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Overshadowing: A Silver Lining to a Dark Cloud in Horse Training

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Overshadowing is a process known in behavioral science that occurs when two stimuli of different strengths are applied simultaneously to a nonhuman animal. Typically, the stronger stimulus overshadows the weaker one, resulting in attenuation of the weaker stimulus. This phenomenon explains ways in which the decreased responsiveness and consequent conflict behaviors (and possibly learned helplessness and wastage) in some performance horses can result from the application of two concurrent aversive stimuli. Despite some adverse consequences in the context of ridden horses, overshadowing can have serendipitous benefits because it offers an efficient method of desensitization for certain stimuli that are sometimes highly aversive: the saddle/girth pressure, clippers, aerosols, and needles. Desensitization with concurrent overshadowing appears to be comparatively rapid, particularly with highly aversive stimuli, possibly because attentional mechanisms are diverted to the more salient stimulus. It is important to note that, following the overshadowing procedure, the effects appear to be retained when assessed on subsequent days. Using 4 examples, this article presents a preliminary exploration of the beneficial use of a poorly understood, underutilized—yet promising—phenomenon that warrants further investigation.

Although humans have been interacting with horses for many millennia through hunting, it is only relatively recently that horses have become beasts of burden and have been used for transport, war, agriculture, and—finally—for sport and leisure. Much of the archaeological evidence points to artifacts of horse domestication from around the end of the 3rd millennium BCE (Levine, 2005). Xenophon, writing more than 2 millennia ago in his treatise *Hippike* (Xenophon,

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trans. 1962), described techniques for training horses under saddle, based on instrumental conditioning, that are still used today.

Modern equitation is based on achieving stimulus control of the horse's locomotory responses where the rider's legs are the discriminative stimuli for acceleration and the bit in the horse's mouth provides the discriminative stimulus for deceleration (McLean, 2004). Upon this base of training, further more subtle cues such as the rider's seat and position are acquired by the horse in equestrian disciplines such as the Olympic equestrian sports (dressage, eventing, show jumping, and reining).

Prima facie, simultaneous evocation of acceleration and deceleration responses seems illogical and therefore ill-advised. However, it is common and even encouraged in many equestrian methodologies, beginning with Xenophon (1962):

> If you support him by the bit and at the same moment give him one of the signs to dash forward, the bit holds him in and the signal to advance rouses him up. He will then throw out his chest and raise his legs rather high, and furiously though not flexibly, for horse do not use their legs very flexibly when being hurt. (p. 59)

Since then, concurrent rein and rider's legs signals have been advocated by "great masters" such as Baucher, 1796–1873 (Nelson, 1992), and more recently, in the German National Equestrian Federation Handbook (1997). The latter is considered the most influential current training method as a result of modern German dominance of Olympic medals in equestrian sports.

Significant problems in the popular modern training styles of performance horses are implied by alarmingly high wastage statistics. Ödberg and Bouissou (1999) reported that 66.4% of French horses sent to abattoirs between the ages of 2 and 7 years were sent there as a result of "inappropriate behaviour." A German study suggested similar findings (Von Butler & Armbruster, 1984). Conflict behaviors such as bucking, rearing, shying, bolting, and hyperreactivity have been associated with modern training methods (McLean, 2005; McLean & McGreevy, 2004). These authors also proposed that waned response, chronic stress, and learned helplessness may also arise from impossible or confusing demands from riders—such as the simultaneous use of the rider's legs and reins. Interestingly, in his later years the 19th century, trainer Baucher renounced the simultaneous use of the rider's reins and legs and coined the classical equestrian maxim "reins without legs and legs without reins." These days, so-called classical dressage exponents distance themselves from the contemporary approach by maintaining such maxims.

Although maximal responding to concurrent stimuli is virtually impossible, the interaction can generate the phenomenon of overshadowing. Overshadowing was first described by Hull (1952) and can be defined as the effect of two signals of different intensity being applied together, such that only the most intense

will result in conditioned response whereas the response normally elicited by the perceived weaker stimulus diminishes (McGreevy, McLean, Warren-Smith, Waran, & Goodwin, 2005). It is important to note that only one stimulus can be salient at a given moment when an organism is presented with two stimuli simultaneously.

