Early training and the education of the youngsters

Welcome to EFTBA’s veterinary newsletter

Fifty years ago when stories of “doping” hit the press, they focussed on the murky world of horses being “stopped” for financial gain. - And racing was the loser.

Today the stories that hit the press relate to the use of substances to improve artificially the horses’ performance. - And of course racing and all equine related sports, are the losers.

International enforcement of a common set of rules based on zero tolerance of race medication is an essential goal for the racing and breeding industries.

With it will come the need for horsemen to go back to basics and understand horses if they are to get the best results from them. Horsemen, not chemists, will determine the outcomes.

Hanspeter’s learned article on Ethology, Behaviour and Learning Theories is an essential read for all horsemen interested in the future of our sport and the horses that make it possible.

Rhydian Morgan-Jones, OBE, FCA.

Editorial

The great advantages of the early training of race- and other sport-horses were the subject of our last newsletter. There, we concentrated mainly upon physical aspects of their health, but of course, the mental soundness and temperament of performance horses are most important as well. They are also basic factors of health, wastage, durability, animal welfare and security both for animal and man.

Dr. Hanspeter Meier
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Introduction

Education and training are indispensable prerequisites for the use of horses, wherefore these basic requirements had to be looked after as soon as these animals were put into our services. Most interestingly, the earliest training instructions for horses already refer to their psychological well-being as well as to other items (Nyland 2009). These references are found in the Kikkuli Text, which was written for chariot horses in the 2nd half of the 2nd millennium B.C. (Raulwing 2009). The Hittite Kikkuli was extremely careful

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- Adherence to the principles of ethology, behavior and learning theories accelerate training success, reduce behavioral wastage and improve safety for humans and animals
- Foals and yearlings are quicker learners than mature horses
- Mental training therefore must also start early in life

“Many thanks to Mrs. Eva-Maria Bucher-Haefner, Moyglare Stud Farm, for her valued sponsorship of this newsletter.”
about the horse's mental state and worked the horses in early training for long periods and with daily repetitions. With his method, the horses had to pass the point where they did find the work easy. He kept them on this level for a period of time to become confident. The basic training started in autumn and lasted for about seven months (Nyland 2009, Raulwing 2009).

Now, it is well possible that one might consider the education and training of horses not a well chosen subject for a veterinary newsletter. Such a thought deserves respect and one must confess that ethologists and behaviorists are the experts in this field. But these people are not as often found in training yards as vets (who also enjoy working with civilized animals best) and one must also agree with the opinion of Charles Frank that "in these days of understandable and laudable worries about animal welfare, the veterinary surgeon must be in the forefront of those concerned with the health and contentment of our fellow creatures" (Frank 1999).

Another reason for the choice of this subject is the fact that questions in regard to ethology, behavior and learning theories generally didn't find much interest in yesterdays equine world. Nowadays however, many amazingly interesting studies have been published, and among the leading researchers in this field are scientists from Australia whose names also appear in publications on the use of the whip, subjects which really are of importance for our industry and our endeavours (McGreevy and McLean 2007, Evans and McGreevy 2011). Here, the authors criticize the lack of understanding of ethology, behavior and learning theories. This reproach should motivate us to get better acquainted with modern and well investigated theories in these fields of science.

Once again, these subjects are normally discussed with many specific terms, which not commonly are used in our daily life. For this reason, a glossary is added at the end of this newsletter.

**Ethology, behavior and learning theories**

By definition, **ethology** is primarily the scientific study of animal behavior, especially as it occurs in a natural environment; **applied ethology** being the study of animal behavior in the human domain.

Ethology can help us understand how animals respond to environments in which they have not evolved (e.g. the human domain). More accurately, it is the study of animal behavior in the environment in which natural selection acted to shape that behavior. Given that all aspects of behavior are subject to natural selection, ethology is not merely the study of innate behaviors but also the study of how selection, both natural and artificial, has influenced learning strategies and capabilities (McGreevy and McLean 2007).

