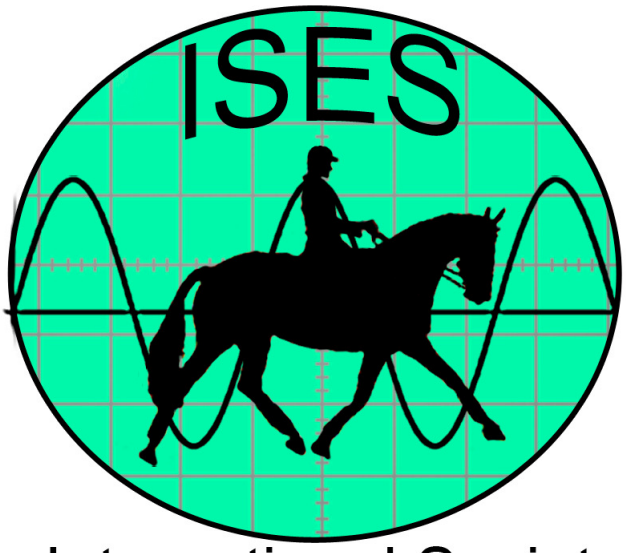
Proceedings of the 3rd International Equitation Science Conference 2007



International Society
for Equitation Science

Hosted by Michigan State University, East Lansing, MI USA

Organizing Committee:

D. Goodwin, C. Heleski, P. McGreevy, A. McLean, H. Randle, C. Skelly, M. VanDierondonck, N. Waran

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TIMETABLE

Sunday August 12	**Activity**	**Presenters**
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9:00-9:30	Is there evidence of “learned helplessness” in horses?	Carol Hall
9:30-9:50	Overshadowing—a silver lining to a potentially dark cloud in horse training	Andrew McLean
9:50-10:10	How can we use learning theory for aiding the training of horses: habituation and positive reinforcement	Natalie Waran
10:10-10:30	Addition of positive reinforcement enhances learning a frightening task	Laura Bauson
10:30-11:00	Poster Session & Coffee Break	
11:00-11:20	Poll-flexion does not induce hypoxia in unridden ponies while trotting	Frank Odberg
11:20-11:40	An innovative approach to equitation foundation training (backing the horse) within an automated horse walker may reduce conflict behavior in the horse	Jack Murphy
11:45-1:15	Lunch	
1:30	Buses depart	
2:00-3:30	Tour & demonstration of equine biomechanics at the Mary Anne McPhail Center	Hilary Clayton

Posters

The following posters were presented during the conference (listed with lead authors):

Weight distribution of the rider and anatomical variation of the equine thoracolumbar dorsal surface make effective saddle fitting far from simple – Jack Murphy, University College Dublin, Ireland

Trailers for Horses: Some transport systems may be less problematic for the naïve horse during loading – Jack Murphy, University College Dublin, Ireland

Obedient or confused – the influence of teaching Para Equestrian Dressage on a coach's understanding of training horses – Mary Longden, Monash University, Australia

An update on two new on-line educational opportunities for equine enthusiasts through eXtension and My Horse University – Christine Skelly, Michigan State University

"Barn talk": Possible expression in equine vocalization – David Browning, Browning Biotech, Rhode Island

Embedding Equine Learning Theory into Equitation Curriculum – Lisa Beard, Rodbaston College and Wolverhampton University, England

Is there evidence of 'Learned Helplessness' in horses?

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Learned helplessness can be defined as a psychological condition whereby individuals learn they have no control over unpleasant or harmful conditions, their actions are futile and they are helpless. In a series of experiments in which dogs were exposed to inescapable shocks it was found that this lack of control subsequently interfered with the ability to learn an avoidance task. Studies of other species including cats, rodents and primates have shown similar results. There is evidence that both neural adaptations and behavioral despair occur in response to uncontrollable aversive experiences in rodents, although this has yet to be demonstrated in the horse. However, the aversive stimuli used in such studies are comparable to certain procedures used in horse management and training. When such aversive conditions are uncontrollable and there is thus no association between behavior and outcome, the learning of subsequent associations may well be impaired.

It has been suggested that traditional methods of horse training and rehabilitation may involve aversive conditions over which the horse has little or no control. These methods have relied predominantly on negative reinforcement and punishment. If reinforcement is not consistently associated with the required behavioural response (resulting in inescapable aversive conditions in the case of negative reinforcement and the possible reinforcement of unwanted behaviour) and/or training equipment is misused (resulting in inescapable discomfort or pain), the result is likely to cause confusion in the horse, un-cooperative or aggressive behavior, or indeed learned helplessness. Training procedures that are repeatedly unpleasant for the horse are likely to interfere with learning and thus performance, in addition to compromising welfare. Thus, this discussion reviews published literature and anecdotal evidence to explore the possibility that learned helplessness occurs in the horse.

