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Don’t Fence Me In: Managing Psychological Well Being for Elite Performance Horses

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This article posits that stereotypical behavior patterns and the overall psychological well being of today’s performance horse could be substantially enhanced with care that acknowledges the relationship between domesticated horses and their forerunners. Feral horses typically roam in stable, social groups over large grazing territories, spending 16–20 hr per day foraging on mid- to poor-quality roughage. In contrast, today’s elite show horses live in relatively small stalls, eat a limited—but rich—diet at specific feedings, and typically live in social isolation. Although the horse has been domesticated for more than 6000 years, there has been no selection for an equid who no longer requires an outlet for these natural behaviors. Using equine stereotypies as a welfare indicator, this researcher proposes that the psychological well being of today’s performance horse is compromised. Furthermore, the article illustrates how minimal management changes can enhance horses’ well being while still remaining compatible with the requirements of the sport-horse industry. The article discusses conclusions in terms of Fraser, Weary, Pajor, and Milligan’s “integrative welfare model” (1997).

Today’s elite performance horses, those who compete at the highest levels of their disciplines, undoubtedly receive a standard of care unparalleled in the agricultural industry. However, the predominance of stereotypical behaviors in these horses may suggest otherwise. Throughout this article, I use the terms “performance horses,” “sport horses,” or “show horses” interchangeably to refer to show hunters, jumpers, and dressage horses. The majority of these horses—
though not all—are Thoroughbreds and Warmbloods. This article illustrates that stereotypical behavior patterns and the overall psychological well-being of today’s modern performance horse could be substantially enhanced with care that includes—and acknowledges—the strong relationship between domesticated horses and their forerunners.

Although the horse has been domesticated for more than 6,000 years (Budiansky, 1997) and has been selected throughout this time to adapt to a human environment, evidence suggests that domestic horses are not so removed from their ancestors in the wild. “Feral” horses typically live with companions in social groups—bands or herds consisting of a stallion, one to several adult mares, and their young offspring. Feral refers to animals who were once domesticated and have returned to living in the wild. There are no truly “wild” horses remaining outside captivity. In private parks and zoos, there exist only 1,100 Przewalski’s horses, the last remaining, truly “wild” horses (Budiansky, 1997).

The band forms a stable, social unit with some members remaining with the same group for life. Social rank is quickly established with clear dominance hierarchies; once in place, disputes are rare, also contributing to band stability (Araba & Crowell-Davis, 1994). Stallions defend harems rather than distinct geography, allowing the band to move to make the best use of the available food resources. Forage is generally poor but widely distributed, so feral bands spend 16–20 hr per day grazing and travel over large territories or “home ranges,” varying in size from 1–48 square kilometers (Keiper, 1986). Lest we be swept away with the magic of the feral horse’s life of liberty, note that these horses are subject to the perils of predators, parasites, harsh weather conditions, and scarce resources—making survival precarious.

Although free-ranging domestic horses do not face similar threats to survival, they still form stable groups with clear dominance hierarchies, travel great distances for forage, spend the majority of their time grazing, and avoid—or flee—threatening predators or stimuli (Cooper & Albentosa, 2002, 2005; Feh, 1999). In spite of years of domestication, we have not selected for a different kind of equid who no longer requires an outlet for these natural behaviors so crucial to their ancestors.

In contrast, today’s elite performance horses live predominantly, if not exclusively, in relatively small stalls (typically 10’ × 12’ to 10’ × 16’ depending on the size of the horse and the discipline). Two to four times a day, they are fed a diet rich in concentrates. Forage or hay is also given at specific, predictable feeding times and is generally rich in quality and, consequently, limited in quantity. As a precaution against injury, modern stable designs generally allow horses to see their stablemates but not to touch them. Turnout (equine time spent outside their stalls in a paddock or pasture area) is often similarly restricted. Although some stables offer the luxury of all-day pasture turnout, horses more typically are turned out alone in relatively small sand, crusher-dust, or bark-mulch enclosures for several hours a day. Contact with other horses is prevented by double fencing, separating
enclosures with alleys, or electric fencing between neighbors. Show horses are exercised and groomed regularly and see a plethora of health care professionals (farriers, veterinarians, grooms, chiropractors, and massage therapists). Those who write about potential psychological and physiological welfare problems with the performance horse’s highly structured management maintain that horses would be better off living with their herdmates outside in large pasture turnout, grazing at liberty on mid-range quality roughage (Luescher, McKeown, & Halip, 1991; Winskill, Waran, Channing, & Young, 1995)—a solution that they admit is not generally palatable or feasible for equine caretakers. Increasing land prices ensure that pasture acreage is a luxury few boarding facilities can provide. Further, elite sport horses are extraordinarily expensive; owners, protective of their investment, fear that horses may injure themselves if allowed greater liberty or, worse still, liberty with other horses. The fear is justified. In current society, litigious issues are more of a concern than ever before, and few owners or stables can afford to take what they believe to be unnecessary risks. Furthermore, horses need to be readily accessible for groundwork training, professional rides, and lesson time with owners. They need to look the part of a show horse—free of chew marks from equine neighbors or sun-bleached coats. Owners generally want their horses to have the best-quality feed, and performance horses have greater protein requirements than their feral counterparts. Hence, the equine diet rich in highly palatable concentrates—consumed quickly and coupled with limited rich forage—has become the dietary norm. Some trainers have also argued that a regimented, controlled environment is crucial for horses to be mentally prepared to withstand the discipline of training and the rigors of an intensive show schedule. Thus, most show horses live a life far removed from their wild ancestors—where they are physically pampered but, potentially, psychologically compromised.