**Ethological challenges**

Ethological challenges include interventions that cause horses social and environmental distress. Examples of social challenges include leaving the group, taking the lead in the company of established leaders, being close to aggressive conspecifics, walking abreast rather than trekking in a line, and ignoring displays by other horses. Enforced proximity to conspecifics seldom occur in the free-ranging state. It can also be hazardous because it limits vision, such as when horses are clustered during steeple-chasing. Furthermore, as jockeys well know, when galloping horses are too closely spaced, they may be prompted by other runners to jump when they are not close enough to the obstacle to clear it safely (McGreevy and McLean 2007).

Examples of environmental challenges to horses that run counter to their ethology are for instance:
- leaving the home range
- deviating from an obvious track
- traversing, rather than avoiding, obstacles.
- leading/following handlers
- lunging
- entering small spaces, including trailers
- proximity to humans
- standing on moving platforms
- approaching erratically moving/sounding unfamiliar objects
- overhanging elements
- maintaining speed while traveling from light to dark areas or across uneven terrain or downhill (head is usually lowered to assist detection of the safest path)
- advancing when familiar conspecifics are emitting fearful signals
- walking backward for more than a body length (i.e., entering any unfamiliar cul-de-sac that would require reversing)
- walking on stony ground
- standing square for extended periods
- the presence of a bit
- sweaty head covered with a bridle and back covered with a girth and saddle
- inappropriate pressure by humans who assume that they can speak the language of horses (but
fail to recognize the averseness of their behavior (McGreevy and McLean 2007). The latter is a fact which leads to the important question of communication.

**Ethological communication**

According to McGreevy and McLean (2007), there is an appealing notion that we can apply equine social strategies to human–horse interactions. But already in 1983, Edwards warned that human response and reaction are poles away from the highly-strung equine. Those who indulge in the dangerous fallacy of anthropomorphism when training horses are set on a course which, if it does not lead to disaster, will certainly result in disappointment for the human and probably utter confusion for the horse (Edwards 1983). Referring to this statement, McGreevy (2004) added prove with the comment that in the midst of social conflict among horses, it is often appeasement signals that switch off aggression (McGreevy 2004). Horses are able to detect minute cues from animals (and not just conspecifics) around them. It seems likely that most human signals are not necessarily interpreted as homologues of equine signals (Roberts and Browning 1998). How crude are the signals from a human to an equine observer? With no tail, fixed ears, a short, inflexible neck and only 2 legs we can hardly expect horses to regard us as equine. The chance that we can mimic equine signaling with any subtlety seems remote. Perhaps this is partly why humans rarely claim an ability to issue appeasement signals to horses and why agonistic advances (that may facilitate putative domination) prevail. Ultimately, however, any search for equine analogues of human interactions with a horse becomes virtually irrelevant when a human gets on the horse’s back. According to McGreevy and McLean (2007), perhaps we should simply accept that we are, at best, caregivers and companions, and when we are not giving care and companionship, we are trainers.

On this subject, McGreevy and McLean (2007) carry on quite clearly and question the suggestion that humans can enter the social ‘hierarchy’ of groups of horses by mimicking their behavior, most notably through their signals (Roberts 1997; Sighieri et al. 2003). Based on the debatable premise that a herd is organized according to a social status established by means of ritualized conflict, this approach has grown in popularity but, according to McGreevy and McLean (2007), embodies some muddy thinking. As an explanatory example, they mention round-pen training. The merits of this type of hands-off training are purported to be that it is humane and the chief appeal of this approach lies in the notion that it is possible to manage unhandled horses without coercion by mimicking behaviors from the equid social ethogram. - But round-pen training does involve coercion. For unhandled horses, being approached and touched seem to lie on the same continuum of aversive interactions as being whipped; they are all interactions worth avoiding (McGreevy 2004). In the opinion of McGreevy and McLean (2007), round-pen training can be ineffective insofar as achieving anything useful in human-horse interactions. This view is shared by Krueger (2007) with the explanation that the horses might simply learn how to avoid being chased (or in other words an example of the response to negative reinforcement). In the opinion of these experts, in some circumstances, round-pen training can be inhumane (e.g. with fearful horses). It lacks ethological salience and can precipitate chronic stress if used to condition horses into constant states of hyper-reactivity and therefore may increase behavioral wastage in the form of loss of usefulness and commercial value. Currently there is insufficient evidence that horses in a paddock approach humans for reasons other than mere curiosity or because they have been conditioned to do so. Indeed, it is worth noting that after ‘successful’ round-pen training, horses show no increase in their tendency to follow trainers (Krueger 2007), leading us to question the use of such a potentially detrimental technique (McGreevy and McLean 2007).

