CHAPTER 15

Applying a Trauma Lens to Equine Welfare

Sarah Schlote

Neuroscience has demonstrated that all mammals share a ubiquitous developmental attachment mechanism and a common stress-regulating neurophysiology. Bradshaw, Schore, Brown, Poole & Moss (2005)

All mammals have a nervous system, a unique personality, species and sex-related traits, sensory perception systems, a drive to bond and socialize, and a set of life experiences – including environmental conditions – which affect development and coping. In spite of our differences, we have an alikeness that is impossible to ignore. Panksepp (1998) spent his career exploring the roots of our shared mammalian experience, creating a field he named *affective neuroscience*. In his work, he established that stimulating homologous parts of structures of the brain produces unconditioned emotional and behavioral responses in human and non-human mammals alike. He found that stimulating the neocortex could not produce these responses; instead, they were generated by deeper recesses or areas of the brain that are considered sub-cortical or beyond conscious control. In alignment with this discovery, he found that the subjective emotional experiences of humans directly correspond to analogous behavior in other mammals. In a parallel fashion, modern paradigms within the field of trauma healing and recovery for humans draw largely on animal models of stress physiology, which will be further elaborated upon in this article (Kozlowska et al., 2015; Levine, 1997, 2010; Payne & Crane-Godreau, 2015; Scaer, 2001/2014). It is on this foundation of mammalian similarities that the importance of applying a trauma lens to not only humans but also other animals finds its support. Appreciating how mammals orient, prepare, and engage in action towards survival or nourishment – *as well as what happens when this process goes awry* – is essential to understanding not only human but equine behavior as

well as to recognizing the common principles that are helpful for trauma recovery for mammals in general.

1. The Nervous System and Preparation for Action

All behaviour involves a continual shifting between preparatory and action phases.

Payne & Crane-Godreau (2015)

A number of authors writing about the stress responses of human and non-human mammals have described a similar hierarchy of actions. This sequence is known by a variety of names, including the activation or threat response cycle (Somatic Experiencing Trauma Institute, 2007), the preparatory set (Payne & Crane-Godreau, 2015), and the defense cascade (Kozlowska, Walker, McLean & Carrive, 2015). Although there are slight differences between these models, they nonetheless point to a similar emotional and behavioral sequence. As described by Payne and Crane-Godreau (2015):

The preparatory set refers to the rapid, largely sub-cortical, preparation of the organism for response to the environment. This preparation involves an organization of core features of the organism in readiness: physical posture and muscle tone, visceral state, affective or motivational state, arousal and orientation of attention, and (subcortical) cognitive expectations. This preparatory set precedes, and influences, the complex human[1] cortical responses of conscious appraisal and voluntary planning.

Responding to the environment involves a three step process, including:

- behaviors involved in the initial noticing and orienting to the situation (which are rapid, unconscious, automatic, and largely mediated by the brain stem); these include the startle and arrest responses when first noticing novelty in the environment;

1 Although this particular quote focuses on human responses, elsewhere in the article the authors discuss how this is based on animal models, similar to Kozlowska et al. (2015) and the Somatic Experiencing Trauma Institute (2007).

- behaviors involved in the preparatory set, readying a particular response to environmental conditions (not entirely unconscious but still sub-cortical); and
- behaviors involved in the execution of the response (whether approaching or moving away from a perceived threat).

Payne and Crane-Godreau (2015) appear to limit the preparatory set to active defenses being mounted for survival; however, this three-step process can also be adapted and applied to the process of noticing and moving towards resources and nourishment as well (such as food, water, exploring novelty in the environment, as well as social interactions such as nurturing, play, and sex). Preparing for action in either case *"involves small changes in physical posture, muscle tone, facial expression and anticipatory micro-adjustments and preparation for movement"* (Payne & Crane-Godreau, 2015). These authors also suggest that one of the reasons facial expressions are often harder to read and make sense of than body language is because the latter shows an intended action more clearly than the former. They along with Panksepp (1998) also suggest that movement, postures and emotions are intrinsically linked, and that emotion arises out of the preparation for action (as well as when actions are thwarted). Indeed, one needs merely to imagine the following scenarios to notice differences in physical sensations and emotional tone. For instance, what happens on the inside when you imagine the following action sequences playing out in slow motion?

