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THE MAN WHO LISTENS TO BEHAVIOR: FOLK WISDOM AND BEHAVIOR ANALYSIS FROM A REAL *HORSE WHISPERER*

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The popular novel and movie *The Horse Whisperer* are based on the work of several real-life horse whisperers, the most famous of whom is Monty Roberts. Over the last 50 years, Roberts has developed a technique for training horses that is both more effective and less aversive than traditional training techniques. An analysis of Roberts' methods (as described in his book, *The Man Who Listens to Horses*) indicates a deep understanding of behavioral principles including positive reinforcement, timeout, species-specific defense reactions, ''learned helplessness,'' and the behavioral analysis of language. Roberts developed his theory and techniques on the basis of personal experience and folk wisdom, and not as the result of formal training in behavior analysis. Behavior analysts can clearly learn from such insightful yet ''behaviorally incorrect'' practitioners, just as such practitioners can benefit from the objective science of behavior analysts.

Key words: positive reinforcement, aversive control, learned helplessness, language, biological constraints, animal training, horses

> For almost a minute they stood there, quite still, the horse and the man, assessing each other. It was Pilgrim who moved first. He snorted and lowered his head and took some small steps back. Tom stayed like a statue, with the tip of his flag resting in the sand. Then at last he took a step toward Pilgrim and at the same time lifted the flag in his right hand and made it crack. Immediately the horse launched off to the left and ran. Round and round the arena he went, kicking up the sand, snorting loudly and tossing his head. His cocked and tangled tail splayed out behind him, flicking and swishing in the wind. He ran with his rear skewed in and his head skewed out and every ounce of every muscle in his body was clenched and focused only on the man. Such was the angle of his head, he had to strain his left eye backward to see him. But it never strayed, held there by a line of fear so enthralling that, in his other eye, the world was but a circling blur of nothingness. (Evans, 1995, pp. 221–222)

> When you are behind the animal or when he flees—whichever comes first—pitch the line toward his rear quarters. This . . . cannot hurt him in any way. At this point, almost all young horses will take flight and proceed around the pen. The horse is retreating so you must advance. Keep the pressure on. . . . Maintain an aggressive mode: Your eyes drilled on his eyes, your shoulder axis square with his head. . . . Try to get the horse to canter five or six revolutions one way; then reverse and repeat, except this time you are readying the horse for a message: Would you like to stop all this work? (Roberts, 1996, p. 233)

If you were a member of the movie-going community in the summer of 1998, you may have seen *The Horse Whisperer* (based on a popular novel of the same name; Evans, 1995). *The Horse Whisperer* is a romantic drama, the story of a young girl who is horribly injured, along with her prize horse, in a traffic accident. Her rehabilitation, as well as that of the horse, is guided by a mystical ''horse whisperer,'' played by Robert Redford in the movie. If you *have* seen the movie or read the book, you are probably already wondering what the connection is to behavior analysis. Although *The Horse Whisperer* is arguably good drama, the psychological processes described are romantic and humanistic, seemingly unrelated to the analysis of behavior.

If you are a member of the equestrian community, you may be aware that Redford's character draws from a number of real-life horse whisperers—individuals who have discovered a new, nonaversive method of training and in-

Roberts, M. (1996). *The man who listens to horses.* New York: Random House.

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teracting with horses. The most famous of these is Monty Roberts. Roberts has received considerable recent attention as author of a best selling book, *The Man Who Listens to Horses* (Roberts, 1996). He also has recently produced a how-to video for horse trainers, has been on a national speaking tour, and has been the subject of a PBS documentary.

It is through Monty Roberts that horse whispering is connected to behavior analysis, because an examination of his techniques reveals great sophistication in the use of behavioral methods and a deep understanding of some significant (and subtle) behavior theory.[1] Interestingly, Roberts has little or no formal education in behavior analysis. Instead, his use of behavioral techniques constitutes a wisdom gained through a lifetime of working with horses—conceding its nonscientific origins, a folk wisdom. The present paper first outlines Roberts' horse-whispering techniques, as described in his book *The Man Who Listens to Horses*. Parallels with behavior analysis are then described. Finally, we conclude by discussing the importance of drawing parallels between behavior analysis and folk wisdom.