**Ethological solutions**

In the opinion of McGreevy and McLean (2007), ethological sound solutions should not depend on a notion of the horse’s benevolence - that the horse is ‘wanting to be with’ or ‘wanting to please’ the trainer. This is an ideologically unsound mindset owing to its anthropocentricity. Contrary to this, one should apply scientifically proven methods and the importance of habituation, sensitization, operant and Pavlovian conditioning should never be underestimated. They facilitate efficient learning and underpin training techniques. They are supported by ethology and informed by learning theory. Although most training systems use a blend of all four of these processes, there are fundamental gaps in the understanding and acceptance (Warren-Smith and McGreevy 2006).

Studying equine ethology demands consideration of how natural selection shaped horse behavior and horse learning capacity. Training philosophies that embrace learning theory can be ethological in
the sense that they might take into account the types of stimuli horses are most likely to respond to and the types of reinforcement that are most rewarding. Instinctive responses predicted by ethology can facilitate horse handling without the need for deliberate training. For example, allelomimetic behavior, stimulus enhancement, and social facilitation are all mechanisms for changing behavior without associative conditioning (McGreevy et al. 2005).

There is no doubt that principles of ethology are most important for successful education programs. But they are only one part of the puzzle and in the opinion of McGreevy and McLean (2007), their application doesn’t imply “speaking the language of horses”. Though this sounds beguiling, ultimately it is an illusion. Luckily only a harmless one if handlers do not have unrealistic expectations.

Moreover, education and training must be supported by the application of **cognitive and learning theories** and the knowledge of physiological aspects of the central nervous system, the latter in exactly the same sense as for any other organ system. This is because purely ethological solutions are limited and confined to the innate predispositions of the animal that humans can capitalize on to modify behavior. By way of contrast, learning theory provides far greater possibilities to alter behavior through the non-associative processes of **habituation** and **sensitization** and associative modalities such as **operant and Pavlovian conditioning** (McGreevy and McLean, 2006). The latter will not be dealt with here.

**Learning theories**

Though the terms “equine ethology” and “ethological training” are becoming commonplace, yet they seem to be used with a conspicuous lack of clarity and with no mention of learning theories (McGreevy and McLean 2007). These theories emerged from psychology to explain changes in behavior that are a product of **reinforcement** (McGreevy and Boakes, 2007).

Reinforcement can be **positive or negative** and is defined as that process in which a reinforcer follows a particular behavior so that the frequency (or probability) of that behavior increases (McGreevy, 2004; McGreevy et al., 2005).

Reinforcement occurs by means of stimuli, and those which meet the behavioral needs of animals (food, water, comfort, sex, and companionship) are considered as primary reinforcers. In educating horses by reinforcement, one wants them striving to meet their behavioral need for comfort, learning all of their basic locomotory responses, right at the beginning, e.g. in-hand with the action of the lead rein (McGreevy and McLean 2005). A most efficient method for positive reinforcement (in the sense of so-called “operant conditioning”) is providing food. Getting fed satisfies a very basic need and is a pleasant experience that a horse does not have to learn to like (Dietrichsen 2012).