- Looking around (orienting)
- Getting up and fleeing the place you are located
- Expressing physical aggression towards someone (fighting)
- Shaking hands with someone new
- Enjoying a hug from a loved one

Preparing for action – whether in regard to survival or to nourishment – involves implicit memory (which includes both emotional memory and procedural memory), also known as body memory. Unlike explicit memory (which involves specific events and knowledge that can be made conscious), implicit memory is largely unconscious (Levine, 2015). Emotional memory includes experiences such as surprise, fear, anger,

disgust, sadness, joy, curiosity, excitement, gladness, and triumph. Procedural memory involves the physiological correlates of these emotions, including, but not limited to, nervous system and organismic responses and action patterns, such as:

- *Motor responses* (e.g., in humans: riding a bike, dancing, playing the piano, and in equines: moving at a particular gait, jumping over obstacles, performing a specific dressage movement, etc.)
- *Emergency responses* (e.g., fighting, fleeing, freezing, etc.)
- *Attraction and aversion responses* (e.g., expanding, extending, reaching and approaching nourishment and growth; stiffening, bracing, retracting, repulsion, avoiding, or moving away from pressure, stressful stimuli, toxicity or injury. Both humans and equines, as well as other mammals, learn through experiences that utilize attraction and aversion, as seen in models of positive and negative reinforcement)

Payne and Crane-Godreau (2015) suggest that implicit memory occurs largely in a bottom up fashion; that is, that implicit memory is subcortical, involves a rapid initial and largely unconscious appraisal of the environment, and leads to a sense of anticipation or expectation that guides the mobilization for action. In contrast, explicit memory is

The call of the wild

Imagine for a moment that you are part of a herd of gazelle, prey animals grazing in unison on the savanna. You are in a state of relaxed alertness, taking in sensory information about your environment as you mingle and enjoy the sun-soaked African terrain. Suddenly, a noise nearby captures the attention of the herd and a few of you perk up, vigilant, scanning the horizon and sounds around you only to discover the sound in the bushes was another prey mammal foraging. The herd's collective nervous system settles and you return to the act of grazing. However, something still doesn't seem quite right, and you remain a little wary. It doesn't take long before another sound grabs your attention, along with a suspicious movement in your peripheral vision. This time, there is no mistaking the prowl of a cheetah. The herd instantly leaps into action in unison, a flurry of legs and bodies in flight.

slower and top down, involving communication from the conscious parts of the brain in the neocortex to the rest of the organism. While the latter is easier to change and has less of an effect on the autonomic nervous system, the former has a direct and almost immediate impact on the nervous system but is harder to change.

It is a dance nearly as old as time itself. Animals have survived for millennia by mobilizing responses to perceived threats and either surviving or dying in the attempt. The autonomic nervous system activates a host of associated sub-systems and physiological responses in the face of specific environmental conditions (or even when recalling or anticipating specific scenarios that are no longer occurring in the present). These include the cardio-respiratory system, the gastro-intestinal tract, sweat glands, pupil dilation, hair follicles, the endocrine system, and muscle tone (Payne & Crane-Godreau, 2015). Survival in the animal kingdom does not only imply being able to fight or flee successfully – when neither is an option or is proving to be effective, a final possibility is to "freeze[2]". This state of rigid or collapsed immobility often occurs when other methods of self-protection are futile, a final surrender state in which the body releases natural endorphins as a way to numb pain, and in which dissociation is common. These are in service of death feigning; were you to fully feel the injuries sustained by a predator or in the attempt of escaping or fighting a predator, your thrashing around in pain would signal that you were still alive and place you at greater risk of ongoing harm. Remaining still could therefore facilitate an animal's eventual escape, if a predator loses interest, becomes distracted, or assumes the prey was inedible carrion and leaves to find another meal. Interestingly, Levine (1997) noted that although mammals in the wild face threats from predators on a regular basis, they are rarely traumatized. This is because wild animals have a natural ability to recover from the freeze state by *"shaking out and passing through the immobility response and becoming fully mobile and functional again"* (p. 18). This discharge of the residual thwarted survival activation left in the system allows mammals to come back down to a state of aliveness and homeostasis and rejoin the living, as it were. The immobility response is intended to be