Overshadowing: a silver lining to a dark cloud in horse training

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In contemporary horse training, the process in behavioral science known as overshadowing is a critically relevant process that has welfare implications. Overshadowing occurs when two stimuli of different strengths are applied to an animal simultaneously. Typically, the stronger stimulus tends to overshadow the weaker one resulting in a diminution of response to the weaker stimulus. This phenomenon explains much of the attenuation of responding and consequent conflict behaviours (and possibly learned helplessness and wastage) in some performance horses as a result of the application of two concurrent aversive stimuli.

However there is also a serendipitous benefit in overshadowing: it offers an efficient method of desensitization. For example, when a stimulus that elicits a learned response (A – e.g. step-back cue) is paired with an aversive stimulus (B – e.g. clippers) at the lowest threshold of aversiveness, the stimulus-response entity of the learned response (A) can come to overshadow the aversive stimulus provided that the dulled learned response simultaneously undergoes "retraining". The aversive stimulus (B) can then be gradually brought closer to the horse and the process repeated until desensitization occurs.

In this procedure, habituation times vary with the intensity of the aversive stimulus, which is also characteristic of the processes of gradual habituation and counter conditioning. Desensitization through overshadowing appears to be comparatively rapid particularly with highly aversive stimuli, possibly because attentional mechanisms are diverted to re-acquisition of the (initially overshadowed) learned response. The Australian Equine Behaviour Centre has adopted this procedure of desensitization when horses find certain stimuli highly aversive e.g. the saddle/girth pressure, clippers, aerosols and needles. Importantly, the effect appears to be robust when tested on subsequent days following the overshadowing procedure. Using 4 videoed case studies, this paper presents a preliminary investigation into the beneficial use of a poorly understood, under-utilized yet promising phenomenon that warrants further investigation.

How can we use learning theory for aiding the training of horses: *Habituation and Positive Reinforcement.*

Waran NK, Andrews, L and Redmund A

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Nicol (2005) suggested that there has not been enough adequate research carried out in the area of equine learning theory and how learning theory can be applied in a practical context in the management of training horses. The aim of training is considered not only to be the acquisition of learned behaviours, but also the suppression (reduction) of unwanted instinctive or developed behavioural responses.

In order to assess the usefulness of experimental learning techniques in relation to the training of horses, two studies were carried out.. Study 1 investigated whether habituation to a particular novel stimulus reduces responses to subsequent novel stimuli and whether horses can recognise a stimulus they have been habituated to when presented with it in another context, and Study 2 focussed on the efficacy of secondary positive reinforcement (clicker training) for maintaining a learned behaviour when a horse is placed in new situation. The results of these studies demonstrate for Study 1, that, habituation to a novel object is useful for reducing subsequent level of response (responsive behaviours $P<0.02$, heart rate $P<0.04$) to a further novel object as well as demonstrating that habitation to a novel object in one context also generalises to another context. The results of study 2, showed that training a new behaviour ('Head-down') using secondary positive reinforcement does translate to new circumstances where the behaviour may be asked for. Horses showed a 100% success rate ($P<0.08$) when tested in a different situation (an outdoor riding arena as opposed to a stall/stable and when another horse was present in the arena as a potential distraction).
In conclusion, these two studies go some way to exploring the use of a structured approach to habituation and the positive reinforcement of new behaviours, as potential tools for aiding and understanding the training of horses for recreation and performance.

Addition of positive reinforcement enhances learning a frightening task (but only for the frightened horses)

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Many horses are trained primarily with negative reinforcement <NR>. We hypothesized that adding positive reinforcement <PR> would enhance learning in horses (n=34) being taught to walk over a plastic tarp (novel/typically frightening task). Subjects were Arabians, ½ -mares, ½ - geldings; aged 3 – 29 yrs; mean = 11.5 yrs (NR only) and 11 yrs for NR + PR. Half were handled "traditionally" <NR>; i.e. halter/lead were pulled; when horse stepped forward, pressure was released; process repeated until criterion met (i.e. horses needed to cross with little/no obvious anxiety). The other half were handled traditionally, but with addition of PR (oats + verbal praise)(NR + PR). Horses were tested in random order over 3 days and handled by the same person. 9 horses "failed" the task; i.e. after 10 min, they refused to walk onto the tarp (26.5%). 6 of 9 failures were from the NR only group (67%); of those, 50% did cross the tarp with addition of PR and a 2nd attempt. 0 of 3 of NR + PR refusals crossed the tarp with NR only. Chance of failure was significantly greater for NR only horses ($P < 0.01$). Failures were not included in further analysis. We concluded with 12 NR horses and 13 NR + PR horses. For horses who actually completed the task, the NR only group completed the task more quickly ($P = 0.05$); behavioral scores did not differ ($P = 0.60$), though there was a trend toward the NR only treatment to require a greater number of trials per horse to achieve calmness criterion ($P = 0.17$). In conclusion, for fearful horses, the addition of PR enhanced the likelihood of completing the task and less anxiety was observed during the learning of the task; however for the remaining horses, NR only was a quicker method.