Despite its significance and ubiquity in horse training, the meaning and use of negative reinforcement (NR) is mostly misunderstood, and the Parelli system of horse training (natural horsemanship) also incorrectly defines it (Parelli 1995, Warren-Smith and McGreevy 2006). In NR, the increasing pressure (including increases in frequency of whip taps) motivates the animal to trial various responses and the removal of the pressure reinforces the desired response. The timing of the release of pressure is critical to reinforcing the correct response. Poor timing of release accounts for many behavioral problems in the ridden and led horse (McGreevy and McLean, 2005) that can manifest as conflict behaviors and may escalate into learned helplessness (McLean and McGreevy, 2004).

**Traditional early training (Suffolk and Craven 1887)**

On top of this, successful education relies both on associative and non-associative learning modalities. Considering the short time since domestication (approx. 4 millennia), it is probable that the associative learning abilities of the horse have not changed, in spite of selective breeding. The same may *not* be true for **habituation**, because this ability may have been maladaptive for the wild horse. McGreevy and McLean (2007) propose that the major cognitive change that occurred during
selective breeding was the capacity for habituation. Nowadays, the domestic horse usually habituates readily to a wide array of environmental and social stimuli and therefore, habituation is an important learning modality in the young horse. Habituation defines the process where-by the horse learns to tolerate its habitat and surroundings including the people and animals within it, along with various paraphernalia used in training including saddlery, boots, blankets, and covers. The horse also habituates to the presence of a human on its back (McLean, 2006).

Finally, McGreevy and McLean (2007) point out that most of what we do to train horses runs counter to their innate preferences. Therefore, the animals are under stress, which to some extent can enhance some learning abilities. But on the contrary, too much stress (e.g. fear) has negative effects on learning. This phenomenon is explained by the nature of prey-animals, where flight must happen reflex-like. Under these circumstances, animal and man do what they are used to do because there was or is no time for lengthy reflections (Gigerenzer 2008, Schwabe and Wolf 2012).

Avoid and disassociate flight responses

It is common knowledge that horses may show hyper-reactive tendencies, due to their nature, and Le Doux (1994) showed that fear responses are less prone to extinction than other behaviors. This renders behaviors ranging from hyper-reactivity to anti-predator behaviors such as bolting, bucking, rearing, and shying as more persistent if given expression. Therefore, it is important for reasons of safety for both horse and rider that such behaviors are neither provoked nor maintained. It is likely that practicing such behaviors has negative welfare implications leading to chronic stress, learned helplessness, conflict behaviors and wastage. McLean (2005) and McGreevy and McLean (2007) pointed out that hyper-reactivity and conflict behavior show a positive correlation.

In relation to all this theory, McGreevy and McLean (2007) consider current practices such as round pen techniques, lunging, driving or chasing horses for any reason whatsoever as detrimental if they induce fear and elicit a flight response. They recommend that they should be dropped from the toolbox of enlightened trainers until there is statistic evidence that the potential benefits claimed for them outweigh the shown costs in behavioral wastage.

Experiments

After all this basic theory, now a few practical studies. As already mentioned, in these days there is quite a lot of literature on foundation training available, but most of it refers to equitation, where the education of horses usually doesn’t start as early as in our sport. Therefore we concentrate only on the much fewer publications on younger animals (foals, yearlings):

Polito et al. (2007): A Pilot Study on Yearlings’ Reactions to Handling in Relation to the Training Method

Reason for performing the study: Polito and colleagues (2007) investigated whether the use of a sympathetic approach (“natural horsemanship”) during the preparation for public auctions influenced the reactivity of young horses towards humans.

Sixteen thoroughbred yearlings were prepared for public auctions during one month: eight horses (“Control”) were handled according to conventional practices, while the others (“Treated”) were handled with two sessions of basic training based on body language. The reactivity of horses was assessed in the presence of an “unfamiliar person” and a “familiar person” inside the horse’s box.

The experimenter recorded the presence/absence of selected behaviors during seven observational moments: “approaching the box,” “opening the box door,” “entering the box,” and four consecutive observations every thirty seconds.