My focus is to illustrate how we might create a bridge between the disparate lifestyles of free-ranging feral horses and their performance-horse counterparts. I argue that the psychological well being of today’s sport horse is indeed compromised. Although modern palatial equestrian stables are not where one would typically search for animal abuse, I contend that show horses are often the victims of psychological cruelty from their well-meaning caretakers. I then illustrate how relatively minimal environment and management changes can enhance sport horses’ psychological well being without compromising the goals of horse professionals and owners.

**EQUINE STEREOTYPIES AS A MEASURE OF PSYCHOLOGICAL WELL BEING**

Although there are obvious physiological indicators of horses’ compromised welfare, ascertaining compromised psychological welfare is more complex. Performance has tended to be a key indicator of a horse’s psychological health;
horses who perform well must be feeling well. However, poor welfare can be masked by veterinary intervention or overlooked when the horse’s psychological state conflicts with an owner’s or professional’s goals (Cooper & Albentosa, 2002).

I focus predominantly on stereotypic behavior as a psychological welfare indicator. Stereotypies have been defined as repetitive, stylized, and as invariant behavioral sequences that appear to serve no useful or obvious purpose (Dantzer, 1986; Houpt & McDonnell, 1993; Luescher et al., 1991). Research indicates that horses exhibiting these behaviors are (or were) probably living in an adverse environment (Mason & Latham, 2004). My goal, however, is not to compile a literature review on potential cures for stereotypic behavior (although much of this research has been shown to reduce and or eliminate stereotypies). Rather this research provides clues as to changes we might make to the performance horse environment before these indicators of compromised welfare appear.

Evidence for stereotypies being indicative of welfare problems is apparent when we look at the context in which they develop—frustration when an animal is prevented from performing a highly motivated behavior, unavoidable stress, fear or restraint, and lack of stimulation. Correlates of stereotypy development also indicate welfare problems. They are greater in single-housed than in group-housed animals, associated with restricted diet, and occasionally inflict self-damage (such as flank biting). Furthermore, when animals are provided an opportunity to perform another behavior (via enriched environment, reduced fear, and arousal-reducing drugs), stereotypical behavior is reduced or eliminated (Luescher et al., 1991). In a comprehensive meta-analysis, covering several hundred publications, Mason and Latham (2004) found significant patterns of increased proportions of stereotypy associated with other indicators of poor welfare in housing and management practices (varying feeding practices or degrees of environmental enrichment).

Stereotypies are purported to originate from a thwarted attempt to satisfy a desired goal or need that develops in an environment where the need cannot be satisfied. The behavior is described as thwarted as it becomes an abbreviated version of what was once a purposeful activity. As the stress is prolonged, there is a greater likelihood that the behavior becomes chronic, repetitive, and ultimately stereotypic in nature. Equine stereotypies have been categorized based on the original motivator that precipitated them. Locomotor stereotypies are generally seen as frustrated attempts to move toward a desired goal. Weaving, for example, may be a walking sequence originally intended to reach food, stablemates, or freedom. It has been abbreviated to a stylized, repetitive sequence when the animal is prevented from attaining this goal. A weaving horse remains stationary but shifts weight from forelimb to forelimb and swings the head from side to side. In some cases all four legs are involved, and the head swinging can be more or less dramatic.
Oral or appetitive stereotypies—cribbing, wind sucking, and wood chewing—seem to be associated with frustrated feeding behavior (Luescher et al., 1991). When cribbing, a horse grasps the edge of a horizontal surface with the front incisors, extends the neck, and pulls back while contracting the ventral neck muscles, often producing a burplike sound. The sequence is similar in wind sucking but the horse manages without grabbing onto a horizontal surface. Contrary to popular myth, in neither cribbing nor wind sucking does aerophagia (swallowing air) actually occur (McGreevey, Richardson, Nicol, & Lance, 1995). In wood chewing, horses gnaw on any available wood surface and may or may not ingest wood. Committed horses can ingest enough wood per day to pose a serious health risk.