Poll-flexion does not induce hypoxia in unridden ponies while trotting

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Cook (2000) hypothesized that poll-flexion induces hypoxia and consequently headshaking. This hypothesis was investigated in an experimental set up approved by the Faculty Ethical Committee.

Five ponies (mean weight (SD) 285 ± 60 kg; mean age: 7 (range 5-9) years; 4 geldings, 1 mare; crosses but 3 "Welsh type", 2 "Shetland type") with a subcutaneous transposed carotid were familiarized with trotting on a level treadmill using progressively the Pessoa reins until the forehead was at 90° to the floor. Afterwards, each experiment was preceded by 2 minutes trotting with loose reins. Each pony underwent 4 successive 7-minute trotting sessions, 2 with loose reins and 2 poll-flexed in a random sequence. Interval duration was guided by the return of the heart rate (HR) to normal values (40 beats per minute). Treadmill speed was set at 3m/s, i.e. 60% HR_{max}. HR was recorded and averaged every 5 sec (telemetry using a standard Polar® technique). Venous (pO_2, pCO_2, HCO_3, pH, BE, PCV, lactate, glucose) and arterial (similar parameters minus PCV, lactate and glucose) blood samples were collected and analyzed immediately before and after each session.

No significant differences ($p>0.05$; Univariate ANOVA; 84 HR values were analyzed as repeated measures) were detected for the main treatment loose/poll-flexed. Significant differences reflected mostly individual differences between ponies. Even currently used hypoxemia limits (70 mmHg; McDonnell, 1996) were never reached (98.58 mmHg ± 7.45). No headshaking was observed.

Ideally speaking, poll-flexion should emerge with collection developed progressively by gymnastics instead of being obtained quickly through coercive use of reins resulting in contraction of neck and jaw. Hypoxia did not occur within the present settings with ponies trained progressively, although drawing reins were used because they were not ridden. One should investigate in different breeds whether it could occur when coercion is used, in settings requiring larger efforts.

An innovative approach to equitation foundation training (backing the horse) within an automated horse walker may reduce conflict behavior in the horse

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Equitation is associated with subtle application of pressure (by the handler) and its immediate removal following the appropriate response by the horse. At the early stages of training for ridden work, horses initially produce the appropriate responses 'in-hand' while 'wearing' saddles, bridles and other items of tack. There is an inherent element of risk associated with 'backing' the horse for the first time and conflict behavior may result from the simultaneous application of too many cues during this process. Automated horse walkers (AHW) have been developed primarily to facilitate the exercising of several horses concurrently at walk or trot for warm-up, cool-down, fitness programmes and rehabilitation purposes. The objective of this study was to investigate if backing the horse within the AHW might reduce the incidence of conflict behavior in the horse when first ridden. Ten horses (3 year olds) with similar basic handling experience were introduced to a training programme primarily involving the AHW. The horses walked within the AHW for between 10-20 mins/day for 3-6 days with a simple bridle and protective boots, followed by a similar protocol where they wore rollers and side reins and finally a saddle. Thereafter long reining was also conducted in parallel with the AHW routine for a further 4-10 days. When considered appropriate, a handler worked with the horses within the AHW during the next 3-7 days. He gradually went from jumping beside the horse to lying over the saddle to sitting astride the horse. The horses habituated to this innovative approach quickly and were capable of being ridden from the AHW after approximately four episodes of this foundation training system. There was no evidence of conflict behaviour in the horses during this first ridden stage and this innovative 'backing' approach may be a useful adaptive application of learning theory within equitation.

Welfare implications for the competition horse outside of the training arena

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Horse are kept for their athletic abilities; all equine activities involve exercise on the part of the horse whether pulling a carriage , executing a piaffe or jumping a 5 foot fence. Exercise affects the horse's subsequent resting, drinking eating and even stereotypic behavior, Horse crib more after exercise. When given a choice most horse will choose not to run on a tread mill. In order to measure motivation for turn-out horses were operantly conditioned to release them selves from a stall. The number of response they would make for release was compared to their motivation for grain; they worked much harder for grain than for the opportunity to exercise. When able to choose length of turn out horse choose 30 minutes when turned out in a group, but only 15 minutes when turned out alone. When deprived of turnout for either 3 days or 2 weeks horse show compensatory activity.