MONTY ROBERTS: THE MAN WHO LISTENS TO HORSES

> As a boy I was serious and polite, and when I look back at those times I see that I never was a child. Child prodigy, perhaps. My father's protégé, yes, for a time. But a child? Never. (Roberts, 1996, p. 39)

Monty Roberts was born in Salinas, California in 1935. His father managed a large equestrian facility and operated a private riding school on the grounds, so it is not surprising that Roberts' earliest memories are of riding horses. Recognized as a prodigy, he had a professional riding career by age 4, traveling around the country by rail to compete in rodeos and other riding exhibitions. By the age of 5, Roberts was working as a stunt rider in major Hollywood productions. His film credits include serving as a stunt-double for James Dean, Charlton Heston, and Roddy McDowell. He even doubled for Elizabeth Taylor in *National Velvet*.

It was in 1948, at the age of 13, that Roberts made the discovery that would change his life. During part of that summer he was charged with capturing herds of wild horses in the Nevada wilderness. Often working alone for weeks at a time, he had the opportunity to observe wild horses in their natural environment, and became particularly interested in the social behavior of the herd. A matriarchal system, the herd was controlled by a single dominant mare. Among the ''duties'' of the dominant mare was that of keeping the younger horses under control. Roberts tells of watching the mare deal with the ''problem behavior'' of a young colt, perhaps 20 months old, which been kicking and biting at the other horses in the herd. After several such incidents, the dominant mare responded by driving the colt about 300 yards away from the herd. The mare maintained a ''squared-up'' position relative to the colt, and drove him off again if he made any move to return. Eventually, the colt began engaging in a pattern of ''submissive'' behavior; behavior that (in Roberts' view) signaled that the colt was ready to rejoin the herd and accept the established dominance hierarchy. These submissive kinds of behavior included a turning of the ears, licking and chewing motions with the mouth, and a dropping of the head. The dominant mare reacted with her own set of responses. First, she changed position from the dominant squared-up stance, turning sideways toward the colt and exposing her flank. In response, the colt slowly returned to the herd and engaged in social grooming with the mare.

It is amazing that a child of 13, untrained in the study of animal behavior, could make observations of social behavior in the wild that would rival those of a professional ethologist. It is even more amazing that Roberts realized the significance of his observations. Within 2 years, he had used his observations to develop a new technique for training horses. The technique, which Roberts calls ''join-up,'' places the trainer in the role of the dominant mare and the horse in the role of the adolescent colt. The trainer uses a ''behavioral language'' similar to that used by the mare, and watches for submissive behavior from the

[1] Roberts does not actually use the popular term *horse whispering* to describe his work. He prefers *horse listening, joining up,* or *starting horses*. We have chosen to use *horse whispering* in the present article because it is the commonly used term to describe the type of work that Roberts does.

colt. The technique is described in more detail below.

As will be shown below, Roberts' join-up technique is vastly superior to the traditional ''horse-breaking'' technique. Yet, Roberts' method was ignored and ridiculed by the equestrian community for almost 50 years; it was not until 1988, when his work came to the attention of Queen Elizabeth of England, that the world began to take notice. After meeting with Roberts and seeing a demonstration of his methods, the Queen insisted that all of the royal horses be trained using his techniques. In fact, it was the Queen who encouraged Roberts to write the book upon which the present article is based. About the same time, Roberts was successful in the rehabilitation of some difficult racing thoroughbreds. After enduring years of ridicule, Roberts has finally gained the attention of both the equestrian world and the general public.

Why has it taken so long for the equestrian community to accept a superior technique? The answer may lie in a comparison of horse whispering to the traditional method of horse breaking.

HORSE WHISPERING VERSUS HORSE BREAKING

> I begin to sing about Poseidon, the great god, mover of the earth and fruitless sea, god of the deep, who is also lord of Helicon and wide Aegae. A two-fold office the gods allotted you, O Shaker of the Earth, to be a tamer of horses and a saviour of ships. (Homeric Hymns 22.5 ''To Poseidon'')

It is uncertain when or where horses were first domesticated. The best archaeological data suggest that the first use of domestic horses occurred in the third millennium B.C. somewhere in the region between the northeast Mediterranean and Siberia (Dent, 1977). The first records of domestic horses being ridden date from 1600 B.C., although the practice probably developed considerably earlier (Baker, 1977). Regardless of when or where domestication first developed, it is certainly one of the most important achievements of ancient civilization. A domesticated horse allowed immediate advances in travel, agriculture, exploration, commerce, and warfare. Furthermore, given that the wild horse is a large, powerful, and potentially dangerous animal, it is not surprising that horses and those who trained them were assigned mythical qualities in the earliest recorded history and literature. The Greek god Poseidon is referred to as a ''tamer of horses.'' Trojan warriors in Homer's *The Iliad* are described with the epithet ''breaker of horses'' as a symbol of strength, honor, and courage.