2 For the purposes of this article, freeze refers to states of tonic or collapsed immobility (along with other associated responses like fainting and feigned death) that occur when fight or flight are thwarted or not possible. However, some authors use the word freeze to mean the arrest response that occurs when an organism first notices novelty in the environment.

time-limited, and mammals demonstrate the remarkable ability to come out of freeze naturally (Levine, 2010).

Which defense response or preparatory set occurs at which time depends on a number of factors. Kozlowska et al. (2015) stated that *"in any particular situation, the defense response will be a function of the species-specific repertoire, genetic variations among strains, characteristics of the threat, and context in which it occurs, all influenced by individual differences.*" For instance, although all equines have the ability to enact all types of self-protective responses, depending on the situation, environmental conditions (for e.g., wild vs. captive animals), personality traits, and so on, it is also thought that there are species-based predispositions for certain behavioral responses that occurred as a result of evolution. As stated by Svendsen (2009):

A donkey's fight mechanism is more easily engaged than a horse's. This is perhaps because when environmental conditions dictate, wild donkeys often live in very small groups of perhaps one or two animals where running away is not always such a successful method of survival, compared to the horse's tendency to live in larger herds. In the wild, donkeys are more territorial than horses and this also applies to domesticated donkeys. (p. 72)

Mules have many of the best traits of their parents [...] Faced with a dangerous situation, mules will choose either to use a flight or fight response depending on individual circumstances [...] This tends to make a well-trained mule very calm and steady [...] they were less likely than horses to panic in dangerous situations and could carry much more than donkeys. However, in common with their horse parent, mules and hinnies can be more "flighty" than donkeys. (p. 102-103)

This does not mean that horses are naturally "flight animals". While their bodies, large herd sizes, and the vast terrains in which horses evolved supported their ability to escape more successfully than the conditions faced by wild donkeys and asses, all equines are capable of fleeing, fighting and freezing when necessary, as well as engaging in affiliative behaviors to maintain cohesion within the herd or band. Similarly, humans have the ability to engage in this array of survival and social responses (sometimes grouped

under the fourth "F", fawn – more on this below), and which responses occur depend on the same variety of factors as outlined above. Ultimately, what matters more is not which behavior is mobilized, but rather, that it ensured survival. There are no value judgments: if it allows a mammal to stay alive, that is all that matters.

2. Introduction to The Polyvagal Theory

The original perception of the autonomic nervous system proposed by Hess (1925) had two branches. This is the most commonly known and widely taught model, and is still in use today. Essentially, the breakdown was that the sympathetic nervous system functioned as the proverbial gas pedal, focused on energy efforts for action; whereas the parasympathetic nervous system served as the brakes in order to allow nourishment seeking efforts and resting. This model suggested that both branches are limited to reciprocal action – that is, when one goes up, the other goes down.

Modern views of the autonomic nervous system promote a more nuanced understanding. Porges (2007) suggested that the parasympathetic branch of the autonomic nervous system can be sub-divided into two branches of the vagus (cranial nerve #10), that are capable of varying to different degrees at the same time. In this model, known as the polyvagal theory, the sympathetic nervous system is still the equivalent of the gas pedal, but the parasympathetic nervous system consists of two different pathways:

- social engagement, mediated by the ventral vagus (which is evolutionarily the most recent system), and
- immobilization, or "freeze", mediated by the dorsal vagus.

The ventral vagal complex (VVC) serves as a brake on the sympathetic nervous system, allowing us to dampen the stress response so that we might slow down and attend to bonding relationships and attachment needs.