Investigating cribbing and weaving behavior in horses in Michigan

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Management of horses during and outside of training and competition influences their behavior and well-being. The performance of stereotypic behavior in horses is suggested to indicate either current or past sub-optimal welfare. Survey research conducted in Europe and Canada has provided insight into the prevalence of and risk factors associated with cribbing and weaving behavior (CWB). Owner perceptions about CWB have also been investigated in some of these studies. Currently, information regarding CWB in Michigan's horse population is unavailable. The objectives of this study were to determine whether Michigan horse owners are concerned about CWB and to investigate management practices being implemented for horses exhibiting CWB. A web-based questionnaire was developed to investigate CWB, and participants included members of 6 Michigan-based equine associations, recipients of 2 Michigan periodicals, and visitors to MSU's Youth Equine Extension website. Responses from 307 individuals were received representing a total of 2,376 horses. The prevalence of cribbing and weaving was 4.9% and 2.3%, respectively. 79.6% and 65.5% of respondents agreed/strongly agreed that cribbing and weaving, respectively, have a negative impact on horse health. 23.1% agreed/strongly agreed that CWB hinder learning and training ability. A large proportion of cribbing horse owners (81.2%) attempt to stop the behavior, with cribbing collars being the most frequent method used (77.9%), followed by alteration of cribbing surfaces and turnout (56.9% and 54.7%). 37.5% of weaving horse owners attempt to stop the behavior, with turnout being the most frequent method used (22.0%), followed by provision of toys and increased social contact (14.6% and 12.2%). It should be noted that many individuals used a combination of methods. The results of this study demonstrate that Michigan horse owners express concern about CWB and that attempts are often made to control these behaviors. Thus, further research studies into the etiology of CWB are warranted.

Group housing with automatic feeding systems: implications for behavior and horse welfare

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Often concern has been raised about the influence of traditional housing conditions on horse welfare. Different types of group housing systems have been built, e.g. the 'Active stable®': a group-system for horses that includes computer-controlled food dispensers (hay and concentrates) to make feeding animals individually possible. The aim of this research was to investigate welfare parameters in two 'Active stables' The parameters chosen were time-budgets, spatial-use, social behavior, synchronization, waiting times and entering frequencies. Thirty-eight riding-school horses and 39 livery yard horses/ponies used the yards. Ethological methods were used for 9 weeks of observations. Halfway through the study, the highest ranked riding-school horses were allocated to one hay-dispenser.

The horses spent 22% of their time resting, 22% feeding, 21% standing, 13% waiting and 21% on "other" behaviors. This indicates that feeding time percentage was low, despite dispensers being almost always in use. Also, the mean number of rewarded visits was low (3-6 times/day) compared to the possibility of visiting 20-times a day. High ranking horses visited the dispensers more often than medium and low ranking horses. In both stables, the horses spent most their time (50-60%) in the open area, but in view of the hay dispensers. The amount of synchronization was mainly determined by the design of the yards.

After the re-assignment based on ranking, no influence was found on the waiting times for the different rank-groups, but there was lower aggression around the hay-dispensers. The frequency of play behavior was similar to that found in domestic horses. The data suggest that the behavioral needs of the horses were generally met, and their welfare was not impaired compared to horses permanently living in pastures.

Transfer of nervousness from competition rider to the horse

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Identifying factors influencing fear in horses may help reduce accidents and ultimately lead to improved welfare and health in both horses and riders. Horses and riders can communicate using very subtle signals, and previous research suggests that horses can detect and react to nervousness from the rider. The aim of this study was to identify factors that influence the transmission of nervousness, as measured by heart rate, from rider to horse.

Twenty-six horses and 36 riders in an international dressage and show-jumping competition participated in the experiment immediately following their participation in the competition. There were 53 different pairings of horses and riders (up to six rides per horse). The experiment required riding a course that included the following situations: Riding walk as a control situation (C), the rider was made nervous (RN) by telling her/him falsely to expect the horse to be startled by a water-jet; and both rider and horse were made fearful (BF) by an experimenter opening and closing an umbrella at a specific point during the course. Riders were asked to rate on scales from 1-10 different aspects of their riding skills, their nervousness, and harmony (quality of communication) between themselves and the horse.

Mixed model analysis revealed, that horses' heart rates (beats/min ± SD) tended to be higher during RN (92.0±23.3; $p=0.08$) and BF (93.5±25.8; $p=0.06$) than during C (88.2±21.8). In addition, horses' heart rates were lower during all experimental situations (RN, BF, C) when the riders rated the horse's responsiveness as good and when riders had more rather than less training with an instructor ($p<0.05$). These findings indicate that more trained riders, and those more in harmony with the horse are at lower risk of inducing nervousness in the horse, that can potentially lead to dangerous fear reactions in the horse.