Similar images have persisted into modern times, as evidenced by the ''cowboy'' stories of the American west. As Roberts notes, ''A television program from 1989 celebrated 20 years of space travel and made the point that while outer space is the great frontier of our era, the 'Wild West' was its previous counterpart. As the program noted, some things have not changed since those times. Among their featured examples was how we break horses'' (Roberts, 1996, p. 39; see also Chenevix-Trench, 1977). The process of horse breaking, during which the horse is initially trained to accept a saddle and rider, has apparently changed very little over the last 3,000 years, although advanced methods of training horses have changed considerably (Baker, 1977; Chenevix-Trench, 1977). This is particularly true in the United States, where the legacy of the wild west still exerts a strong influence on training methods.

Roberts goes on to describe traditional horse breaking. As implied by the name, the process is to repeatedly apply aversive stimuli until the horse ''breaks'' and accepts a saddle and rider. The horse is literally beaten into submission. Roberts' own father was recognized as a skilled breaker of horses, and his methods can serve to illustrate the process. Wild horses (as many as six at a time) are first driven through a ''squeeze chute'' so a rope or halter can be looped around the neck. The horses are then tied to a post, and a heavy tarp or weighted sack is repeatedly thrown over the horse's back, causing the legs to buckle. Inevitably, the horse shows fear responses such as kicking, rearing, and bucking. The beating is continued for several days. A rear leg is then tied up (so the horse cannot stand on that leg) and the ''sacking out'' is repeated, and is repeated again with each of the four legs tied in turn. Eventually, the horse is fitted with a saddle, and sacking out is repeated with the saddle in place. The

horse is then attached to a ''long line'' and run in circles around the pen. Finally, when the horse is considered ready, its rear legs are tied to prevent bucking. It is repeatedly mounted and dismounted and is kicked and whipped if it misbehaves. From start to finish, it takes about 3 weeks to break a horse, with considerable risk of injury to both the horse and the trainer.

The traditional process of horse breaking seems cruel and barbaric. It is time consuming and dangerous. According to Roberts, it is also common, although we have heard that some equestrians suggest that it is not as common as Roberts believes. Until recently, horse breaking was the only accepted way of saddling a horse, and despite the publicity surrounding Roberts and his methods, it is still the most popular method. If you have ever ridden a horse, at the zoo, at the park, or on a trail ride, chances are that it was originally broken using the traditional procedure.

Roberts' join-up method, based on his observations of wild horses, stands in stark contrast to traditional horse breaking. As described in the passage quoted at the beginning of this essay, Roberts first brings the untrained horse into a round pen and, using body signals and a light rope, he drives the horse in circles around the perimeter of the pen. According to Roberts, the signals he uses are similar to those used by the dominant mare to drive a colt away from the herd, and the process of driving the horse around the ring is functionally identical to the mare driving the colt from the herd. Roberts then waits for behavioral signals from the trainee: a turning of the ears, chewing and licking motions with the mouth, and a lowering of the head to the ground. Again, these submissive signals are exactly those Roberts first observed in the wild colt. According to Roberts, these behavioral signals have an important social significance. The colt is saying ''I am a herbivore and I am grazing. I am no threat to you. Please let me return to the herd.'' Roberts complies by turning away from the horse, in the same manner that the dominant mare turns away from the wild colt. Invariably, the horse-in-training approaches Roberts and engages in social nuzzling. Roberts responds by grooming the horse, just as the mare groomed the colt. From here, it is a matter of a few minutes before the horse is saddled, mounted, and ridden for the first time. The horse is never beaten or whipped, and its legs are never tied. No aversive stimuli are applied. The entire process takes about 30 min.

The advantages of horse whispering over horse breaking are readily apparent. The ethical differences are perhaps the most obvious: Unlike the horse breaker, the horse whisperer does not use cruel and barbaric techniques. Less obvious is the economic advantage. Roberts' father, working with several horses simultaneously, could break six horses in about 3 weeks. Roberts can train six horses in about 3 *hours*. The sheer difference in efficiency is astounding. There are other economic benefits as well. Horses exposed to traditional breaking are often injured, and some are eventually destroyed. In addition, traditionally broken horses often go on to display severe behavior problems later in life. Apparently, none of these problems occur with the Roberts method.

Given the tremendous economic and ethical advantage of horse whispering, why is it not more popular? Why has it taken 50 years for Roberts' techniques to gain even a small amount of acceptance? Roberts is not the only horse whisperer; he is not even the first. He is simply the most famous of a small group of contemporary ones. References to similar techniques can be found in the ancient Greek Xenophon, writing in about 300 B.C., and a handful of similar references are scattered across the last 2,000 years of western culture (see Scanlon, 1997). So the question is even larger: Why has it taken 2,000 years for horse whispering to gain acceptance?