The implications of overshadowing are that it is likely that the horse—when faced with the simultaneous stimulation of the rider's reins and legs—will choose to respond to the most salient stimulus. In terms of aversiveness, pressures in the horse's mouth (via the reins) would, in most circumstances, be expected to be of greater salience than those on the sides (provided by the rider's legs). In this way, the bit pressures would overshadow the leg pressures, and the result is that the horse becomes less responsive to the rider's leg signals.

This overshadowing problem provides the most likely explanation for the phenomena of "dead sides" and "laziness" in performance horses. Conversely, in correct horse training, overshadowing of the rider's signals over environmental stimuli is an inherent process. One of the primary aims of horse training is to eliminate the stimulus-control effect of the environment that might cause a horse to shy or bolt and place the horse under stimulus control of the rider's signals (known as the aids). When under stimulus control of the rider's signals, the horse tends to lose conditioned or unconditioned responses to environmental stimuli. Even in positive reinforcement schedules, trainers attempt to overshadow unwanted conditioned stimuli with attractive unconditioned stimuli.

However, there are further beneficial effects provided by the overshadowing phenomenon. This overshadowing effect holds promise for the elimination of many fearful responses to particular eliciting stimuli (such as when the electric clippers are turned on) in the in-hand management protocols of domestic horses. This can be achieved by overshadowing the particular anxiety response through the simultaneous evocation of certain locomotory responses. Optimally, the process should be undertaken gradually, beginning at the lowest threshold of anxiety.

Because overshadowing results in the waning of one response in favor of another, it is common for powerful fear-eliciting stimuli to overshadow the handler's in-hand signals of acceleration or deceleration: The horse simply runs away to greater or lesser extent. Therefore, if the situation is reversed so that the handler's in-hand signals are more deeply trained—to the extent that they overshadow the fearful responses of the horse—the undesirable, fearful responses will wane as the horse becomes habituated to the originally fearful stimulus (the clippers).

Other processes used in behavior modification of fear responses include gradual habituation and counterconditioning (Gough, 1999). Gradual habituation involves exposing the horse to the aversive stimulus but not preventing the horse's fear response or attempting to elicit any other response. For example,

a horse in a field adjacent to a roadway will eventually habituate to traffic, although the horse is free to startle and run away to some extent and may do so in the early habituation stages. In behavior modification, a horse who finds crowd clapping aversive may be gradually habituated to it if a recording of the clapping is played regularly nearby. Of course, the optimal approach is to begin with very low levels of aversiveness. Again, the horse is free to express anxiety and some amounts of escape.

It is possible that being able to *express* fear inhibits efficient behavior modification. When the horse flees, the habituation process may be thwarted because fleeing reinforces the escape behavior through the process of negative reinforcement (NR; the fearful stimulus is removed to greater or lesser extent). Horses require few experiences with fearful behaviors for them to become habitually practiced, and many chronic fearful responses in both humans and nonhuman animals can be traced back to a single event (Lindsay, 2000). Indeed, one-trial-learning of fearful responses is documented in horses (Kiley-Worthington, 1987) and is commonly recognized by horse people. It makes sound evolutionary sense that some lifesaving avoidance behavior patterns require only a single event (Seligman, 1971).

Fearful responses are learned at the subcortical level involving the amygdala and hippocampus (Le Doux, 1998), and there are direct projections from the amygdala and hippocampus to the motor cortex. This direct neural architecture and the central role of the amygdala in remembering fear responses contribute not only to the rapid acquisition of fearful responses but also to their resistance to extinction (Le Doux, 1994). When working with fearful responses, it is important to consider their rapid acquisition and persistence. So, although extinction of fearful responses may not be possible, these responses can be inhibited or attenuated in successful behavior-modification programs.

Another problem that may arise in a gradual habituation program is that the horse may never choose to fully approach the aversive stimulus. Therefore, fearful responses may maintain a discrete proximity effect. It has been shown that preventing dogs' expressions of fear facilitates habituation to fearful stimuli (Baum, 1970). If the situation is similar with horses, then overshadowing may be more efficient in behavior modification because of its inherent locomotory control and subsequent prevention of fearful and reinforcing fleeing responses.

Counterconditioning involves using the aversive stimulus itself as a classically conditioned predictor of a pleasant event (McGreevy, 2004). An easy example is provided by the earlier example of the horse who is afraid of crowd clapping. If the recording is played only just before food is delivered, then the aversive stimulus takes on more attractive salient characteristics. Counterconditioning thus provides useful adjunct in programs of either overshadowing or gradual habituation where the aversive stimulus is transformed to become a secondary positive reinforcer.