From an evolutionary standpoint, the only way early organisms could slow down was through the immobilization or dorsal vagal response. This primitive system would stop movement and activity when another organism approached, and resume movement

and activity when said organism moved away. Fight or flight later emerged with reptiles, offering a broader repertoire of options in response to perceived threat. Finally, mammals appeared and, along with them, a focus on social collaboration and affiliation in raising young. This required the ability to slow down in the absence of fear in order to give birth, nurse, play and foster social bonds. As stated by Stanley (2016):

Stimulated by perceptions of safety, the ventral vagal system is myelinated to provide spontaneous, immediate communication and transformational change between the face, eyes, throat, larynx, pharynx, heart, and lungs. When the ventral branch is activated, we are able to put the brake on sympathetic arousal of fear, and socially engage, regulate, negotiate, nurture, care and empathize with others through compassionate connection. These interpersonal connections prompt the body to release oxytocin, which supports the social engagement process (p. 31).

Therefore, when threat occurs in interpersonal relationships, utilizing the social engagement system to dampen fight or flight energy (especially when these are not possible to execute successfully) can be a common survival strategy, otherwise known as the fourth "F": fawn. The fawn response consists of mending, tending and befriending social strategies that serve to keep the peace and prevent further potential harm. Not surprisingly, repressed anger and chronic anxiety (signs of thwarted fight and flight responses) are common in individuals who learned to submit, caretake and placate in relationships where anger or escape were not perceived to be possible. This is evolutionarily quite different from the dorsal vagus as a brake system, which is slower and less nuanced as a response, and associated more with reptiles. According to Stanley (2016):

The dorsal vagal circuit is the lower part of the vagus nerve linking the viscera and internal organs, in the region of the gut beneath the diaphragm, with the brain [...] The dorsal vagus is not myelinated, so messages move more slowly from the gut to the brain than those from the myelinated ventral vagus. The dorsal vagal circuit regulates muscles associated with visceral functions in the lungs, diaphragm, heart and stomach, including peristalsis of the GI tract, and respiration. Responsible for heart rate, dilation of blood vessels and blood pressure, the dorsal vagal system creates a bodily-based state of partial or full immobilization when we

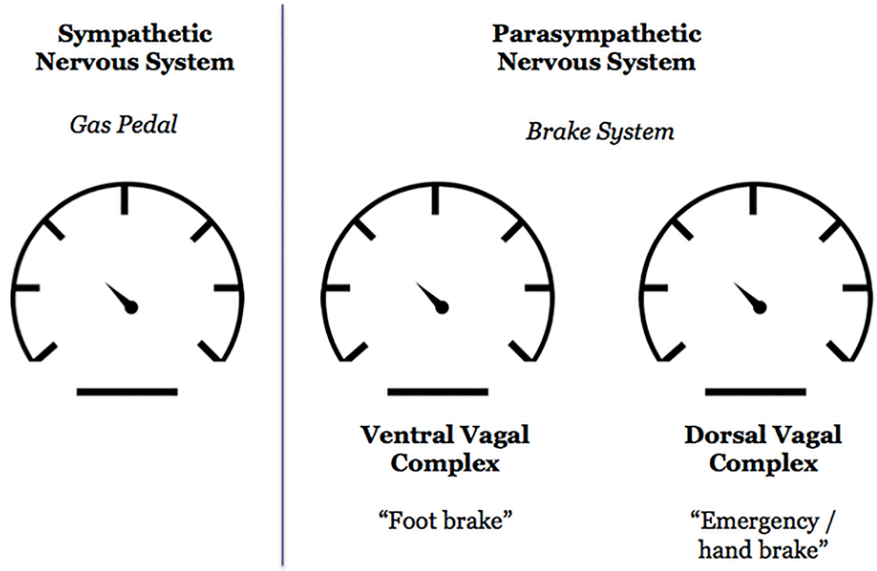
feel safe and ready to rest and restore. This circuit communicates immobility and the body goes into a still state to conserve energy [...] The dorsal vagal complex without fear also provides the quiet peace of mind to nurse and nurture a baby and initiates a motionless bliss following sexual intercourse or, at times, during meditation (p. 36).