One reason is that horse whispering is nontraditional, and nontraditional methods are often met with skepticism. When Roberts first demonstrated his technique to a family friend, the reaction was ''that was a fluke.'' The same remark has been repeated, again and again, over 50 years. Roberts wryly recounts a comment made by an associate following a successful demonstration: ''Fifty-first fluke in a row'' (Roberts, 1996, p. 201).

The skeptical scientist *does* need to guard against the pseudoscientist and charlatan. Could this be a modern example of Clever Hans? Although it is correct for the skeptic to consider this possibility, it seems very unlikely. Roberts has recently demonstrated his

technique on a national tour,[2] and the structure of the demonstration makes any kind of Clever Hans effect unlikely. During the demonstration, Roberts is introduced to two untrained horses that have been provided by well-known local equestrian organizations, and Roberts has never seen them prior to the start of training. The horses have never been saddled, never been ridden, and never had a bit. Roberts proceeds to train each horse in turn. By the end of the demonstration, both horses have been saddled and ridden for the first time. The process has also been detailed in an independent PBS documentary and demonstrated to the British royal family. It is possible, but we find it unlikely, that the royal family, the Public Broadcasting System, and local equestrian organizations have all conspired with Roberts in a huge charade.

A second explanation for the slow acceptance of horse whispering is rooted even more deeply in tradition. As noted above, horse breaking has long been associated with strength, bravery, and courage. It was a symbol of machismo in Homer's Troy as well as in America's wild west; the same is true today. A traditional horse breaker personifies the dominance of humans over other species. In this context, it is not surprising that the traditional horse breaker would take exception to kinder, gentler methods.

HORSE WHISPERING AND BEHAVIOR ANALYSIS

The average behavior analyst is probably not an equestrian, so the triumph of horse whispering over horse breaking might seem no more than an interesting curiosity. Horse whispering is more than a curiosity, however, because Roberts' techniques are thoroughly congruent with behavior theory, specifically the principles involved in "learned helplessness," the advantages of positive reinforcement over aversive control, the use of techniques such as timeout, the importance of species-specific defense reactions (and other biological constraints on learning), the interpretation of language as behavior, and the functional role of behavior in communication.

[2] Roberts, M. (1998, July). *Join-up.* Paper presented in Springfield, IL.

Horse Breaking and Learned Helplessness

> In human terms the horse is an incredibly simple soul and so it is essential that any method used or applied for the purpose of teaching him anything must be reduced to the simplest possible terms. (Hattan, 1977, p. 228)

> As soon as you whip a horse, you eliminate his ability to learn. (Roberts, 1998[2])

The horse has historically been viewed as a powerful, dangerous, and useful animal, but rarely as an intelligent animal. According to Roberts (1996), the majority of modern horse trainers believe that horses are basically stupid, capable of only the most limited learning, and then only after extensive training. After all, it takes 3 weeks to train a horse to accept a saddle and rider! Prior to Roberts, nobody seems to have realized that the problem lies with the training method and not with the horse.

Traditional horse breaking seems to be a clear example of the debilitating effects of exposure to noncontingent aversive events. In a now-classic set of experiments, Overmeir and Seligman (1967) exposed dogs to inescapable shock. When the dogs were later exposed to avoidable shock, they were unable to learn the avoidance task (or did so far more slowly than control animals). According to Overmeir and Seligman, the animals learned that their behavior was ineffective during the inescapable shock, or that they were "helpless" to change their environment. This sense of helplessness was displayed in their subsequent failure to acquire the avoidance response. Behavior analysts sometimes have problems with the *theory* of learned helplessness because of the cognitive overtones, and Seligman's interpretation has received considerable criticism (e.g., Minor, Dess, & Overmeir, 1991). As an *empirical* phenomenon, however, the effect is well established: Exposure to inescapable aversive events results in a reduced rate of learning in subsequent tasks.

Traditional horse breaking is, essentially, the constant application of inescapable aversive stimuli. As described earlier, the horse is repeatedly beaten over several weeks, while tied and hobbled. During the breaking process the horse has no opportunity to escape or to otherwise behave effectively. The horse is considered ready to ride only when (in the words of

traditional horse breakers) its "will to resist has been broken." From a behavioral perspective, the horse is ready to ride only when learned helplessness has been achieved.

When viewed as the product of extensive exposure to noncontingent aversive events, the relative failure of horse breaking can be understood. Such procedures result in reduced learning rates, and traditional horse breaking is very slow compared to Roberts' method. Horses have traditionally been viewed as stupid animals, but such stupidity may well be a by-product of the breaking process and not the quality of the organism.