Research varies widely as to the rate of occurrence of stereotypies, with estimates ranging from 2.5% to 34.7% (Houpt & McDonnell, 1993; McGreevy, French, & Nicol, 1995; Waters, Nicol, & French, 2002, Winskill et al., 1995). Rates seem to vary across age, breed, and discipline. Younger, intensely managed Thoroughbreds and Warmbloods competing in demanding disciplines are at the highest risk. For example, with questionnaire data representing 1,750 competitive performance horses, McGreevy et al. (1995) found stereotypies in 32% of dressage horses (who perform physically and psychologically demanding work, coupled with intensive management and long periods of confinement), 30.8% of eventers (equally demanding work but less intense management practices), and 5% of endurance horses (physically demanding work that more closely resembles the ranging experienced by feral horses, and the least intense management).

Less extreme stereotypic behaviors (mild stall walking, head nodding, wood chewing, or tongue playing), though repetitive and serving no obvious function, appear to be relatively benign. However, these milder stereotypies may still indicate some psychological stress and have been associated with the later development of more serious stereotypic behavior (Nicol, 1999). Wood chewing, for example, is more likely to be seen in horses who later become cribbers (Waters et al., 2002). Whether the wood chewing actually leads to cribbing is questionable, as wood chewing has been correlated with adverse management practices also associated with cribbing—limited social contact and confinement (Simpson, 1998). Equine professionals have often claimed that horses learn stereotypies from one another. However, there is little scientific evidence to support this claim (Nicol, 1999) or that horses learn any behaviors by modeling the activities of conspecifics (Houpt, 1998). One explanation for the purported mimicry of stereotypies is that the environment that encouraged the development of a stereotypy in one horse will also do so with other horses (Houpt & McDonnell, 1993). Thus, stereotypies may be an indicator of a suboptimal environment—even for horses who are not displaying stereotypic behavior (Mason & Latham, 2004).

Researchers have postulated that stereotypies may be an adaptive mechanism that offers some degree of perceived environmental control (Mason, 1991; Mason
Latham, 2004), acting as a buffer against psychological distress and thus providing a modicum of relief in an adverse environment (Cooper & Albentosa, 2005; Hughes & Duncan, 1988; Mason, 1991; McDonnell, 2000; McGreevy, 1997). Similarly, research investigating the complex relationships among stereotypies, palatable grains, and the release of beta-endorphins supports the notion of stereotypies acting as a coping mechanism (Dodman, Shuster, Court, & Dixon, 1987; Gillham, Dodman, Shuster, Kream, & Rand, 1994; Pell & McGreevy, 1999). The coping hypothesis has also been extended to physiological well being. For example, cribbing may ameliorate the risk of gastric ulcers, as oral stereotypies increase salivary flow and provide some defense against the acidity of gastric juices (Nicol, 1999).

Some researchers have further argued that horses who exhibit stereotypies may in fact be better off than their “well behaved” stablemates, who experience the same stress but lack the coping outlet. In spite of research support for the coping hypothesis, it still remains that stereotypical horses are adapting to difficult environments, which adversely affects welfare. Ultimately, when the environment is poor, all horses suffer—as to who suffers more is tangential. Indeed, stereotypic behaviors “are better at revealing the poorest environments than they are at identifying the worst off individuals within those environments” (Mason, Clubb, Latham, & Vickery, 2006, p. 170).

Mason and Latham (2004) offer an efficacious template when considering stereotypies as welfare indicators: (a) environments that induce stereotypy are generally worse than those that do not; (b) despite this correlation, prevalence rates of stereotypy should never be used as the sole indicator of animal welfare; and (c) animals with low rates or no stereotypies in a stereotypy-inducing environment should not be overlooked.

EQUINE ENVIRONMENTAL AND MANAGEMENT DESIGN: ENHANCING PSYCHOLOGICAL WELFARE

Almost all research agrees that preventing stereotypies initially is far more effective than trying to eradicate them once they have been established (Luescher et al., 1991). Stereotypies are thought to become self-organizing over time; that is, the behavior becomes emancipated from the original stressor, requiring little cognitive processing or need for sensory feedback. They are said to have moved into “central control” where they are triggered more readily, performed in more diverse situations, and are more resistant to modification (Mason & Latham, 2004). As Strickland (1997) comments, “Once established, stereotypic behaviors become a need in themselves” (p.20).

The tenacity of these behaviors emphasizes the need to examine our equine environments before stereotypies occur and to implement enrichments proactively.
rather than reactively (Mason et al., 2006). In this section, I outline common equine management practices that have been associated with stereotypic behavior and are suggestive of potential welfare problems. Based on research of stereotypies in captive animals (agriculture, zoos, and companion animals), I pose alternative practices that may prevent stereotypies from occurring or eliminate existing ones. These practices strive to improve overall psychological well being for all performance horses—stereotypic or not.