At the end of the auction preparation, “Treated” horses exhibited more “contact” ($p = 0.08$) and “lick” ($p < 0.05$) behaviors in the presence of a person.

“Control” horses showed higher (non-significant) percentages of negative (more nervous) rankings during “bit,” “grooming,” and “surcingle” tests. Two “Control” horses showed aggressive behavior during the application of the surcingle. In this pilot study, horses handled with a sympathetic approach showed less reactive behaviors compared with “Control” horses (Polito et al. 2007).

Heird et al. (1981): Effects of Early Experience on the Learning Ability of Yearling Horses

These researchers worked with 24 Quarter Horses fillies, which were divided into three groups: (i) very limited handling, (ii) intermediate handling & (iii) extensive handling.

At about 14 months of age, each horse was preconditioned for 2 weeks and then run in a simple place-learning T-maze (labyrinth) test in which it had to locate its feed. Thirty trials were run daily for 20 days, with the location of the feed changed...
each day. To retire from the labyrinth, a horse had to meet the criterion: 11 correct responses in 12 tries, with the last eight being consecutive. Horses in Group II required the fewest trials to reach criterion. These horses also learned more and had the highest percentage of correct responses (P<.05). Mean trainability tended to predict learning ability; however, trainability and trials to criterion were not significantly correlated. Mean emotionality scores indicated a tendency for horses in the intensively handled group to be less emotional than those in Group I or III. Results indicated that **horses with an intermediate amount of handling scored higher** on an intermediate test of learning. All handled horses scored **higher on learning tests** than those not handled. The authors concluded that **early handling increases the learning ability** of horses. The amount of handling will influence the horse's reactivity to new and varied situations. Results indicate that the horse that will be exposed to a wide variety of stimuli should be handled more than the horse that will be exposed to less varied stimuli. A relationship between the amount of handling and the later desired responsiveness of the horse was indicated. A horse will be more reactive to stimuli if it is handled less, but will be calmer in different situations with more handling. Learning in individual horses is difficult to predict on the basis of a small amount of training. Although it may be possible to predict trends in learning, individual personalities make it difficult to predict accurately the learning ability of a given horse.

Sigurjónsdóttir and Gunnarsson (2002): **Controlled Study of Early Handling and Training of Icelandic Foals**

**Reason for performing the study:** We wanted to test the idea that early handling and training of foals should calm the foals considerably and teach them valuable lessons, which would make training easier later on.

**Methods:** 22 Icelandic foals, 10 colts and 12 fillies, were treated 4 times. In the control group there were equal number of foals from the same farms, 9 colts and 13 fillies. The treatments involved manipulations (imprinting) as recommended by Miller (2000) and usual handlings like haltering and leading the youngsters. The foals were handled for 5 weeks and the behaviour of the dams was also noted.

**Tests:** Approximately 4 months later, all handled and control foals were tested by one person (experimenter) who had not been involved in the treatments in the spring and remained blind to group assignments. Different tests were made and the experimenter graded foal on each test. The time it took to carry out all the tests was measured and finally the foal was graded (on scale 1-5) on overall compliance. Beside this, the owners of the mares had to answer a questionnaire featuring characteristics and temperament of the dams.

**Results:** In regard to imprinting techniques, the early handled foals were in general not calmer than the control foals and were similarly difficult to catch in the beginning of the test. There was some indication that foals in the early handled group scored better than the control foals in some tests, but in no case was the difference significant. However, the foals differed in difficulty being caught, haltered and lead. The analyses from the video recording revealed that the resistance of control foals was greater than that of early handled foals, measured as total time (p<0.01) and frequencies of strong resistance (p<0.02). There was no difference between the sexes. Also, in the experimental group, the strength of foal resistance to handling was correlated with the temperament scores of the dam in 3 of the 4 attributes tested (ease of training: r = -0.510, p<0.02; ease of handling: r = -0.556, p<0.01; general level of nervousness: r = 0.483, p<0.03). In the control group, no significant correlations were found in comparable tests.