Horse Whispering and the Triumph of Positive Reinforcement

> The first rule of starting a fresh horse, then, is *no pain*. The trainer will not hit, kick, jerk, pull, tie, or restrain. If you are forced to use some restraint, it should be of the mildest nature and without the feeling of *you must* communicated to the horse. Suggest to the horse that *you would rather he did* but not that *you must*. (Roberts, 1996, p. 232)

Learned helplessness may be an apt characterization of the relative failure of horse breaking, but it cannot account for the relative effectiveness of horse whispering. One reason for that success may be that Roberts' technique is based on positive reinforcement. With the possible exception of the initial "driving away" of the horse, no aversive stimuli are used. Painful stimuli are never applied. Instead, the method is based on the use of positive reinforcement, most often in the form of social interaction. Roberts readily acknowledges the use of positive reinforcement, and uses the term to describe his work. Roberts does, on occasion, use the term *negative reinforcement* when he means punishment, but this is a common mistake and probably should be forgiven.

The aversive control of behavior remains a controversial topic within behavior analysis (see Johnston, 1991; Sherman, 1991). Some behavior analysts would prefer that aversive techniques never be used to control behavior, whereas others take the pragmatic view that aversive control is allowable when it is the most effective therapy available. Unfortunately, such debates are often long on rhetoric and short on data, and are further complicated by legal and political concerns (but see Dinsmoor, 1998). People on both sides of the controversy recognize that there are many disadvantages to using aversive procedures, and that aversive techniques should never be used when equally effective nonaversive techniques are available (see Azrin & Holz, 1966, for a classic review; see also Sidman, 1989). Thus, the behavior analyst should applaud the discovery of nonaversive techniques that are as effective as aversive techniques. Roberts' horse whispering represents just such a case. His nonaversive procedure is not only equally effective but is in fact more effective than traditional aversive methods.

There is another interesting parallel between the aversives controversy in behavior analysis and the horse-whispering controversy in the equestrian world. In the late 1960s, ethical and empirical concerns over the use of painful aversive techniques led to the development of alternative, nonaversive therapy. Timeout represents one of the most popular and effective of such techniques (e.g., Bostow & Bailey, 1969). Technically, timeout is a form of punishment in which the punishing event is the removal of the opportunity to earn positive reinforcement. For example, a misbehaving child would be required to spend a brief interval in a timeout area before being allowed to return to his or her previous activities (which were presumably more reinforcing).

The timeout procedure is remarkably similar to behavior found in wild horses. As described earlier, Roberts observed that a misbehaving colt would be driven away from the herd for a period of time, and would only be allowed to return after displaying submissive behavior. This is an exact parallel to a misbehaving child being temporarily excluded from the social group, and being allowed to return only after displaying appropriate behavior in the timeout area. In both the colt and the child, the result is a decrease in inappropriate behavior. As previously noted, Roberts begins training by driving the colt away from himself, just as the mare drives a misbehaving colt from the herd, thus incorporating this naturalistic timeout procedure into his training. In fact, Roberts believes that the success of his approach relies on the similarity between his training methods and the horse's natural ecology. This idea is explored in more detail in the following section.

Horse Whispering, Biological Constraints, and Species-Specific Defense Reactions

> The horse is the quintessential flight animal. When pressure is applied to the relationship, he will almost always choose to leave rather than fight. (Roberts, 1996, p. 232)

The 1960s and 1970s saw a revolution in the experimental analysis of behavior, as researchers began to recognize that there are biological constraints on animal learning. Phenomena such as instinctive drift (Breland & Breland, 1961), the Garcia effect (Garcia & Koelling, 1966), and autoshaping (Brown & Jenkins, 1968; Hearst & Jenkins, 1974) all demonstrated that an organism's evolutionary past and ecological niche have an important impact on the results of conditioning experiments. Animals have great difficulty learning tasks (e.g., Garcia & Koelling, 1966) or maintaining responding (e.g., Breland & Breland, 1961) when those tasks are not consistent with the organism's biological predispositions.

Species-specific defense reactions (or SSDRs; Bolles, 1970) are another example of a biological constraint on learning. According to Bolles, animals in traditional avoidance experiments will easily acquire the avoidance response only to the extent that the required response resembles the animal's natural (instinctive) response to danger. Different species have different SSDRs that occur when the animal is confronted with danger: Some species freeze, whereas others flee or fight. If the avoidance response required in an experiment is similar to the organism's SSDR, the animal should readily acquire the avoidance response. Thus, it should be relatively easy to train a passive avoidance task (which requires the animal to remain motionless) in a species for which freezing is a species-specific defense reaction. Likewise, it should be difficult to train a pigeon to key peck to avoid shock because key pecking is not consistent with the pigeon's natural response to danger (flight).