Analogs of such overshadowing procedures are well known in human psychology. Commons (2000) has argued that overshadowing underpins the effectiveness of conventional psychotherapy treatments. He proposes that these overshadowing techniques work because the salient stimuli interrupt negative emotional responses elicited by traumatic stimuli. In the treatment of severe trauma in humans, therapies involving overshadowing processes are successful (Wolpe & Lazarus, 1976). Proponents of techniques based on overshadowing claim rapid effects and lasting results in humans (Sherman, 1998).

In the practical situation of equine-behavior therapy, conventional treatments for elimination of fearful reactions to everyday stimuli include gradual habituation and counterconditioning. Although these treatments can be effective, overshadowing procedures offer speed and efficacy yet to be fully investigated but potentially analogous to similar therapies in humans. Because of their effectiveness, overshadowing procedures now form the Australian Equine Behaviour Centre's (AEBC's) predominant treatment protocol for fearful horses requiring desensitization. This article provides a preliminary examination of overshadowing techniques that can be used to suppress fearful responses in horses (and other species) during exposure to four particular stimuli that some horses find aversive: (a) electric clippers, (b) injections, (c) shoeing, and (d) the girth strap (cinch).

METHOD

This examination focuses on four desensitization examples using overshadowing. The 4 horses were admitted to the AEBC in April 2007 for specific desensitization treatment of the following stimuli that elicited severe aversive reactions: (a) clippers, (b) injections, (c) shoeing, and (d) girth-shyness. A severe aversive reaction is defined as one that elicits a full-blown flight response where the horse attempts to escape and may exhibit dangerous defensive behaviors such as kicking or striking. During such severe flight-response behaviors, the horse may be uncontrollable for a significant period and so may flee some distance. Therefore, the overshadowing treatment is designed to reestablish the salience of the in-hand signals so that they achieve salience in critical circumstances. In lay terms, this is described as deepening the stop-and-go signals.

Personnel and Equipment

In the protocol established at the AEBC, two skilled personnel are required: one for the establishment of stimulus control of the acceleration and deceleration responses (the handler) and the other in control of the aversive stimulus (the

operator). The horse is fitted with a head collar (halter), lead rein, and, in severe cases, a stallion bit (UK chifney).

General Protocol—Initial Training

In the examples of equine-overshadowing therapy outlined in this article, stimulus control is achieved over the horse's locomotion. Controlling locomotory responses is important because fearful behaviors manifest as locomotory responses. It is the locomotory consequences of fear that present the danger and the difficulty to handlers. To be effective, overshadowing must be implemented gradually and must be preceded by some training of stepping back and stepping forward responses until the steps are elicited by light lead signals (McLean, 2003, 2004, 2005). Then, when the aversive stimulus is brought closer to the horse, the stimulus must immediately remain at the distance where the horse showed the first signs of fear. At that moment, the handler sets about stepping the horse back and forth (while the operator keeps the aversive stimulus at the same distance from the horse's body) until the locomotory responses again arise from the lightest of signals.

Surprisingly, although most horses appear to lead well, few horses actually respond to light lead pressure alone. Instead horses rapidly and autonomously learn to be cued by the stepping of the handler by classical conditioning very early in training (McLean, 2003). As a result, many domestic horses never thoroughly learn the anterior facing or posterior facing lead rein cues; because these cues have their origin in negative reinforcement, problems may arise when they perceive lead pressures for which they are ignorant. Significantly, conflict behaviors correlate with dysfunctions in NR-generated acceleration and deceleration signals established by negative reinforcement (McLean, 2005; McLean & McGreevy, 2004).

General Protocol—Overshadowing

Following the initial training, the overshadowing procedure can begin. It is important that it is gradual and follows specific steps:

Step 1. The horse stands immobile while the operator approaches it without the aversive stimulus (no clippers, needle) so as to familiarize and habituate the horse to that person.

Step 2. If the horse shows an aversive response to the operator, the handler will notice that the horse is now more difficult to step back and forward than before: the response is heavy and delayed. The horse is stepped back and forward quietly and repeatedly until the response is elicited by light aids as before. It is important to step the horse back first rather than

forward. This is because flight responses manifest as forward responses, so stepping back can assist in quelling a hyperreactive forward response. A wall can be useful to prevent sideways movements of the horse.

Step 3. The operator can now step closer until the first sign of a fearful threshold is reached, and again the steps back and forward are repeated.