This dorsal vagal state without fear is referred to as the "low-tone dorsal vagal", or "immobilization (stillness) without fear". By contrast, "high-tone" dorsal vagal complex (DVC) acts as a conservation state to prepare for low oxygen (such as suffocation or drowning) or death. It also acts as a brake to stop fight or flight mobilization that is deemed unsafe, ineffective or impossible in other situations as well; this is what is referred to as the "freeze" response, which physiologically represents the psychological state of "I can't", and the subsequent collapse and surrender to the threat at hand. This is intended to be a short-term survival strategy, with the outcomes either being death, or a subsequent thawing out of the immobility response when the threat goes away, with resulting deactivation or discharge of the remaining survival energies in the nervous system, allowing the return to a healthy sense of vitality and aliveness.

Each of these branches can co-occur to varying degrees at the same time. It can be helpful to think about each one like a dial or dimmer switch[3] that can be turned up or down depending on the circumstances. This is important when it comes to understanding mammalian behavior, or, more specifically to this article, that of equines and humans. It means that things are not always as simple as "the horse is licking and chewing which means he must have been in distress, pain, or confusion", as thought by some.

Salivation does kick in when the nervous system is in a parasympathetic state, but this does not mean that all licking and chewing behavior occurs in response to the deactivation of intense stress, or that all stress is inherently negative. The sympathetic nervous system is also involved during situations of pleasurable stress, stress occurs to varying degrees both within and outside of a window of tolerance for each individual, and stress can be tempered by whatever other "dials" (see diagram) are on at the same time.

3 The dimmer switch analogy to present polyvagal theory concepts was first used by Brian Whelan during an advanced level Somatic Experiencing training (Whelan, B., personal communication, August 20, 2017).



For instance, someone can be in a state of high sympathetic arousal when excited about something pleasurable, without being in fear or distress. However, adding fear into the equation changes the tone of that experience and the degree to which we are able to remain open to social engagement. Take for instance, when one individual is tickling another. For a period of time, this can be experienced as exciting and fun (moderate SNS), as the two individuals remain in social engagement (moderate VVC, low to no DVC). However, at some point, a threshold is reached and the experience ceases to be fun for the person being tickled; in the face of overwhelm, a fight response might kick in (high SNS) and the person might begin to pull away socially (low VVC, perhaps higher DVC if the person shuts down) as the body perceives threat to itself from the other.

Furthermore, Levine (2010) describes research where guinea pigs were placed on their backs in a trough, inducing a state of immobility. Freeze, or immobility, is a response initiated by the dorsal vagal branch of the parasympathetic nervous system, and it would be easy to assume the animal was in distress. However, after a few moments, the guinea pigs were able to flip back over and resume normal activity, showing no signs of

long-term damage, a process known as self-paced termination. Indeed, there are many examples of "immobility (stillness) without fear" in mammals that can be calm or even pleasurable, including when kittens are carried by the scruffs of their necks by their mothers, the "quiet" or "stillness" following orgasm, savasana during yoga, or certain meditative states. However, each of these experiences can also be altered by adding in the sympathetic response of fear. When guinea pigs were frightened prior to being turned on their backs, they took much longer to come out of the immobility state, sometimes hours. This is analogous to the social engagement (VVC) response of submission, which can occur with and without fear as well. Examples of the latter include dogs rolling over on their backs and wagging their tails when they see their owners, one partner allowing another partner to lead or dominate during sex, or deferring to a colleague or superior at work, and so on. Submission can also occur with fear (SNS) and/or shutdown (DVC), which is the definition/interpretation most people think of/have when hearing that word.

Porges (2007) describes five global states having their own preparatory set, involving different degrees of these "dials". They include: relaxed social engagement (low SNS, high VVC, low DVC), vigorous social play (moderate SNS, high VVC, no DVC), aggressive/defensive mobilization (high SNS, low VVC and no DVC), immobility/stillness with fear (high SNS, low/no VVC, high DVC), and immobility/stillness without fear (low/no SNS low/no VVC, low DVC), as described above. There are other states as well, involving different amounts of each "dial", though these five are viewed as primary in mammals. This corresponds to a large degree to the work of Panksepp (1998), who described seven core mammalian emotional systems with their own preparatory sets: CARE/NURTURANCE, PLAY, LUST, RAGE, PANIC/GRIEF, FEAR, and SEEKING (capitalization his own). SEEKING does not appear to feature directly in Porges' five global states, but corresponds to the orienting response organisms have to novelty, safety, threat, and nourishment in the environment.