**THE CRUELTY OF PHYSICAL PREVENTION**

Many equine professionals have addressed the chronic nature of stereotypies by physically preventing the behavior. They use devices such as weaving bars, toxic substances applied to potential chewing surfaces, cribbing collars, spiked collars, and even surgery. A cribbing strap placed snugly behind the horse’s ears mechanically prevents the contraction of the neck muscles and thus prevents the full expression of the cribbing sequence. Modifications to the strap include the spiked collar, where sharp pins protrude into the neck when the muscles are contracted in cribbing. Chronic cribbing has been addressed with surgery where a section of the ventral branch of the spinal accessory nerve is cut out of both sides of the horse’s neck (Frauenfelder, 1981). Physical prevention of stereotypies, however, is associated with physiological measures of distress, such as raised adrenocorticol levels and elevated heart rate (McGreevy, 1997).

Furthermore, the effectiveness of these preventions is dubious. McGreevy (1997) found that cribbing collars reduced cribbing while on, but horses cribbed more aggressively when collars were removed, resulting in an increased motivation to crib. Weaving bars simply moved the behavior farther back into the interior of the stall (McBride & Cuddeford, 2001). Many researchers concur that these devices further contribute to the horse’s compromised welfare, especially when the underlying precipitator has not been addressed (Cooper & Mason, 1998; Luescher et al., 1991; McGreevy, 1997; Winskill et al., 1995). In addition, horses exhibiting stereotypies provide the necessary alert that all is not well with the stable management or design. Masking these behaviors closes a door to a wealth of valuable information (Dantzer, 1986).

**PROBLEMS WITH CURRENT FEEDING PRACTICES**

The Problem With Concentrates

There is convincing evidence indicating that the feeding of concentrates with limited access to forage is problematic, physically and psychologically, for an
animal designed for almost continual grazing (Casey, 2002; Cooper & Albentosa, 2005; Cooper & Mason, 1998; Houpt & McDonnell, 1993). First, this kind of diet leaves horses vulnerable to equine gastric ulcer syndrome (EGUS), the result of an imbalance between the protective and acid-producing functions of the stomach. Horses, designed to have a consistently full gut, produce gastric juices constantly. Erosion of the protective stomach tissue happens when there is no food or saliva in the gut to buffer the stomach acids. In fact, the association between an empty stomach and the formation of ulcers is so reliable that food deprivation is used as a mechanism for creating ulceration in animals used for research (Murray & Eichorn, 1996). Clinical signs of ulcers include weight loss, poor appetite, listless performance, depression, and gastrointestinal discomfort (mild to severe colic). However, symptoms often go undiagnosed, as a definitive confirmation of ulceration is only possible through endoscopy where the stomach is examined with a scope (McLure, Carithers, Gross, & Murray, 2005; Murray, Nout, & Ward, 2001).

Endoscopically proven prevalence rates have been reported in 81–93% of racehorses and rates from 58%–66% of hunter, jumper, and dressage horses (Mitchell, 2003; Murray, Schuster, Pipers, & Gross, 1996). Exercise has also been implicated in the development of ulcers. Stomach pressure is increased due to the contraction of abdominal muscles, causing gastric juices from the lower stomach portion to push up into the stomach’s minimally protected upper portion. Intense exercise is also thought to delay gastric emptying resulting in acids remaining in the stomach longer (Mitchell, 2003; Murray et al., 1989).

The prevention and cure of ulcers is straightforward; temporarily easing the training regime and access to pasture is sufficient to cure ulcers in less than one week. Where pasture is not available, free-choice hay—combined with ample turnout—provides the next best alternative, although increasing forage without increasing turnout is less effective (Pratt, 2003). Ulcer medication is also not sufficient to heal ulcers. Researchers found that ulcers persisted, despite medication, until management practices were substantially altered (Mitchell, 2003).

Reduction of Feeding Time

Concentrates are also problematic because of the speed with which they are consumed. Today, the horse’s biological requirements are met quickly, while the psychological need to forage is still acute. Perseverance of feeding motivation after the food has been consumed may be an attempt to supplement the meal with roughage (as in wood chewing or eating bedding) or fulfill the psychological need for oral activity (Cooper & Albentosa, 2005). Although free pasture access is still ideal, alternatives are available to satisfy feeding motivation that may be more realistically provided in the show-horse environment. Feeding
free-choice hay is optimal, and hays with a higher fiber content will satisfy foraging needs without contributing to obesity (H. P. B. Davidson, 2002). Performance horse managers pride themselves on finding the richest, finest quality hay available, but this may not necessarily be in the horse’s best interests (Cooper & Albentosa, 2005; Houpt & McDonnell, 1993; McGreevy, Cripps, French, Green, & Nicol, 1995). Richer hay must be fed more sparingly and is consequently consumed more rapidly. Good quality but higher fiber forage that requires more chewing and can be fed in greater quantities may be a superior alternative. H. P. B. Davidson (2002) comments that providing horses with more than one type of forage may increase well being by increasing foraging time and providing horses with greater autonomy over their food choice. Ultimately, time spent eating is time not spent performing the stereotypy (Cooper & Mason, 1998).