Step 4. The operator steps closer to the horse, and the handler overshadows the fearful reactions with steps forward and back, repeated until the operator makes contact with the horse.

Step 5. When contact is made, it is useful for the operator to groom the horse, paying particular attention to dorsal anterior thoracic region (the base of the withers), a known allogrooming site that induces relaxation and heart-rate lowering (Feh & de Mazières, 1993).

Step 6. The next phase involves approaching the horse with the aversive stimulus. If the aversiveness of the stimulus involves more than one sense modality, each modality should be dealt with separately. In all desensitization procedures, the most efficacious result occurs when only one variable at a time is habituated. For example, in the case of electric clippers, the visual (but not aural) stimulus of the clippers should be habituated to first, followed by the clippers with motor running. If the stimulus can be further reduced, for instance using smaller, quieter clippers, this also facilitates habituation.

Step 7. The operator approaches the horse quietly, visibly holding the aversive stimulus. This approach immediately ceases as soon as the horse shows any fearful sign. At this moment, the handler should attempt to step the horse back followed by a step forward. In all cases, when the aversive stimulus enters the fearful threshold distance, the step back and step forward responses will be weakened—the horse will respond only to a stronger signal. This is because the animal's attentional mechanisms are diverted to the aversive stimulus.

Step 8. The operator maintains the aversive stimulus at the same distance from the horse's body, where possible, throughout this period of stepping back and forward. The handler meanwhile performs repetitions of step back and step forward, using negative reinforcement correctly in terms of the timing of release. The handler will notice that the step back and step forward responses rapidly become elicited by lighter pressures.

Step 9. When the pressures required to elicit the responses are as light as at the end of the initial training procedure, the operator moves closer until again the horse shows any fearful response. Again, the handler will notice a diminution of responding to step back and step forward responses and again he sets about repeating the responses until they are elicited by light pressures. Meanwhile, as before, the operator maintains the aversive stimulus at the same distance.

Step 10. This protocol reestablishing lightness (whereby the handler's approach ceases at the fearful threshold) is continued until the horse is fully habituated to the aversive stimulus. Such protocols should be undertaken for three or four sessions until the fearful reactions have completely subsided.

During this procedure, it is important to avoid flooding, which can delay habituation. To achieve this, the operator ceases to approach the horse with the aversive stimulus when the lowest fearful threshold is reached. In addition, it is important that the operator, having reached the threshold distance, maintain the aversive stimulus at that distance. If the horse's fearful responses coincide with a retreat of the aversive stimulus, this reinforces the fearful behavior. On the other hand, if the aversive stimulus approaches the horse while the horse exhibits fearful behavior, the fearful response will escalate.

During procedures when reactions can be sudden, it is useful for the handler to step the horse back and forward regardless of the existence of any visible sign of fearful responding. This enables the handler (and operator) to gain an insight into the horse's actual level of fearfulness, because any fear at all will result in the horse being heavy and delayed to step back and forth. In effect, it provides a useful way for the handlers to identify what the horse considers the most salient stimulus.

Specific Protocol—Electric Clippers

Small, battery-operated clippers with the motor switched off are used following the previously described protocol until habituation. The first and usually easiest body site to target for habituation is the neck, followed by the sides and then the back. The forelegs and hind legs should be desensitized while they are held up by the operator as this practice is safer. These regions should be smoothly and gently rubbed all over with the small clippers. Of course the leg is released when the handler communicates that he is about to cue the horse to move back or forward. Then the small clippers are switched on and the same protocol is followed, after which larger clippers with the motor switched off are introduced and similarly overshadowed. Finally, the motor of the large clippers is switched on and the overshadowing procedure followed. Any signs of fearful behavior should immediately result in the horse being stepped back and then forward until habituation emerges.

Specific Protocol—Injections

Injections should be administered only by veterinarians; therefore, the operator in this instance is the veterinarian. As a result of previous experience, horses

sometimes learn to find the veterinarian himself aversive. Therefore, the presence of the veterinarian should be overshadowed using the general protocol described earlier until the horse is habituated to the veterinarian. Some veterinarians favor crimping of the horse skin between thumb and forefinger prior to the injection (itself an overshadowing procedure). During such crimping, if the horse shows any aversive reaction, the handler should overshadow this reaction with step back and forward responses until habituation. As the veterinarian inserts the needle subcutaneously, intravenously, or intramuscularly, the handler steps the horse back and forward to ensure habituation. Stepping back also tends to thwart any sudden hyperreactive response.