Roberts clearly understands species-specific defense reactions. *The Man Who Listens to Horses* contains numerous references to the phenomenon, and although Roberts does not use the technical terminology, he clearly understands the principle and its relevance. According to Roberts, when confronted with danger, the horse's natural response is to run away. The flight response can be produced by any sudden stimulus but is particularly sensitive to stimuli that resemble those produced by natural predators. For example, a horse will react when the trainer spreads his or her fingers because (according to Roberts) the fingers suggest the exposed claws of an attacking mountain lion. The horse is also sensitive to stimuli directed to the underbelly (where it might be attacked by wild dogs) and the back (where it might be attacked by mountain lions). Interestingly, these areas are stimulated by a saddle and girth, which could explain the horse's violent rejection of riding tack.

In addition to being a flight animal, the horse is also a social herd animal. The "safety of the herd" is another way that the horse avoids danger, and a horse driven away from the herd is indeed in a dangerous and vulnerable situation. Roberts notes that wild horses use the safety of the herd to maintain the dominance hierarchy. When a young horse misbehaves, it is driven from the herd by the dominant mare. The dominant mare emits a variety of signals, including a squared-up stance. Being away from the herd is aversive, so the young horse responds with submissive behavior (ear turning, licking, chewing, and dropping of the head). The mare then turns, exposing her vulnerable flank, signaling that the young horse can return. If social herding behavior is indeed part of the horse's natural defensive system, then horses should be particularly sensitive to stimuli that resemble those found in the herd.

The success of Roberts' method is largely based on his understanding of SSDRs. From the horse's point of view, a human could be a predator, or a human could be a member of the herd. The task, then, is to maximize the social herding responses while minimizing the predator defense responses. This is accomplished by a training procedure that mimics the animal's natural environment. Initially, Roberts seeks to establish a dominance relation similar to that found in the herd. The trainer first presents a dominant squared-up stance, similar to that used by the dominant mare. The horse-in-training responds by running away, as it naturally would in the wild. However, this is an aversive situation for a herd animal, so it will soon begin displaying the submissive responses which, in

the wild, would allow it to return to the herd. The trainer responds by turning (exposing his or her flank) and allowing the horse to approach. Thus, the initial steps of Roberts' join-up technique exactly mimic the horse's natural herding behavior.

After the herding relationship is established, Roberts deals with stimuli related to predators. A predator will direct attacks to a horse's vulnerable areas, so a horse is naturally sensitive to stimuli directed to those areas. Social herding behavior includes a submissive response in which one animal displays its vulnerable areas to another, and actually allows the other animal to approach and contact those vulnerable areas. According to Roberts, a horse will not be ready to ride until this occurs. After the horse-in-training is allowed to return to the trainer, the trainer attempts to approach the horse's vulnerable areas: the neck, hips, back, withers, and flanks. The trainer gently massages the vulnerable areas, thus behaving in ways that mimic a herd member and not a predator.

Biologically based learning theories (such as SSDR theory) often suffer because they are difficult to test empirically. It is not possible to manipulate an animal's evolutionary history, so such theories, by nature, have limited empirical support. Some of these problems can be overcome by comparative research, in which animals of different species (and different evolutionary backgrounds) are tested under similar conditions. *The Man Who Listens to Horses* does provide a small amount of comparative evidence for the theory. Roberts has successfully used his technique to train wild deer, another flight animal. Even stronger evidence would be a failure of the technique with an organism that is not a herding herbivore. Roberts does not provide such evidence, but it seems reasonable to predict that the technique would fail to work even with a domesticated dog or cat.

Language and Behavior

> *Actions speak louder than words.* We say it but too rarely live by it. The horse uses a predictable, discernible, and effective language, one that requires no interpreters. Like any form of communication, Equus, as I call it, requires some effort to master. If we refuse to believe that the horse can communicate, pain can be used to train him somewhat effectively. But pain is needless and terribly limiting. (Roberts, 1996, p. 231)

> I like to think of myself as multilingual: I speak English (quite well, actually), desperately poor Spanish, a better than passable Horse, and I can get along quite nicely in Deer. (Roberts, 1996, p. 188)

Skinner's (1957) behavioral analysis of language remains one of the most interesting components of behavior theory. Foremost in Skinner's analysis is the idea that language is verbal *behavior.* Language is behavior, and like other forms of behavior language is subject to control by its consequences. The consequences of verbal behavior are defined within a verbal community in which members speak the same language and provide a common set of contingencies. Skinner describes a variety of contingencies, such as mands, tacts, and intraverbal chains.