Assessing the rider's seat and horse's behavior: difficulties and perspectives

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A correct seat of the rider is essential to efficiently communicate with the horse and minimize interference with natural movements. The present study aimed to measure deviations from the 'ideal' seat, test a seat improvement program and investigate whether horse behavior was affected by the quality of the rider's seat.
Five experienced trainers defined 16 seat deviations and scored the occurrence of these deviations in 20 riders (each riding three different horses) in a standardized dressage test. Half of the riders carried out an individual training program (dismounted physical exercises) while the others acted as the control group. After nine weeks, riders were scored again by the same jury members who were unaware of the treatment. On both occasions, video and heart rate recordings of horses and riders were taken.
Panel members did not agree upon the deviations in the riders' seat (Fisher's exact test), therefore no differences were detected between experimental and control group. Nevertheless, horse behavior classified as 'evasive' (e.g. tail swishing, head tossing) increased ($P<0.05$) and horse heart rate decreased in the experimental group ($P<0.01$) in the second session. Heart rates of riders in both groups decreased ($P<0.05$).
It can be concluded that deviations in the riders' seat are difficult for even experienced trainers to agree upon and evasive behaviors in horses are not necessarily related to increased heart rates. All riders in the experimental group answered in a questionnaire that the exercises were useful and seven thought it improved their riding performance. The latter may be a real or a psychological effect on these riders taking part in the program. Thus, there were some indications of the usefulness of dismounted exercises, but increased knowledge is warranted in order to allow trainers to objectively evaluate the rider's seat.

Horse temperament and riding performances

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Only a small number of combinations of horse and rider create a perfect match and achieve the best possible riding performance. It is assumed that whether a certain combination matches this is dependent on physical skills and abilities and mental states of both parties. To evaluate the interaction between personalities of horses and the effect on behavior of horses during riding, we studied these aspects in 16 riders and 16 horses. Each rider rode each horse once, so data from 256 rides were used for the analysis. The standardized course included riding along novel objects and being challenged by unfamiliar noises. All rides were videotaped and stress-related behavior, like tail switching, head swinging, shying, defecating and stopping was scored afterwards. Additionally, compliance between horse and rider for items such as obedience of the horse, riding ability and interplay between rider and horse were scored during the ride by an external judge and afterwards by the riders themselves. The temperament of all horses was assessed objectively pre-ride by behavioral tests and post-ride subjectively by the riders.
Results showed that more emotional horses, as assessed by temperament tests pre-ride, showed more stress-related behavior during the ride and were found to be sensitive to the environment by the riders. The temperament assessment by the riders revealed two underlying dimensions: the sensitivity of the horse to the environment and the attentiveness of the horse to the rider. Horses that were found to be sensitive to the environment showed more stress-related behavior during the ride, and horses that were found to be more attentive to the rider were found to be more cooperative with the rider.
Hence, this study showed that horse temperament is related to riding performance. This line of research can be important to find the optimal match between horse and rider.

Different expectations between producers (vendors) and purchasers may lead to wastage and welfare concerns for the horse

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There are many types of horses involved in the various disciplines of equitation. Several equine characteristics influence equestrians when either selling or buying a horse, such as height, color, temperament/personality, pedigree details, and training and competition experience. We sought to investigate if there was consensus between the expectations of producers (vendors) and potential purchasers with respect to the various individual characteristics that were rated as important in the typical Irish Sport Horse (ISH) at the time of sale. This was a questionnaire-based survey and the participants (n=1377) comprised of 792 persons who were vendors of sport horses and 585 persons who were purchasers actively seeking a suitable horse for use as a leisure or competition animal. The participants rated specific equine attributes including gender, soundness, pedigree, conformation, movement, presence, height, color, temperament, trainability, performance history and competition experience in terms of importance. The data were recorded on a Likert psychometric response scale and analyzed with Wilcoxon's test for statistical significance. The findings indicated that there was consensus between vendors and purchasers with respect to several equine bio-characteristics. In particular, both parties agreed on the importance of equine soundness, conformation and movement characteristics when selling/buying sport horses. However, vendors attached a significantly higher importance rating to characteristics such as gender, color, pedigree details and performance record of the horse and its siblings. In contrast, purchasers rated equine temperament/personality, trainability and physical presence (aesthetic appeal) as significantly more important attributes when selecting horses for participation in equitation. Suitability for purpose of the horse is likely to be the most important criterion during equestrian activity and any shortcomings in this regard could lead to wanton wastage and welfare concerns for the horse. Producers and end-users should attempt to achieve conformity of their expectations/value ratings of equine characteristics to avoid unnecessary wastage.

Paedomorphosis: a novel explanation of physical and behavioral differences in horses?