Feeding time may also be increased by making horses work harder to obtain their food—adding chaff to concentrates, placing smooth, large stones in the bottom of the feeding tub, or spreading hay thinly over a larger area (N. Davidson & Harris, 2002). Foraging devices, easily adapted in a show-horse facility, allow small amounts of food to fall out of a rolling ball or barrel as the horse pushes it. This increases feeding time, encourages foraging behavior, and more closely mimics a horse’s natural grazing patterns (Winskill et al., 1996; Malpass & Weigler, 1994). In a study looking at ponies quarantined in long-term isolation housing for virus research, Malpass and Weigler designed a simple foraging device as a potential for environmental enrichment. A 5-gallon bucket with snap-lock lid, drilled with 16 (3/4") holes in four vertical rows was filled with alfalfa cubes. Ponies learned to use the device quickly, and the frequency of adverse behaviors was significantly diminished.

Feeding Frequency: Is More Better?

To satisfy the energy requirements of performance horses, however, forage needs to be supplemented with high-protein concentrates (oats, corn, and pelleted grains). Some researchers have hypothesized that spacing concentrates across numerous feedings more closely mimics the horse’s natural grazing pattern and contributes to greater psychological well being. However, research does not consistently support this hypothesis. In a mail-out questionnaire to 622 performance-horse stables in Switzerland, providing data on 2,341 horses, Bachmann, Audige, and Stauffacher (2003) found that feeding 4 times per day increased the likelihood of stereotypic activity compared with horses fed less or more often (see also McGreevy, Cripps, et al., 1995). The authors argue that anticipatory stress may trigger these behaviors. Horses fed less often have fewer opportunities to anticipate food and experience less emotional stress; horses fed
more often may be more satiated and less likely to perform anticipatory behaviors. In a British study of 18 stabled performance horses with stereotypies, Cooper, Mcall, Johnson, and Davidson (2005) found that, contrary to their hypothesis, increasing meal frequency contributed to greater stereotypic behavior. Further analyses revealed that while locomotor stereotypies (weaving and head nodding) increased, oral stereotypies decreased. Horses with locomotor stereotypies soon learned the new schedule, anticipatory weaving and nodding peaked as feeding time approached, and a food reward subsequently reinforced behaviors. Not surprisingly, horses not being fed while other horses were, or while feeding cues were present, also increased stereotypic behavior. Cooper et al. (2005) discussed the advantages of feeding freely available roughage, as satiated horses are less easily aroused around feeding times. These results point to the necessity to look at the origin of stereotypical behavior before we can effect change. Although there may be benefits for increasing meal frequency for horses with oral stereotypies, this may be a poor strategy for horses with stereotypies originating from different factors. In addition, overall stereotypic activity may increase unless feeding schedule modifications are universally applied.

Confinement and Social Isolation

Horses have been evolutionarily selected to travel over large territories to feed and periodically run with sudden bursts of speed to flee actual or perceived threats. Horse-show stables that afford little or no turnout time compromise psychological well being by thwarting this innate desire to move. Indeed, the confinement practices we see in many performance-horse stables could well be argued as unjustly, albeit inadvertently, cruel. However, it is the solitary nature of confinement—where horses have little or no contact with conspecifics—that is the greater cruelty. The importance of social contact is evidenced by the negligible rate of stereotypies in stall-tied horses such as cavalry mounts (Houpt & Ogilvie-Graham, 2002) and mares used for urine collection to make estrogen supplements (Houpt, Houpt, & Johnson, 2001; Flannigan & Stokey, 2002). Presumably, stereotypy prevalence would be high in horses where movement is so restricted. Apparently, this confinement is offset by the opportunity for visual and tactile social interaction with conspecifics.

Performance-horse caregivers (owners) and professionals are often reluctant to house or turn out horses together. However, horses have evolved to avoid aggression and embrace affiliation (H. P. B. Davidson, 2002). To live successfully in a herd, horses developed a behavioral repertoire that avoided expending energy fighting for resources. Rather than sudden attacks of aggression, cues escalated gradually. In most cases, the relatively innocuous flattening of ears or turning the hindquarters toward the offending horse was sufficient to maintain pre-established dominance hierarchies (Budiansky, 1997; H. P. B. Davidson, 2002). Although
much of this behavioral repertoire is still intact, modern show horses differ in signif-
nificant ways from their range-roaming ancestors—ways that may increase the
risks of group turnout. For example, high-protein diets give show horses greater
energy reserves, coupled with fewer opportunities for expression; both contribute
to more explosive and volatile behavior when at liberty. Show horses wear steel
shoes. There are also extrinsic factors in the show-horse environment that can dis-
turb established hierarchies (arrivals and departures of new horses or a loose
horse). Ultimately, although potentially psychologically beneficial, group turnout
of show horses probably places them at increased risk for injury.