Roberts' training methods are based on his recognition that horses have a behavioral language. Roberts calls this language Equus, and in his opinion, mastery of Equus was what enabled him to develop his training techniques. To master Equus, the trainer must enter into the horse's verbal community.

It is not clear that anything is to be gained by directly applying Skinnerian terminology to the language Equus. Most of what Roberts describes can be analyzed as a complex response chain, with the behavior of the horse and the behavior of the trainer serving as both reinforcer and discriminative stimulus for the other member of the dyad. Thus, it is not particularly necessary to invoke the jargon specific to verbal behavior. In addition, much of the horse's behavior may be instinctive and thus less sensitive to consequences than traditional verbal behavior. However, Roberts does claim that Equus is a language, and it is relatively easy (with a few concessions) to analyze Equus as a combination of intraverbal chains and mands.

Roberts' understanding of the relationship between language and behavior goes even farther. One of the most important legacies of behavioral linguistics is the functional interpretation of "meaning." Language can be called "meaningful" only to the extent that it is behavior that occurs within a linguistic community. Words by themselves have no meaning, and the term *meaning* is itself mean-

ingful only in the context of a verbal community in which there are specific reinforcement contingencies for specific classes of verbal behavior. Roberts has designed his training procedure based on this principle. The language of Equus is a meaningful mode of communication between horse and trainer only when the two share a linguistic community, in this case a nonvocal community. Roberts has accomplished this by joining the horse's linguistic community—by learning the horse's natural language—rather than by forcing the horse to join the human verbal community (which describes more traditional training methods).

It is worth noting that the same method has been applied to successful behavioral interventions with human populations. For example, structured teaching has been successfully applied to the treatment of autism. Structured teaching is ''based on the assumption that people with autism have behavioral difficulties because environments and teaching techniques are not based on their individualized needs'' and is ''designed to minimize behavioral difficulties by creating meaningful environments that people with autism can understand and succeed in'' (Mesibov, Schopler, & Hearsey, 1994, p. 207). Just as structured teaching creates a meaningful environment that a person with autism can understand and succeed in, the Roberts technique creates a meaningful environment (or verbal community) that a horse can ''understand'' and succeed in.

Behavior Analysis and Animal Welfare

> Accepting reciprocity between humans and members of other species, and assuming that they have many characteristics in common, does not guarantee easy decisions regarding how they can best interact, nor does it support easy definitions of respective ''rights.'' Inevitably, interactions between as well as within species involve a variety of relationships that range from those with symmetry and mutual advantage, to the distinctly asymmetrical ones of parasitism or predation. We cannot stand outside these relationships. (Hineline, 1986, pp. 123–124)

Many experiments reported in the *Journal of the Experimental Analysis of Behavior* (*JEAB*) use nonhuman animals, and most of those expose the subject to some ''unpleasant'' situation. This can include painful aversive stimuli, prolonged deprivation, or various pharmacological agents. The *JEAB* authors who perform such experiments (including the authors of the present article) are all well aware that a small but vocal segment of the general population finds these experiments to be unethical. It is probably unwise for the behavior-analytic community to take a strong position in favor of unrestricted animal rights. Indeed, behavior analysts surely favor treating animals with respect and looking after their well-being within the constraints of worthy scientific advance and instruction (see Hineline, 1986).

Many defenses of animal research concentrate on the value the research has for humans (Miller, 1985). The animal rights community is typically not swayed by this approach, however, because research on animals is (in their opinion) an example of ''speciesism''—the belief that it is acceptable for humans to use animals for personal gain simply because we are biologically different (see Regan, 1983, for discussion). Many animal rights activists consider speciesism to be the moral equivalent of racism or sexism, so it is not surprising that the animal rights community is unconvinced when benefits to humans are cited. A more effective approach, then, may be to cite cases in which animal experimentation is of benefit to animals.

It is not difficult to find examples of animal research benefitting animals when considering the literature in veterinary medicine. It is less common to find examples within behavior analysis, but such examples do exist (but see Miller, 1985). Applications of the Garcia effect have been used to improve practices in wildlife management (Gustavson, Brett, Garcia, & Kelly, 1978), knowledge of behavioral principles has been used to improve zoo exhibits (Myers, 1978; Stevens, 1978), behavioral techniques have been used to improve the welfare of farm animals (Foster, Temple, & Poling, 1997), and basic conditioning techniques have been used to make the training of pets more humane (Pryor, 1985).