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Breeds and types of horses are generally acknowledged but their classification often lacks scientific rigour. Paedomorphosis, the retention of juvenile morphology at maturity, is important in generating evolutionary change through domestication. when dogs are compared with their ancestral species, the wolf, paedomorphosis manifests in different breeds through their physical and behavioral traits (Goodwin et al. 1997).

The current popularity of small heads and long legs in the selection of some performance horses (van Heel et al., 2006) is strongly suggestive of paedomorphism, a process that may influence communication, play, trainability, responsiveness and socialization. These qualities can directly influence the usefulness and therefore welfare of riding horses. However, examination of paedomorphic effects associated with the domestication of horses is thwarted because their ancestral species are extinct. Nevertheless, reports of breed differences in morphology (e.g., Evans & McGreevy 2006) and behavior of horses (Lindberg et al. 1999) are available in the literature. Combined with data from faunal records of ancient horses (Levine 1999), preliminary analysis of paedomorphic effects on extant breed differences in morphology and behavior is possible.

Using morphological and behavioral data, paedomorphic trends can be investigated in a range of breeds from northern (e.g. Exmoor ponies) to southern (e.g. Arabs) regions. Breed differences in social and ingestive behavior can be recorded from observations of adults kept in single-breed groups under controlled conditions including: open field tests; interactions with familiar and unfamiliar humans and horses; access to familiar and novel forage resources. These data can be correlated with morphological data including skull morphology; head:body ratio; long bones ratios; limb length:height ratio; gut length; and skeletal biometrics. This approach facilitates investigation of any relationship between physical and behavioral differences across the breeds and allows us to move beyond the current limits of typing horses as hot-bloods, cold-bloods and warm-bloods.

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Tight tendon/brushing boots: Lower limb protection or innovative lower limb sensitisation training technique in the showjumping horse?

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Showjumping is a demanding equestrian pursuit that requires the performance horse to deliver high degrees of motor accuracy and athletic ability. Faults are incurred for 'knock downs', which can be costly in terms of competition results, prize money and overall value of the horse. Showjumping riders regularly employ various 'schooling' strategies to control the horse's jump stride kinematics (JSK). These plyometric regimes involve jumping lanes and integrated grids with a variety of different obstacles ranging from verticals to oxers and combinations fences – essentially jumping various fences of different heights/widths set at specific distances. The use of so called 'placing poles' and 'ground poles' are commonly accepted techniques employed by the majority of showjumping riders to improve JSK in the horse. However, other techniques are also used to induce hyper-flexion of the equine limbs so as to 'teach' the horse to become 'ultra-careful' and avoid hitting/knocking fences. Rapping, once used almost routinely, has now been outlawed but the application of weighted boots attached to the lower and distal equine limb is another mechanism often used to alter equine JSK. There is growing evidence to suggest that some riders use special (heavier) boots on the horses when training and immediately prior to competition (warm up) as an innovative training aid. The application of excessively tightened tendon/brushing boots may be little more that an adaptation of this technique. In some cases, tendon/brushing boots are 'over-tightened' (particularly hind limbs following warm up) in an attempt to sensitise the horse's legs and induce exaggerated degrees of hyper-flexion immediately prior to and during competition. It is unclear at what point this strategy crosses the line from being an acceptable and innovative training aid to becoming a welfare concern within equitation. The effects of over-tightened tendon/brushing boots within showjumping merit immediate scientific investigation on equine welfare grounds.

Preliminary investigations into the ethological relevance of round-yard training with horses

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Training horses within a round-yard (round-pen) is said to elicit signals from horses that are analogous to those used with conspecifics. To assess equine responses to senior conspecifics in round-yards and the ethological relevance of common training techniques in this context, members of 6 mare-young horse dyads were introduced to each other in a round-yard and videoed for 8 minutes. Horses spent more time >10m apart than <1m apart ($P<0.001$). Mean time spent <1 m apart peaked (at 2.8s) during the first minute and decreased (to 0.3s) over the remaining 7min ($P=0.010$). Mares and youngsters did not differ in their tendency to make the initial approach but youngsters making the initial approach did so quicker than mares ($P=0.040$). Kick threats were exhibited more than bite threats ($P=0.031$) but mares and youngsters did not differ in their tendency to exhibit either. Mares occupied the centre of the round-yard and chased youngsters (that were forced towards the perimeter) for only 0.73% of the test period ($P<0.001$). All agonistic approaches were made by mares ($P<0.001$) and all investigative approaches by youngsters ($P=0.018$). Distance between horses showing agonistic responses increased over time ($P=0.004$), as did head lowering (HL) frequency by youngsters ($P=0.027$). In contrast, the frequency of licking and chewing (LC) by youngsters did not change over time. Both HL and LC occurred mostly when youngsters were looking away from mares ($P<0.001$). Of the total testing time, HL occupied 3.84% and LC 2.71%. Approximately 0.45% of HL was accompanied by simultaneous LC. Given that the time the horses spent <1 m apart decreased after the first minute, it seems unlikely that equine dyads generally 'join-up' after periods of chasing. Thus, the current results question the ethological relevance of common round-yard practices and imply that equine social bonds are not developed by negative reinforcement.