Specific Protocol—Shoeing

If the presence of the farrier elicits a fearful response, the handler should overshadow this as the farrier steps closer to the horse following the general protocol described earlier. With young horses, fearful reactions evoked by touching the limbs may inadvertently be learned because people generally (and sometimes wisely!) let go of the limb during such moments. This release reinforces the hyperreactive reaction. In such cases, cold hosing the horse's legs while the handler overshadows the effect of the water spraying on the legs is generally sufficient to habituate horses to humans touching their legs. When the operator touches the horse's legs, the handler overshadows this with step back and step forward reactions.

Because fearful reactions to the farrier in experienced horses manifest as sudden reactions (as soon as the farrier touches the horse's leg or as soon as he begins filing or as soon as he begins hammering), the handler must have excellent timing so that he chooses the best moment to step the horse back. At the moment of the step back, it is important that the farrier is aware that this procedure is about to occur. That said, farriers are usually the first to notice tension in the horse's limb and can therefore be ready to release it.

Specific Protocol—The Girth Strap

When horses are girthed for the first time, they may show hyperreactive responses. It has been reported that around 12% of horses during foundation training exhibit hyperreactive responses to the girth pressure (McLean, 2004). Before overshadowing the girth stimulus, it is important that the horse is habituated to the saddle and cloth (numnah) on his back. If not, the general protocol of overshadowing applies here also. Following such habituation, the procedure of overshadowing the fearful reaction of the horse with the girth is the next step. To do this safely, as with all overshadowing procedures, personnel should be skilled in horse handling. The horse should wear a neck strap for the operator to

hold with his left hand as he brings the girth under the horse's thorax. Holding the neck strap is a safety measure that ensures that in the unlikely event that the horse suddenly leaps forward and kicks out, the operator will be taken along and outside the range of the kick.

The operator gently brings the girth strap under the horse's thorax; as soon as the horse shows any aversive reaction, the handler repeats the step back and forward routine. During these moments, it is useful for the handler to gauge the level of fearfulness by eliciting steps back and forth. The operator repeats the girth contact and gradually increases the girth pressure while the handler steps the horse forward and back to test the level of fearfulness and to delete fearful responses as necessary. The girth straps are now ready to be gradually buckled. Again it is useful for the handler to overshadow fearful reactions and to test the quality of the response to the step back and forward lead signals.

DISCUSSION

Dealing with fearful behaviors in horses presents dangers to personnel as well as to horses. It is therefore essential that the lowest thresholds of fearful behavior are overshadowed; otherwise, the horse may express dangerous defensive behaviors or escape, which would serve to reinforce fearful behavior or endanger the horse as well as humans. Even small amounts of escape where the horse's behavior results in an increased distance between the horse and the aversive stimulus can be reinforcing and persistent. Over time, the treated, fearful behaviors become less likely to occur; however, given appropriate eliciting contexts, they can return in full-blown expression, requiring repeat therapy.

To allow other stimuli to compete for attention and to prevent further unwanted fearful associations as a result of flooding, it is important to begin at the lowest threshold of fearful response (Anokhin, 1965). It also gives the trainer the best opportunities to more deeply train the acceleration and deceleration locomotory responses so that, in critical situations, the horse will still respond. Whereas the horse would normally set about escaping as soon as the aversive stimulus enters the flight zone, overshadowing techniques allow the handler to implement stimulus control over the animal's locomotory responses.

Overshadowing therapies prevent the expression and, therefore, the further reinforcement of the fleeing response; however, in many circumstances, rehabilitation—as compared with gradual habituation techniques—is likely to be expedited. Overshadowing therapies also avoid some of the problems of gradual habituation such as the possibility that the horse may be reluctant ever to fully approach the fearful stimulus. Counterconditioning techniques provide useful strategies for behavior modification. However, there are limitations there

too; the horse may easily learn that the sound of the clippers predicts the arrival of food, but the feel of clippers on the skin may still be traumatic.