3. The Importance of Attachment and Affiliative Behaviors

Whether it is called CARE/NURTURANCE, social engagement, attachment, pair bonding, or a ventral vagal state, attachment and affiliative behaviors are an important and natural need for all mammals. Mammalian young rely on caregivers for soothing, safety, and survival, so that arousal is maintained within a window of tolerance (Siegel, 1999) and the window is gradually grown to tolerate more life experiences. Primary caregivers and in many cases other members of the family, tribe, band, pack or herd calm babies when arousal is too high and stimulate them when arousal is too low, through consistent and responsive attunement via gaze, touch, holding, voice, interactive play, and the quality of their physical contact.

Mammals are typically born with auto-regulation on board, meaning that heart rate, breathing, and other core functions are usually operating at birth. However, other aspects take longer to develop and are shaped as a result of social interactions, such as the ability to soothe distress (down-regulation) and raise energy when too lethargic (up-regulation). The process by which mammalian young are soothed through parental nurturing, and the parents are further soothed in response to their young feeling settled, is known as co-regulation. This process is necessary for optimal development and sets the foundation for eventual self-regulation (Kain & Terrell, 2016). Similarly, the components of attachment (Ainsworth & Bowlby, 1991) – safe haven, secure base, proximity seeking, and separation distress – are equally foundational to developing secure attachment in other relationships as mammals mature. Attachment relationships in humans (Schore, 2001) and other mammals are crucial with regards to other processes as well, including:

- Survival by learning social norms of the species/herd
- Sensory stimulation to promote brain growth
- Exploring the environment/world
- Orienting to familiar and novel situations
- Tolerating changing conditions

- Developing coherent responses to stressors, both positive and negative
- Accurately detecting safety and threat (neuroception)

Bonding and attuned interactions with caregivers stimulate natural opioids and dopamine in the brain. The surge of endorphins released in periods of attuned social engagement (VVC) with attachment figures (such as parents/alloparents and their young, or pair bonds) promotes the attachment relationship and is essential for love, connection, pleasure, pain relief, and stimulating reward pathways in the brain (incentive and motivation). Ethologists Lucy Rees (2013, 2017) and Francesco De Giorgio (2016) emphasize the importance of recognizing the bonding needs of horses as being the primary way horses relate to one another in the wild. This differs from prevailing views about captive horses being flight animals that live in hierarchical herds (Rees, 2013):

In general, in social interactions, there's a tendency to split things into agonistic behaviour, which is conflicted behaviour, and affiliative behaviour, which is what brings them together. And curiously enough, we've done an awful lot more looking at more at agonistic behaviours, which are extremely well classified, all the ranges of ways that horses can express conflict, and very little about affiliative behaviour. Although you see that they are cohesive, the band goes around together. There's loads of stuff that goes on between them that maintains that – spacing, who's with whom, sharing of individual space, but loads of little touches. We've started to look at where they touch each other, just little tiny touches. The movements they do, they very often pass their heads one over the head of the other, or over the neck of the other, or over the back of the other. They sometimes rest their whole head and neck on the back of the other. The other thing we've noticed is when they are standing very close together, resting close together, one will just move its head very slightly towards the other and you see the nostrils flare and they're just breathing each other for a second, like a sort of olfactory contact. Nobody's really looked at that. We seem to be much more interested in conflict, although there is so little conflict and there is so much bringing them together.