That said, there may be ways to ameliorate this risk and make the cost–benefit
ratio of group turnout more appealing. For example, potential herdmates can be in-
troduced gradually, sharing adjacent stalls, then adjacent double-fenced paddocks.
Fitting horses with protective boots, removing hind shoes (until hierarchies have
been established), and keeping successful groupings stable will also minimize
risk. Herds also maintain peace through respect of personal space (generally about
6–10 ft) within which they will allow only those with whom they have an intimate
relationship (H. P. B. Davidson, 2002). Thus, successful group turnout must pro-
vide sufficient space so that horses are not constantly threatened, and/or threaten-
ing, to protect personal space.

Feral horses form pair-bonds with a particular herd member who is allowed
within their personal space. When permitted, horses may often be seen nose-to-tail
scratching the withers and surrounding areas of their mate. The evolutionary pur-
pose of this “allogrooming” was the removal of parasites, but perhaps it was more
important for the cementing of pair-bonds that enhanced the stability of the harem
(Budiansky, 1997; Feh, 2002). Thus, allowing a horse to form a relationship with
“a turnout buddy” satisfies affiliation needs and may be more workable than larger
groupings.

Stable Design to Satisfy Affiliation Needs

Understandably, there may be owners and equine professionals who are still not
comfortable taking on the risk of group or paired turnout. Fortunately, there are
also stable modifications that will satisfy many of these social needs.

Cooper, McDonald, and Mills (2000) exposed chronic weavers to five stable
designs: (a) front half door open only, (b) half doors open at front and back, (c)
back half door only, (d) front and one side grill opening to the adjacent stablemate,
and (e) all sides open (front, back, and both side grills). Weaving was significantly
reduced when horses could interact with a neighbor in the front and side options
and ceased entirely when all sides were open. The all-sides option also showed an
effect of decreased stereotypic nodding and a nonsignificant trend to reduced crib-
bing. The researchers comment that opening up the stable design increases oppor-
tunities for interaction with the environment and conspecifics. This, in turn,
decreases the time available for performing stereotypies and provides an outlet for the horse’s natural need to socialize—the lack of which was possibly the original precipitator of the weaving. Results are striking given the resistance to extinction of chronic stereotypies (Cooper et al, 2000). Although not studied by these researchers, presumably stalls that open onto individual paddocks (in/out stalls) would further increase visual horizons, provide the horse with some degree of environmental control, and increase well being (Luescher et al., 1991). Cooper and colleagues (2005) also found that horses bedded on straw—as opposed to wood or paper shavings—were less likely to engage in stereotypic behaviors (McGreevy, Cripps, et al., 1995), presumably because they could pick through the straw and forage for small traces of oat or wheat grains.

Using Mirrors to Increase Psychological Welfare

The use of mirrors may also have an attenuating effect on some locomotor stereotypies (Mills & Davenport, 2002; McAfee, Mills, & Cooper, 2002). In a study looking at 6 chronic weavers, McAfee et al. found that installing a 1m x 1.5 m acrylic mirror in the horse’s stall eliminated weaving and head nodding entirely in all horses. Trials ran over 5 weeks, suggesting that at least over this time period, horses do not habituate to the mirror and return to previous stereotypic activity.

The study took place while the institution was transitioning from summer season—where horses were on pasture for 18 hr a day—to fall season. In the fall season, horses moved inside for lessons and received only 2 hr a day of turnout or riding. The mirrors were equally effective in spite of this dramatic change in management regime. These authors propose that horses may see another horse in the mirror and feel less isolated. Alternatively, the mirror may provide a distraction in an otherwise sterile environment. The mirror may reduce the feeling of confinement by increasing visual horizons. Or, the effect may be due to a combination of all these factors. As to whether mirrors would be an effective preventative tool is not discussed. However, this research suggests that mirrors provide a successful technique for environmental enrichment. Relative low cost and ease of installation make them a viable alternative for horses who must have limited equine contact.

The Benefits of Human Companionship

As social creatures, horses will bond readily with members of other species, particularly when there are no equine alternatives. As Budiansky (1997) comments,
Our horses’ affection for us, their owners, is unquestionably real, grounded in a basic
instinct to form friendship bonds; it is slightly bruising to our egos, though, to realize
that they bond with us only for lack of better company. (pp. 84–85)

Thus, it is important not to underestimate the positive impact of providing ade-
quate human companionship for performance horses. A number of studies have
pointed to the benefits of grooming for reducing equine stress. In a study looking at
eight Camargue ponies and their foals, Feh and de Mazieres (1993) found that vig-
orous grooming at the horses’ withers significantly decreased heart rate. Building
on these results, Normando, Haverbeke, Meers, Odberg, & Ibanez Talegon (2002)
recorded heart rates on 16 Spanish x Selle Francais horses ages 3 to 12 years at four
different body sites (mane, withers, shoulder, and hip). Heart rate was significantly
decreased in all areas compared with the control period of no grooming (mane:
10.8%, shoulder: 14.3%, hip: 15.2%). When the withers were groomed (grooming
that most closely resembles allogrooming), heart rate was reduced by 22.1%.
Furthermore, the heart rate continued to drop over each of the six sessions
(Normando et al., 2002). Although the authors do not comment on how long these
grooming effects may last, they conclude that grooming horses, particularly at the
withers, has a calming effect.