**Discussion:** The results suggest that the 22 foals in the experiment did not learn significantly by being handled, haltered, and lead **during the first 2 weeks** of their life. Some foals had learned some of the tasks and appeared to retain compliance later, but due to high individual variation the overall differences between early handled and control were not significant. However, early handled foals were calmer and on average resisted less when tested 3 months later compared to control foals. When analysed in detail, it became clear that the **difference is due to the effect the whole treatment had on foals whose dam’s were in general easy to handle.**

**Discussion**

Contrary to the many publications of excellent quality on physical aspects (in Newsletter 9), in regard to the field of psychology and the young Thoroughbred, there exists almost no literature, and the scientific quality of studies with so few animals must be questioned. What’s the reason for this? — Very probably, there is simply not much need for it as the early training is most beneficial psychologically as
well. Just as Warburton (1892) cited: “Tis education forms the common mind, just as the twig is bent the tree’s inclined”, or comparable to the saying on the continent: “What little Hans doesn’t learn, grown up Hans will never learn”.

In proverbs, there is normally an empirically founded grain of truth, but of course, it is much more satisfying when assumptions can be explained and be proven scientifically. However, experiments with horses are pretty demanding and therefore we may as well profit from work with other animals and personal experience. One fundamental investigation on this subject was published in 1947, where Hebb studied “The effects of early experience on problem solving at maturity”. He used laboratory animals to test the effect of early handling on learning ability and reported that superior animal performance on tests involving complex behavior was obtained if a richer environment was provided early in life. Moreover, handling influenced not only learning ability, but temperament later in life as well (Hebb 1947). - A finding which the author of this newsletter (born 1947) thinks to have experienced in the meantime convincingly himself.

These opinions are also in agreement with explanations of ethologists, who say that learning must occur in a young age, as it serves for preservation of both the animal itself and its species. It helps to avoid risks and therefore learning abilities are best developed early in life (Lindberg et al. 1999). But surprisingly, Scheibe (2012) thinks that this phenomenon isn’t well enough taken advantage of in the work with horses, generally. Evolutionary and therefore essential elements of learning ability in the horse are curiosity, behavior of inquiry and play, and interestingly, the first two are also considered as necessary preconditions for domestication, generally speaking (Budiansky 1998, Scheibe 2012). Curiosity of young horses can be bothersome sometimes for the handler, but one must always respect this as a most useful quality for our work with them and the need for this virtue probably has been best expressed by Tom Dorrance: „Don’t knock the curiosity out of a young horse“ (Miller and Lamb 2005).

Further reasons for the lack of research on the education of young Thoroughbreds probably are that the traditional way of working with them (haltering, leading, walking, long-reining, etc.) has intuitively and empirically developed the right way. One may just remember what already has been written more than 120 years ago: “Yearlings will suffer less in breaking and training during cool weather than in the summer months. This operation ought always to be conducted under the personal supervision of the trainer and with the aid of his ablest and most patient assistants. The effects accruing from ignorance, carelessness and ill-usage at this period of the colt’s existence can never be completely effaced. The temper of many colts is ruined at this age. It is now, principally, that he contracts vices, becomes headstrong, head shy, learns to break his halter, start back in the stable, kick, becomes hard-mouthed, timid or tricky, any or all of which not only cause him to be a nuisance to his trainer and attendants, but militate against his success as a racehorse. Therefore, no pains should be spared, no precautions omitted in his education” (Warburton 1892).
Conclusions

There is certainly no doubt that our aims as breeders are sound, durable and successfully performing horses and a sport which meets to-day's standards of animal contentment. They are therefore well in accordance with the opinions of Derksen and Clayton (2007) that performance horses are expected to perform at a very high level and must be trained and managed in a manner that produces appropriate physical fitness and mental demeanour for competition.