Rees (2013) goes on to state that:

Domestic horses are a great deal more aggressive than feral horses. Even grazing in fields, in a stable group your aggression rates are something like 20 times higher than in feral horses. Why? We're not paying attention to this. What we've paid attention to is who's the most aggressive, who's the most dominant, instead of saying they're subject to a huge amount of stresses that we don't even talk about. They're not brought up naturally, they don't learn about subtle social behaviour. Very often, we're creating competitive aggression by giving them buckets of food. We ride them so they're quite often uncomfortable. They're not in natural groups, they haven't chosen to be in that group, we change their groups, we buy them and we sell them. We put fences around them, we limit their space. There's a whole load of stuff there that produces quite a lot of stress. [...] I don't think we've got a handle on stress-related aggression and learning-related aggression.

The notion that hierarchical or conflicted behaviors in horses is evidence of stress or adverse experiences aligns with the research on adverse childhood experiences in humans, where very similar outcomes were noticed. Indeed, such outcomes are noted in other mammalian species also (see below). This view (De Giorgio, 2016; Rees, 2017) also aligns with Porges' polyvagal theory, which stipulates that mammals are driven by social connection first, with fight, flight and freeze occurring secondarily when necessary, as opposed to "survival mode" being a mammal s natural state.

4. Impaired Action and Attachment: The Impact of Thwarted Drives

"Our theory suggests that any of these preparatory states oriented to escape, attack, sexual activity, exploration, nurturance, etc. could become maladaptive through persistence or disorganization, and form the basis for various kinds of distress."

Payne & Crane-Godreau (2015)

Stress is often viewed as the cause behind emotional and physical issues in people and other animals. Indeed, the impacts of chronic stress on health and behavior are well

documented. However, as discussed earlier, stress taken broadly is not the issue, as there are different thresholds of stress and different valences of stressful experiences. Stress can be pleasant or pleasurable, lead to a desired outcome and be deemed as purposeful, within a range where social engagement is still possible, or at a high degree where fear and shutdown are present. As stated by Payne and Crane-Godreau (2015), it is important to qualify the kind of acute or chronic stress that is the most problematic in terms of impact on functioning – that of thwarted drives towards protection or nourishment.

Trauma has long been described as an experience of life threat that exceeds a person's capacity to cope (Golan, 1969). To be more specific, drawing on what we know from the literature, trauma is an experience that exceeds a person's biophysiological capacity or range of (di)stress tolerance, exceeds one's capacity to mobilize and fully complete a self-protective response, or reflects significant ruptures in attachment relationships that result in either of the previous experiences. In his studies of mammalian stress physiology, Levine (1997, 2010) noted that animals in the wild are routinely exposed to life threat yet are rarely traumatized. Indeed, the title of a well-known book in this field – *Zebras Don't Get Ulcers* – speaks to the fact that wild animals do not typically experience anxiety disorders, panic attacks or other mental health issues. In the wild, mammals typically will mount a defensive orienting response to notice the threat, as well as a specific active self-protective response, such as fighting or fleeing, or enter into an immobility response if these strategies prove to be unsuccessful. Should a mammal survive the threat, they then typically recover from a freeze state by discharging the energy that was built up prior to entering the freeze state. It is through this process of discharging the stacked survival energy in the body that wild animals regain a sense of balance and do not spend their lives living in fear of being the next meal. They mobilize a response when necessary, then return to baseline when the moment has passed. What goes up, must come down. As stated by Levine and Kline (2006), *"the heightened arousal energy together with shutting down (when there is no escape) are biologically hard-wired survival mechanisms. However, this protective system is meant to be time-limited; our bodies were designed to return to a normal rhythm soon after the danger ends"* (p. 41). Most often, wild animals either mount a successful response to a short-term stressor, come

out of the freeze state by discharging whatever survival energy is left in the system, and returning to the act of living or die trying. However, both wild and domesticated animals can and do experience trauma, of course, often at the hands of human interference. More specifically, trauma occurs where mobilizing and successfully completing such responses, as well as acting on natural drives for movement, foraging, bonding with attachment figures, and other primal instincts, are prevented from taking place.

