour during riding. The occurrence of aggressive behaviours before feeding suggested a problem during contact with a human being during preparation for riding and disobedience during the ride (tab. 2). Agreement in the ranking at levels of 40% and 32% indicates that a horse showing aggression at feeding need not exhibit problematic behaviour during preparation for riding and will not necessarily bolt, but the result does suggest a tendency towards specific behaviours. It may be surprising to note that horses that do not show strong agitation before feeding may have a tendency to show anxiety in dealing with humans. The correlation was not high (-0.25), but it was negative and statistically significant. This is most likely not due to connections between the horse's personality traits, but to acquired experiences [McLean and Christensen 2017]. It may be that the handler, knowing that the horse is excitable and reactive, approaches it more calmly, handles it more gently, and is more careful. Thus, the animal learns positive contact and, despite its low excitability threshold in contact with humans, does not show anxiety, fear or aggression.

An important finding of the study was the correlations between the horse's behaviour during preparation for riding and its behaviour during the ride (tab. 3). This observation is of great practical importance, because preparation for riding is a constant element that cannot be omitted from work with the horse. The results clearly indicate that if this is a problematic moment for the person preparing the horse, there will also be problems during the ride. The 0.4 correlation indicates that the behaviour of a horse during such activities as approaching the animal and grooming, saddling or saddling cannot be ignored, as they are an indicator of its behaviour while being ridden. An animal showing increased anxiety or aggression should not be used by an inexperienced individual [Hockenull and Creighton 2010, Jastrzębska and Wilk 2019]. It seems that preparing the horse for riding can be the first 'test' for people who plan to ride recreationally and report to equestrian centres as new riders. Depending on the animal's response to this person, it is possible to predict the horse's behaviour during riding, which will undoubtedly improve the rider's safety.

Although many studies indicate the need for positive reinforcement in horse training, in practice training is mainly based on negative reinforcement [Cooper 2007]. Our results show that the rider's behaviour while riding, the handling of the horse, and the methods used have a large impact on the horse's perception of both the individual and the ride itself. Animals learn whether certain stimuli predict positive or negative events [Mendl et al. 2009], and this leads to an effective response to the environment. The emotions a horse experiences while being ridden appear earlier, during preparation for riding, hence the correlations between the behaviour of the horse during preparation for riding and during riding were 0.40.

It is worth noting the significant correlations found in the study between the horse's various behaviours during preparation for riding. These relationships indicate that if problematic behaviour appears as a reaction to the approaching individual, further activities related to preparation will be difficult as well. All preparations for riding involve direct physical contact with the horse. Negative reactions to these activities may have many causes, but they will all be associated with the animal's perception of these procedures and the effect of classical or instrumental conditioning [McCall 1990]. An animal which has experienced discomfort during certain procedures, even in the past, e.g. due to improper treatment, may feel negative emotions and show inappropriate reactions as a result of classical conditioning [McLean and Christensen 2017]. Many horses that had been improperly treated in the past have had to undergo counterconditioning to eliminate incorrect associations and learn new, appropriate responses. Studies have shown that early experiences can significantly affect a horse's ability to learn and its behaviour [McCall 1990]. Horses, like other animals, have long-term memory [Hanggi and Ingersoll 2009], and individual experiences have consequences in their emotional relationship to their environment [Christensen et al. 2006, Sankey et al. 2010]. The quality of relationships with people is one of the most important factors influencing the behaviour of horses during their use [Rozempolska-Rucińska et al. 2013], and their experience with a specific person is generalized to other people [Hausberger and Muller 2002, Fureix et al. 2009]. At the same time, the emotional relationship is remembered by the horse and can be exploited in the future, even after a long separation [Sankey et al. 2010].

Links between behaviours during riding indicate that the horse's reactions may be the result of improper conduct on the part of the rider. Aversive stimuli used in conditioning of prey species impair the ability of animals to learn by arousing fear, and at the same time reduce the safety of interactions with the animal [Press et al. 1995]. An inexperienced rider or an individual who in some way causes the horse discomfort or even pain makes the animal try to defend itself. This explains the correlations between an attempt at kicking and bucking, rearing, or attempting to bite. In this way, the animal wants to 'escape' from the discomfort. Depending on its psychological predispositions, the animal may be more or less motivated to avoid aversive stimuli and thus may react differently to negative stimuli [Murphy and Arkins 2007, Lansade and Simona 2010].

Another reason for such behaviour may be aggression towards another horse on the riding arena, which is also linked to the negative emotions that the animal feels at that moment. Negative correlations were found between the tendency to bolt and head movements during riding, referred to as headshaking. These are uncontrollable and often repeated movements of the head and neck, which may be continuous or intermittent, spontaneous, vertical, horizontal or rotational. They may occur during the riding season or off-season, and they generally intensify during work with the horse [Newton et al. 2000]. This behaviour is usually very absorbing for the horse, which focuses on it alone, without attempting other reactions. Therefore, it is rare to observe horses that exhibit this behaviour and at the same time have a tendency to bolt.

The study found no connections between behaviours classified as stereotypes and other reactions (tab. 2 and 4). This is explained by the fact that stereotypes appear as behaviours indicating increased stress [Roberts et al. 2017] and are not associated with the horse's temperament and excitability.

To sum up, even during such basic activities as feeding it is possible to identify horses with tendencies towards problematic behaviour during preparation for riding and riding. In particular, the occurrence of aggressive behaviour before feeding may be a marker of inappropriate reactions before and during recreational riding. The behaviour of the horse during preparation for the ride can be an indicator of its behaviour during the ride. Initial activities preparing the horse, i.e. approaching the animal, grooming, bridling and saddling, can be used as a 'test' to evaluate and predict the quality of the ride. Problems with these procedures also suggest that there will be significant problems during the ride. Observations of the animal during preparation for riding make it possible to choose a suitable rider, thus significantly improving the safety of people riding horses recreationally.

In conclusion, the research suggests that the horse's behaviour before feeding and during preparation for riding should be considered an important indicator for assessing the safety and comfort of the ride.

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Streszczenie. Celem pracy była ocena, czy na podstawie obserwacji reakcji zwierzęcia podczas codziennych czynności jest możliwe przewidywanie jego zachowania podczas jazdy. Badaniami objęto 60 koni rasy małopolskiej w wieku od 5 do 15 lat. Konie były utrzymywane w 3 stajniach o profilu rekreacyjnym w systemie boksowym. Uzyskane dane pochodziły z wywiadu przeprowadzonego z osobą zajmującą się codzienną pielęgnacją i obsługą koni. Obserwacje obejmowały co najmniej półroczny okres codziennego kontaktu z koniem. Przeanalizowano zachowanie koni obserwowane przed karmieniem, przy przygotowaniu do jazdy i w trakcie jazdy. Z przeprowadzonych badań wynika, że występowanie zachowań agresywnych przed karmieniem może być markerem niewłaściwych reakcji konia przed i w czasie jazdy rekreacyjnej. Wstępne czynności przygotowujące konia, a więc podejście do zwierzęcia i pielęgnacja, kielznanie i siodłanie, mogą być wykorzystywane jako „test” oceniający i przewidujący jakość jazdy. Problemy z wykonaniem tych zabiegów sugerują również znaczne problemy w trakcie samej jazdy. Zachowanie zwierzęcia przed karmieniem oraz w trakcie przygotowań do jazdy powinny być ważnym wskaźnikiem oceniającym bezpieczeństwo i komfort jazdy.

Słowa kluczowe: koń, jeździectwo rekreacyjne, zachowanie

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