It is commonly believed and has been established with tests, that foals and yearlings are quicker learners than mature horses. Both physical and psychological training therefore must start early in life and information on the learning abilities of horses should be used in developing training methods (Warburton 1892, Fiske and Potter 1979, Mader and Price 1980, Houpt et al. 1982, McCa 1990). However, research where such knowledge is put to the test is limited (Flannery 1997) and as with all science today, multi-disciplinary research teams including veterinarians, animal scientists, behavioural scientists, ethological scientists and trainers will be most successful (Derksen and Clayton 2007).

Adherence to the principles of ethology, behavior and learning theories and incorporating them into all horse training methodologies should accelerate training success, reduce behavioral wastage of horses and improve safety for both humans and animals (McGreevy and McLean 2007).

Since the subject of horse welfare generates a great deal of emotion in people, it is important to avoid anthropomorphism and over-interpretation of data (Derksen and Clayton 2007).

Considering all these facts as above, our traditional way of bringing up our youngsters doesn’t seem to be wrong.

References


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Glossary

Alleomimetic behavior or allomimetic behavior: A range of activities in which the performance of a behavior increases the probability of that behavior being performed by other nearby animals. Alleomimetic behavior is sometimes called contagious behavior and has strong components of social facilitation, imitation, and group coordination. It is usually considered to occur between members of the same species.

Classical conditioning: The process whereby the unconditioned or conditioned response becomes elicited from a conditioned stimulus. In equitation it is the process where learned responses are elicited from more subtle versions of the same signal or to entirely new signals.

Conflict behaviour: A set of responses of varying duration that are usually characterised by hyperreactivity and arise largely through confusion. In equitation, confusions that result in conflict behaviours may be caused by application of simultaneous opposing signals (such as go and stop/slow/step-back) such that the horse is unable to offer any learned responses sufficiently and is forced to endure discomfort from relentless rein and leg pressures. Attempts to flee the aversive situation result in hyper-reactivity. In addition, the desired response to one or both cues diminishes. Conflict behaviours may also result from one signal eliciting two or more responses independently, such as using the reins to achieve vertical flexion independently of the stop/slow/step-back response, or using a single rein to bend the neck of the horse independently of its previously conditioned turn response. Similarly, conflict behaviour may result from incorrect negative reinforcement, such as the reinforcement of inconsistent responses, incorrect responses, no removal of pressure, or no shaping of responses. Often referred to as evasions and resistances.

Conflict theory: Conflict theory proposes that most unwelcome responses in animals trained with aversive stimuli are more appropriately recognized as active coping behaviours, arising from dysfunctions in negative reinforcement.

Contact: The connection of the rider’s hands to the horse’s mouth, of the legs to the horse’s sides, and of the seat to the horse’s back via the saddle. The topic of contact with both hand and leg generates considerable confusion related to the pressure that the horse should endure if the contact is deemed to be correct. In classical equitation, contact to the rein and rider’s leg involves a light pressure (approximately 200g) to the horse’s lips/tongue and body, respectively. Although a light contact is the aim, there are brief moments (seconds or parts of a second) when contact may need to be stronger, particularly at the start of training, or in re-training, to overcome resistances from the horse. Many contemporary horse trainers insist that the contact should be much heavier than a light connection. This view may cause progressive habituation leading to learned helplessness to the rein and leg signals as a result of incorrect negative reinforcement and/or simultaneous application of the cues. Contact may therefore need to be the focus of discussion and debate.

Cue: An event that elicits a learned response. In equitation, cues are sometimes termed aids or signals. Rein, leg, whip and spur cues are initially learned through negative reinforcement and then transformed to light cues (light rein, light leg, voice, seat) via classical conditioning because of the temporal relation between the two. In traditional horsemanship, the cues are divided into two groups: the natural cues and the artificial cues. This distinction is misleading as it neither identifies nor correlates with the two different learning modalities through which the horse acquires its responses to the cues. These are learned through classical conditioning when a response comes increasingly under stimulus control.

Ethical equitation: Ethical equitation aims to minimize deleterious effects at the human-horse interface. It demands, in particular, that trainers and riders use minimal pressure in both contact (if relevant to the sport) and signalling and that pressure is released immediately. Furthermore, it requires trainers and riders to understand the impacts of their actions and be prepared to justify them.