In larger show stables, where grooms are responsible for the majority of the
horse care, owners can be encouraged to spend additional time with their
horses—grooming and hand grazing. In addition, increasing the groom-to-horse
ratio so that grooms have more time with each horse in their care offers horses
greater opportunity to satisfy some of their affiliation needs through human bond-
ing. As an additional benefit, grooms who spend more time with their charges can
more readily pick up subtle psychological or physical health indicators.

Ultimately, as H. P. B. Davidson (1999) so aptly stated, “stabling our horses
usually benefits only one half of the horse-human relationship—the human” (p. 8).
Even so, some relatively simple modifications can potentially reorient the balance
in this one-sided relationship.

INADVERTENTLY REINFORCING UNWANTED
BEHAVIORS

Finally, many unwanted behaviors may not necessarily be related to welfare but,
rather, are learned behaviors taught by the very individuals who want the behav-
ior eradicated. For example, feeding a horse who paws to “shut him up”; getting
an impatient kicking horse off the trailer immediately; or taking a pawing, cir-
cling stallion to the breeding shed reinforces these unwanted behaviors (Houpt &
McDonnell, 1993). Using 24-hr surveillance, Houpt and McDonnell found
that horses who were considered to have continuous stereotypical behaviors ac-
ually performed stereotypies only when humans were there to watch (and inadvertently reinforce) them. Houpt and McDonnell outline a behavior modification strategy suitable for some stereotypies where the horse is rewarded for not performing the unwanted behavior. For example, horses who kick in anticipation of being fed may be fed initially with half a cup of feed when they refrain from kicking for 2 sec. Gradually the time can be increased to 5 sec, 10, 30 sec, and so on. Teaching a countercommand (such as “stand” or “quiet”) that elicits a food reward further solidifies the desired behavior. Similar repertoires could be implemented for an impatient horse on the trailer or an anticipating stallion. Ultimately the aim is to ensure that the horse is not successful in reaching the desired goal (food or attention) by performing the unwanted behavior.

CHALLENGES IN THE HORSE-SHOW ENVIRONMENT

Horse professionals may argue that even if these practices could be implemented at home, performance horses spend much time in horse-show environments that are not easily modified. Arguably, although horse-show grounds are not given to flexibility, our sport horses appear to have much greater adaptability. Extrapolating from the literature on factors related to equine welfare, I outline relatively simple changes to horse-show routines that may improve equine well being.

Confinement

Research by Cooper et al. (2000) suggests that increasing visual horizons in confined horses may be related to reduced stress. Horse-show stalls, which are typically smaller than standard, could potentially contribute to increased stress for the performance horse. Buying more stall space so that three conventional stalls can be converted into two may be beneficial. Similarly, commercial stall fronts, as used in many racetrack facilities, fashioned with a large “U” in the center, allow horses to hang their heads outside of the stall while not allowing them the freedom to lunge at equine or human passersby. Provided the shed row is sufficiently wide so as not to pose a safety issue, these stall fronts could provide an economic alternative to increase visual perspectives. Confinement is further exacerbated by the increased time horses spend in their stalls at horse shows, which can be ameliorated by renting turnout paddocks when available, hand walking, and hand grazing. Much of the dead time owners spend waiting between classes can be spent just as easily, and potentially more pleasantly, with a horse at the end of a lead rope.
Stabling Layout

As herd animals whose survival depended upon forming stable social units, horses are hardwired to stick together (Budiansky, 1997). In general, few horses manage well when isolated from stablemates, particularly when in an unfamiliar and high-stress environment. Thus, keeping horses’ stabling patterns at shows as close as possible to those at home could potentially ameliorate some of the added stress of the new stabling situation. In addition, if assigned stabling creates isolated stalls, these would be better utilized for feed and equipment while keeping stablemates together.

Managing Hormones

There is a tendency to isolate stallions because higher testosterone levels increase the risk of conflict with other horses. However, as discussed, much of stallions’ aggressive behaviors are taught (albeit unintentionally). Lunging at horse neighbors, excessive kicking, and biting all generally elicit further human attention that may well be reinforcing to a stallion separated from stablemates. Much of a stallion’s aggression can be curtailed with training at home, where stallions are rewarded for not performing the behavior, and by providing alternatives (human company and increased time outside the stall before the unwanted behaviors occur (Houpt, 1998). Isolation is a harsh and generally ineffective solution for an animal so intensely programmed to watch over his harem.