Overshadowing techniques may also offer a broader scope for eliminating fearful behaviors than gradual habituation or counterconditioning. For example, some horses develop phobias that are very context specific. Horses who have learned fearful reactions to sprays may not react at all when they hear aerosol sprays but may show an uncontrollable fearful response when they feel the sprays on their skin. In these circumstances, the trainer—employing overshadowing techniques—is able to control the fearful reactions and can then introduce the mildest of aerosol mists at the beginning of the therapy. However, overshadowing therapies do not necessarily have to rely solely on locomotory control. Aversive stimuli may be overshadowed by altering contextual associations. For example, in dealing with aerosol phobias, it is highly effective to initially hose the horse's body with water and gradually transform the hosing into a fine mist. Then the aerosol spray may be gradually introduced in conjunction, at first, with the mist of the hose. Soon the hose is withdrawn and the horse has begun habituation to the aerosol. In many cases, however, implementing locomotory control as an additional overshadowing procedure may assist in such circumstances.

Overshadowing therapies can be highly successful when combined with counterconditioning. So, once an aversive stimulus has been undergone, habituation through overshadowing the previously aversive stimulus can be used as a novel conditioned stimulus that predicts the arrival of a pleasant event. For example, following overshadowing procedures for head-shyness, gently rubbing the horse's head and ear region can herald the onset of a meal. Similarly, a well-timed switching-on of clippers can be associated with turning the horse out from the stable to the paddock. Used in this way, the success of counterconditioning can be increased when it follows overshadowing therapies. Although many trainers and horse professionals may find such therapies initially cumbersome, great dividends in efficiency emerge from the employment of a careful training program that may consist of overshadowing, gradual habituation, and counterconditioning techniques.

Overshadowing of fearful behavior can be applied to diverse situations of fearful behaviors. For example, where horses have learned to exhibit fearful fleeing response during crowd-clapping—as seen in a surprisingly large number of top competition horses in competitive equestrian sports—overshadowing offers a successful treatment regime. Again, the emphasis is on overshadowing the lowest aural threshold of fearful behavior. When triggering stimuli of fearful behavior are multifactorial in terms of sense modalities, it is more efficient to treat these separately. Olfactory, aural, and visual components thus should be overshadowed separately and then brought together after their individual habituation. For example, horses who are phobic of worming treatments may react to the sight and smell of the worming syringe. In such circumstances, it is

useful to overshadow visual aspects first. So a clean syringe or one filled with a pleasant solution, such as molasses, is introduced, and—at the onset of an aversive response—it should remain at the same distance from the animal's mouth. At this moment, the handler immediately begins stepping the horse forward and back until these reactions are elicited by light signals and the syringe is again brought closer.

When veterinarians and other horse professionals not only employ overshadowing techniques to deal with hyperreactive losses of immobility but also teach their clients to do so, their future safety is safeguarded. Clients quickly learn the advantages of such training in terms of the newfound calmness in their horses, and it is easy for them to see the far-reaching applications of such techniques. As a result, their assessment of the horsemanship skills of the horse professional is positive.

For 2 decades, the AEBC has had extensive experience in rehabilitating horses with various phobias. In the past, gradual habituation and counterconditioning methods have been utilized with considerable success. In more recent years, overshadowing techniques have been adopted as the initial technique of choice for difficult desensitization cases owing to their efficiency and durability. The success and durability of these techniques is verified by follow-up procedures: Owners are contacted immediately after horses are sent home and again after 4 weeks. Commons (2000) has reported that overshadowing techniques used with both human subjects and horses are similarly efficacious in terms of speed of rehabilitation and maintenance of resolution after cessation of treatment. Typically, most fearful reactions are resolved within three sessions. The dangers inherent in utilizing overshadowing procedures in horse training lie in overexposure to fearful stimuli where the fearful threshold is too high and the animal is overwhelmed by a flight response. Therefore, the correct use lies in recognizing, then overshadowing, the lowest threshold levels of fearful behavior. Attempting to overshadow impossibly high levels of fear can further sensitize an animal to a fearful stimulus.

The purpose of this article is to present a preliminary glimpse of the use and diversity of overshadowing techniques in the rehabilitation of fearful behaviors in horses. The inherent dangers of handling horses and the high wastage rates in horses suggest that handling techniques need considerable revision. Although it is likely that overshadowing techniques have long been used in an ad hoc fashion by horse people over the millennia, recognizing and understanding overshadowing as a distinct process is illuminating for horse trainers. It offers a promising addition to the horse trainer's toolkit and has potential to improve horse-human interactions. Overshadowing is an intriguing and important process that, on the one hand, has negative welfare implications in equitation when two signals are applied concurrently and, on the other, has positive implications in attenuating fearful responses. Overshadowing thus merits further examination.

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