Horse whispering represents a humane approach to the treatment of horses. Behavior analysis can also contribute to an understanding of horse whispering if, as argued above, the techniques of horse whispering can be understood in terms of behavioral principles. This is not to say that behavior analysis can

take credit for the discovery of horse whispering. Behavior analysts can, however, help promote horse whispering by studying the phenomenon and potentially providing it with a context of valid, systematically understood scientific principles. If behavior analysts decide that the Roberts technique is worthy of additional study, this represents another area in which behavior analysis can be used for the benefit of both animals and humans.

CONCLUSION: ON FOLK WISDOM AND BEHAVIOR ANALYSIS

> If behaviorists were more humble, their effectiveness as scientists would increase. (Neuringer, 1991 p. 1)

It would be easy to criticize this book from a behavior-analytic perspective. Monty Roberts has received little or no formal education in behavioral psychology, and *The Man Who Listens to Horses* is not an academic book. The book is a collection of anecdotes and stories bearing a closer resemblance to the work of Romanes (e.g., Romanes, 1882) than to the work of Skinner. Roberts' method is not scientific. He did not arrive at his theories on the basis of controlled scientific study. He did not make quantitative measures of behavior while manipulating variables. He anthropomorphizes and infers cognitive processes, and sometimes invokes magical explanatory concepts. He even misdefines negative reinforcement. If Roberts does have a research methodology, it is difficult to define. Some of Roberts' methods (e.g., his use of naturalistic observation) resemble the work of ethologists. At other times, his techniques seem to resemble ''qualitative research'' strategies such as ethnography. Finally, his theories might be characterized as ''folk wisdom''—knowledge gained from growing up in an equestrian culture, and as a result of a lifetime of practical experience with horses. The book clearly cannot be taken as a coherent illustration of behavior-analytic principles and concepts.

Still, the book should be taken seriously; the problem is how to do so. Behavior analysts sometimes have difficulty in dealing constructively with insightful descriptions and discussions that are couched in ordinary-language terms (see Neuringer, 1991). An all-too-common reaction would be to simply reject them for their conceptual incompatibility if not their inconsistency. In the present case, Roberts and his theory would be rejected simply because the ''wrong'' method is used and because the ''wrong'' language is used to communicate the conclusions. Such a response would not do justice to the obvious genius of Roberts and others like him. Behavior analysis itself would suffer because we would be cutting ourselves off from potentially fruitful avenues of inquiry.

Alternatively, the behavior analyst could embrace nonbehavioral methods as an alternative way of knowing, coequal to the experimental analysis of behavior. Such a move might delight postmodern deconstructionists, but most behavior analysts would agree that it would be a move in the wrong direction. There are good reasons to be wary of folk wisdom and other nonscientific approaches. Folk wisdom can lead to wildly incorrect conclusions, and Skinner was correct to note that primitive analysis may lead to ''magical explanatory concepts'' (Skinner, 1938, p. 3).

A third, middle path is probably best. The behaviorist could embrace nonbehavioral materials to a limited degree, recognizing that such materials can serve as an alternative (though flawed) way of recognizing and understanding behavioral principles. The above analysis of *The Man Who Listens to Horses* is one example of this middle path. Taking the middle path can serve behavior analysis in a number of ways. First, nonbehavioral literature may serve as an interesting impetus for new research and study and a valuable source of data and ideas. A deeper study of horse whispering, using the traditional tools of behavior analysis, might uncover important new information for both behaviorists and equestrians. Second, behavior analysis (and psychological science in general) often confronts a general public predisposed to accept folk wisdom over science. By drawing parallels between folk wisdom and behavior analysis, the behaviorist can highlight the efficacy of behavioral principles for an audience who might otherwise reject those principles. Books such as *The Man Who Listens to Horses* can thus become an educational tool, allowing behaviorists to demonstrate the myriad ways in which behavioral principles contact everyday life (for a similar argument concerning literature, see

Dougan, 1987). Finally, behavior analysts often live within an academic environment in which they are a minority, and their views are seen as extreme and outdated. By taking a less extreme middle path, and by showing an openness to other ideas, behavior analysts can improve their reputation within the academic community (see also Dougan, 1994; Neuringer, 1991).

Should the behavior analyst embrace folk wisdom as an alternative research strategy, coequal to the experimental analysis of behavior? Certainly not. Should research based on nonbehavioral techniques become a regular part of *JEAB*? Again, no. Should the behaviorist recognize that instances of folk wisdom can provide fertile ground for demonstrating the efficacy of behavioral principles? Indeed, it may be wise for behaviorists to do so.

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