Anatomical variation of the equine thoracolumbar dorsal surface makes effective saddle fitting far from simple

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Most horse owners have experienced 'saddle fitting problems' with their horses. The tentative solution is often to use saddle pads (numnahs) or purchase yet another saddle with narrow, medium or wider gullet settings in an attempt to rectify the perceived problem. Uneven saddle panels (or perhaps more correctly, saddle panels that contact the horse's back in an uneven surface distribution) are likely to cause significant pressure on the animal's back resulting in pain and muscle atrophy. The most frequent site(s) of injury involve aspects of the longissimus dorsi muscles and/or the supraspinous ligament in the caudal withers and cranial lumbar regions. Soft tissue damage including skin necrosis may lead to stiffness and unwillingness of the horse to move forward when ridden. Any such discomfort is likely to exert negative influences on how the horse performs through the transitions and achieves degrees of collection and/or flexion (lateral, dorsal and ventral). We used a simple technique to establish the extent of surface contact between the panels of a new medium fit dressage saddle and the thoracolumbar dorsal surfaces (backs) of six horses. The horses were groomed, talcum powder was applied to the 'saddle area' and the saddle was placed in situ when the horses were standing square on a level surface. The saddle was fitted (without the girth) on four occasions on each horse – twice from either side to provide an accurate 'print' of the mean total contact area, which was visible from the talc distribution on the saddle panels. The total extent of surface contact varied between left and right panels for all horses and there was different degrees of saddle surface contact overall among the horses due to their anatomical differences. Objective scientific evaluation of saddle fit and the influences/consequences of ill-fitting saddles upon the equine back are urgently required.

Trailers for Horses: Some transport systems may be less problematic for the naïve horse during loading

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Owners regularly transport their horse(s) from one location to another – often to participate in competition or other equestrian activity. In general, this presents little or no difficulty for the horse where appropriate transport systems are available. On the other hand, some horses are 'poor travellers' and may require extra space, have a preference for one side of a trailer/float or need other special arrangements to ensure basic safety and welfare conditions. Loading the naïve horse for the first time can be stressful for both horses and handlers and occasionally results in damage/injury to horses, handlers and equipment. The objective of this study was to investigate the efficacy of two different trailer systems when attempting to load young horses for the first time. The trailer systems had different ramp/rear door arrangements: Trailer 1 (T1) had a spring loaded fold-down ramp that required the horses to walk over during loading while Trailer 2 (T2) had a swinging door that necessitated the horses to step-up into the trailer while loading. We loaded four naïve horses (3 year olds): each horse loaded twice into T1 and T2 (the animals were randomly assigned to T1 × 2 attempts and subsequently T2 × 2 attempts or vice versa). A handler led the animals while an assistant was positioned behind the horse to encourage it forward into the trailer such that the ramp/door could be closed. The horses assigned to T1 initially, exhibited resistances and conflict behaviours during the T1 loading protocol but subsequently loaded easily into T2 without incident. In contrast, the horses assigned to T2 initially, loaded freely but subsequently exhibited some resistances when loading into T1. The findings suggest that naïve horses may find 'standard' ramp trailer/float systems somewhat problematic during first loadings but could benefit from introduction to loading protocols using T2 systems.

Obedient or confused – the influence of teaching Para Equestrian Dressage on a coach's understanding of training horses

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This discussion looks at three aspects of how coaching riders with a disability enhances the ability of a coach when training 'able bodied' riders and horses. Underlying good performance is the 'goodwill' of the horse. It is hard to measure but easy to identify when it is missing.

- Clear understanding has to take place for learning to be effective. The horse must be able to interpret the aids of the rider, and the rider has to understand instructions from the coach. Misunderstanding leads to inappropriate behavior in both horses and riders.
- It does not matter how long it takes for a horse or a rider to learn something. It is the quality of the learning and subsequent 'performance' that matters.
- Horses and riders fatigue both mentally and physically when training. When coaching people with a disability one becomes more aware of the state of the horse and the importance of keeping its 'goodwill'.

Interpretation of language is individual to every horse and rider. Riders with autism understand language in a literal way. Horses understand a rider's aid, or language, in the same way. Horses are able to learn lots of different aids for the same response providing they are taught them. Using the 'new aid, old aid' method is the most effective.

There is no difference is training horses or teaching riders with or without a disability. Progressive coaches learn from all experiences, which leads to better performance in all disciplines of competitive riding.