Hormones may also affect mares who may be uncomfortable about being ridden when in season, appear “moody” or “cranky,” and may be particularly susceptible to disruptions in contact with stablemates. Some stables routinely prescribe hormone treatments for mares during show season that mimic a state of pregnancy and prevent mares from coming into estrus. Arguably, artificially regulating hormones may be an invasive intervention but perhaps the less invasive alternative for mares who are particularly prone to painfulness, mood swings, or separation anxiety during heat cycles.

Feeding Schedules

As discussed, research indicates that arousal levels peak when horses observe feeding cues and conspecifics being fed but are prevented from feeding (Cooper et al., 2005). Horse-show stabling often exacerbates this problem where different stables share the same aisle. Horses fed free-choice hay will have less anxiety when horses from the opposing stable are fed and they are not. Where possi-
ble, particularly where stable neighbors are known and trusted, synchronizing feeding times with the opposing stable will further reduce stress levels.

**WORKING WITH A WELFARE MODEL: INCREASING THE OVERLAP**

In discussing potential solutions to equine welfare problems, success should not be marked by the cessation of stereotypic activity. When stereotypies move into “central control,” they may well occur more often and for longer duration without any subsequent deterioration in welfare. As Mason and Latham (2004) contend, “Central control means that we should not automatically take a failure to alleviate stereotypy as a failure to improve welfare” (p. 561). Equine professionals should not be discouraged when design and management changes fail to eliminate all stereotypic behavior. Welfare may still be substantially improved for these horses as well as their nonstereotypic stablemates.

In a theoretical paper discussing the difficulties of assessing animal welfare, Fraser, Weary, Pajor, and Milligan (1997) have proposed an “integrative model.” Circle A depicts the animal’s evolved adaptations, and Circle B depicts the environmental challenges that the animal must meet currently. When animals live in the environment for which they were evolutionarily designed, we expect that adaptations and challenges will correspond closely, and the overlap between the circles will be large. When we move animals out of that environment, as we do with captive or domestic animals, we can expect that the circles will not overlap entirely (Figure 1). It is this imperfect correspondence that becomes significant for animal welfare. In the area to the left of the overlap, we have the animal’s evolved adaptations that no longer serve a useful purpose; in the area to the right of the overlap, we have challenges in the environment for which the animal does not possess the corresponding adaptations. In the overlap area, we have challenges faced by the animal for which the animal does possess the corresponding adaptations. A perfect correspondence of adaptations and challenges, however, does not necessarily guarantee good welfare; an injured and starving, pregnant wolf may still be living in the environment for which she was evolutionarily designed. However, when human beings have domesticated animals such that the animals are solely dependent upon us as caretakers, our ultimate goal should be to present them only with those challenges that are within their adapted behavioral and psychological repertoire (Figure 1).

Fraser et al.’s (1997) model offers an advantageous way to understand equine psychological well being and the issues discussed in this article. For example, in the area to the left of the overlap (adaptations that no longer serve a useful purpose), we can place the adaptations we saw in the feral horse—a hair-trigger flight response, the aptitude to form stable and lasting pair-bonds with conspecifics, or
the capacity to live on low-quality forage spread over large ranges. We compromise the welfare of the performance horse because the adaptation includes a motivational need to perform behaviors that now have no outlet for expression while simultaneously blocking the positive benefits associated with that behavior. For example, a horse’s motivational drive to graze is superfluous when feed is delivered in the stall. The motivational need to graze, however, remains and may now be expressed in frustrated, stereotypic activities or internalized. The horse is further compromised by being deprived of the positive benefits associated with free-range movement and grazing.

In the area to the right of the overlap (challenges from the environment for which the animal lacks the corresponding adaptations) fall other equine welfare problems discussed in this article (confinement, social isolation, and concentrated diet). For example, ulcers arise because the horse’s gut has not adapted to manage long periods of fasting between set mealtimes of rich concentrates. Thus not only is the horse’s psychological welfare compromised but biological functions are also endangered.

In the central overlap between the two circles (challenges for which the animal possesses the corresponding adaptations), are challenges we have imposed upon horses, and for which they have evolved the necessary adaptations. For example, the requirement to perform with speed, endurance, and agility is met by the horse’s adaptation of strength and athleticism. The challenge to accept training is met by the horse’s evolved social nature and an innate respect for dominance hierarchies. Indeed, this correspondence is what has allowed us to domesticate the horse so successfully.
Given the disparity between the performance horse as it has evolved (Circle A) and the environmental challenges that we have asked of today’s sport horse (Circle B), it is remarkable that there is any overlap between these two circles. I would argue that it is only due to the horse’s highly adaptable nature that the overlap exists. And it is this same adaptable (dare I say, generous) nature that offers us so much potential to expand this overlap and greatly improve the psychological well being of today’s elite performance horse.

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