Ethology: Ethology is primarily the scientific study of innate adaptive behaviour in animals, as it occurs in a natural environment; applied ethology being is the study of animal behaviour in the human domain.

Habituation: The waning of a response to a repeated stimulus as a result of frequent exposure (not fatigue).
**Learned helplessness:** A state in which an animal has learned not to respond to pressure or pain. This arises from inappropriate application of negative reinforcement, which results in the horse not being able to obtain release from aversive stimuli. If this continues over a period of time, the horse will no longer make responses that were once appropriate. Learned helplessness has the following characteristics: a disinclination to trial behavioural responses to pressure; lowered levels of aggression; dullness; loss of appetite; physiological and immunological changes.

**Learning theory:** describes the body of knowledge that defines and describes all aspects of learning processes in the animal kingdom.

**Negative punishment:** The removal of a reinforcing stimulus which makes a particular response less likely in the future.

**Negative reinforcement:** The subtraction of something aversive (such as pressure) to reward the desired response and thus lower the motivational drive.

**Operant conditioning:** Training the horse to respond consistently to signals through positive and negative reinforcement.

**Positive punishment:** The addition of an aversive stimulus which makes a particular response less likely in the future.

**Positive reinforcement:** The addition of a pleasant stimulus (a reinforcer) to reward the desired response and thus make this response more likely in the future.

**Punishment:** The presentation of an aversive stimulus that decreases the likelihood of a response or, in the case of negative punishment, the removal of a reinforcing stimulus. Punishment is often used incorrectly in horse training, i.e., when not immediately contingent with the offending response. Incorrect use of punishment can lower an animal’s motivation to trial new responses, desensitise the animal to the punishing stimulus and create fearful associations.

**Reinforcement:** The process in which a reinforcer follows a particular behaviour so that the frequency (or probability) of that behaviour increases.

**Reinforcer:** An environmental change that increases the likelihood that an animal will make a particular response, i.e., the addition of a reward (positive reinforcer), or removal of an aversive stimulus (negative reinforcer).

**Response:** A reaction to a stimulus.

**Shaping:** The successive approximation of a behaviour toward a targeted desirable behaviour through the consecutive training of one single quality of a response followed by the next. In horse training, a shaping program is known as a Training Scale. Not paying due attention to shaping in horse training has been associated with conflict behaviours.

**Stereotypy:** A repeated, relatively invariant sequence of movements that has no function obvious to the observer. A number of stereotypic behaviours are seen in horses and are erroneously referred to as stable vices. Crib-biting is where the horse is holding onto a fixed object with the incisor teeth, arching the neck and leaning backwards, with or without engulfing air with a characteristic grunting noise; in the US it is referred to as cribbing. Wind-sucking, in Australia, describes a stereotypic gripping of a fixed object with the teeth while pulling back and engulfing air into the cranial oesophagus whereas in the UK it refers to the gulping of air into the cranial oesophagus without holding onto any fixed object.

**Stimulus:** Any of the cues or signals used to elicit responses in horses. Often referred to as aids.

**Stress** (acute and chronic): Stress, in its acute form, is a short-term dysfunction of the signal-response relationship presenting variously as raised tension levels, agonistic behaviours, redirected aggression and displacement activities. Chronic stress manifests as raised corticosteroid levels, physiological disturbances, gastric pathology, repetition and ritualisation of original conflict behaviours, redirected, ambivalent and displacement behaviours, development of stereotypes and injurious behaviours, such as self-mutilation and increased aggression.

**Training scale:** A progressive order of training particular qualities of responses through the process of shaping. Shaping programs merit further research.
Whispering: Many opinions exist in relation to what are regarded as normal and abnormal behaviours by horse owners and trainers. Most recently, this has culminated in a renaissance for the ‘horse whisperer’, who has supposedly mythical powers to commune with horses in their very souls.