An update on two new on-line educational opportunities for equine enthusiasts through eXtension and My Horse University.

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In 2006, two on-line educational programs - eXtension HorseQuest (www.eXtension.org) and My Horse University (www.MyHorseUniversity.com) - were launched. eXtension is an educational partnership of more than 70 Land Grant Universities. In eXtension, subject matter experts collaborate within a Community of Practice to develop reliable up-to-date information that is available free of charge online. HorseQuest, the first Community of Practice launched from eXtnesion, offers free interactive on-line resources including: frequently asked questions with science based, peer reviewed answers; learning lessons that are self paced; news & upcoming events from all over the United States; and synchronized online chats with three expert specialists on a variety of equine related topics. HorseQuest has a formal partnership with My Horse University (MHU), a national on-line horse management program based out of Michigan State University (MSU), to share curriculum resources and promote education in the field of equine science. The horse management curriculum of My Horse University is designed to be current, relevant and provide effective information that is cap stoned with quizzes and problem solving activities. The core courses include nutrition, health, selection and conformation, and behavior and welfare. Students can invest their time and financial resources in topics that are most applicable to their educational goals and receive a certificate of completion and continued education credit. MSU faculty and national experts in the field of equine science develop the curriculum which goes through a rigorous review process consisting of an internal review, professional editing, external peer review and a pilot launch. While MHU courses are revenue generating, MHU also offers free web casts, an online e-newsletter and sponsors face to face demonstrations for the public. Though different in delivery styles, eXtension and My Horse University offer horse enthusiasts online anytime/anyplace learning opportunities using science based, non-biased, peer reviewed information from the academic community.

"Barn talk": Possible expression in equine vocalization.

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Equines, indeed all of the perissodactyls, can vary frequency during vocalizations, unlike the relatively constant tones in a cow's moo or a sheep's baa. This presents the possibility for expression. As a first case, we have shown that horses can produce a repeatable call, with a specific frequency profile, under a particular circumstance (separation of a Morgan mare from a foal – in this case the strongest signal started at about 2 kHz and gradually lowers to 1.5 KHz during the whinny). Next we plan further research to determine if the characteristic call will be different under other specific circumstances (such as breeding). As Acousticians we soon began to appreciate that horses are primarily visually responding creatures who tend to limit their vocalizations (sometime to our dismay). In a barn box stall, however, the combination of limited visibility, low light conditions, confinement from escape, and closely approaching horses, people, and equipment , we believe, is more likely to evoke vocalizations. In addition, the relatively quiet noise conditions in a barn allow any specific sound (such as human footsteps, arrival of a feed cart, stallion being taken out, etc.) to be easily heard. There is anecdotal evidence of riders, when entering the barn, claiming a morning greeting from their horse, and our analysis of the limited data presently available indicates sometimes a similar "greeting" between horses when one passes by a box stall. Our ultimate objective is to collect enough "barn talk" data to determine if a horse's vocalization is determined in anyway by whom they are "speaking" to, and we welcome feedback from your experiences.

Embedding Equine Learning Theory into Equitation Curriculum

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It is assumed that equitation educational institutions facilitate knowledge and practice of ethical horse training methods. Yet with abundant numbers of successfully packaged and marketed horse training methods accessible, how and where do trainers/riders learn and practice scientific horse training principles? Faced with this question and a desire to improve horse/rider welfare, Rodbaston College and the University of Wolverhampton validated three new equine degrees with the objective of embedding equitation science throughout modular degree programmes.

The degree programmes have provided ongoing ethnographic data, investigating and researching students' interpretation, perception and application of academically robust and ethical horse training principles. A sample of twenty-two students over a two year period provided data for level one equitation modules. Learners varied in equestrian experience and knowledge, with a range of starting points: National Diploma Horse Management, 'A' levels, BHS and Pony Club qualifications. Theme analysis was conducted, analyzing the content of student assignments, reflective logs, tutorials, and video training evidence over the 14 week period. Four themes were identified and critiqued: desirable trainer attributes, skill-acquisition during training, training self-reflections, and the identification of new trainer behaviors. Codes were implemented and results analyzed. Students' acquisition of learning theory resulted in challenging existing equitation paradigms. Students placed negative reinforcement principles as the most valuable and essential knowledge to all horse training, providing an awareness of timing, co-ordination and appropriateness of aids to train desirable behaviors. Additionally, students felt knowledge based on scientific principles provided effective 'tools' to facilitate the speed of the horse's learning and in return empowered the trainer/rider.

In light of these findings a review of curricula in terms of learning theory is recommended. Delivering a curriculum based on scientific horse training principles should provide coaches/riders with an ethical training framework to improve equitation welfare.