When attachment does not unfold as nature intended, development goes awry. Disruptions to attachment bonds can have disastrous consequences at a psychophysiological level, especially in animals that have close relationships, complex social structures, and rely on members of the extended herd to lend support in raising young. Insecure attachment styles can develop, which in human children have been categorized as anxious/ambivalent, avoidant/dismissive, or disorganized/disoriented, and in human adults as preoccupied, dismissive, and fearful-avoidant. Although attachment styles in non-human animals have not received the same degree of research focus as in humans, a number of individuals have suggested that secure and insecure attachment patterns also extend to other mammals as well, including dogs and horses[4], even if the exact categorization of insecure patterns in non-human animals may be slightly different (Horn, Huber & Range, 2013; McLean, n.d.; Parthasarathy & Crowell-Davis, 2016; Payne, Bennett & McGreevy, 2015; Rehn, Lindholm, Keeling & Forkman, 2013). Insecure attachment affects mammals' abilities to form stable relational bonds with one another, and also with other species (such as the human-equine bond). It is important to note that insecure attachment styles are different from and can intersect with personality traits, which are not always based in past attachment ruptures. Some animals are naturally more independent and prefer to connect on their own terms, while others are more social and willing to interact. This does not necessarily mean that trauma is part of the picture, though it can be a contributing factor in cases where there is more than just personality at play.

4 Interestingly, DeAraugo, McLean, McLaren, Caspar, McLean, & McGreevy (2014) found that a human's attachment style was a determining factor in which training methods one used with horses. It would be interesting to develop a measure of attachment styles in horses, and then explore the ensuing dynamics with their human caregivers based on the humans' attachment styles.

Brain development is also impacted when there are attachment ruptures, resulting in behavioral and neurochemical dysregulation due to lack of nurturing adults to act as a secure base of protection and with whom to engage in co-regulation. In other words, there is no one to soothe distress or "make it ok", no one to turn to for comfort or security, no one to help determine safety or threat, and no one to model appropriate social interactions. The lack of social learning provided by the herd also creates a cascade effect of impoverishment across subsequent generations, resulting in a loss of understanding of norms, roles, hierarchies, boundaries and other nuances of social behaviors within the human or non-human animal's community. A potent example is that of poaching or culling situations where elephant herd members are made to witness mass slaughter and experience the resulting breakup of family groupings. Sometimes, orphans are removed from the wild only to be confined and sometimes abused for entertainment or other purposes, or relocated to other areas. The consequences are reminiscent of human genocide (Bradshaw, Schore, Brown, Poole & Moss, 2005):

The air explodes with the sound of high-powered rifles and the startled infant watches his family fall to the ground, the image seared into his memory. He and other orphans are then transported to distant locales to start new lives. Ten years later, the teenaged orphans begin a killing rampage, leaving more than a hundred victims. A scene describing post-traumatic stress disorder in Kosovo or Rwanda? The similarities are striking but here, the teenagers are young elephants and the victims, rhinoceroses. [...] Wild elephants are displaying symptoms associated with human PTSD: abnormal startle response, depression, unpredictable asocial behaviour and hyper-aggression [...]

Calves witnessing culls and those raised by young, inexperienced mothers are high-risk candidates for later disorders, including an inability to regulate stress-reactive aggressive states. Even the fetuses of young pregnant females can be affected by pre-natal stress during culls. The rhinoceros-killing males may have been particularly vulnerable to the effects of pre- and postnatal stress for two reasons. Studies on a variety of species indicate that male mammalian brains develop at a slower rate relative to females, but also that elephant males require a second distinct phase of socialization. As with females, male socialization begins during

infancy with the mother and a tight constellation of allomothers. But in adolescence, males leave the natal family to participate in older all-male groups, a period coincident with a second major stage of brain reorganization identified in humans. Cull orphans sustain a series of traumas, such as premature weaning, shock and the lack of older male socialization. The critical role of older males in normal social development was clearly demonstrated when researchers re-introduced older bulls to quell the young males violence. Hyper-aggression and abnormally early musth cycles (periods of sexual activity and hormonal shifts) both ceased (p. 807).

Equines and even humans are similar to elephants when it comes to complex social structures and attachment bonds. When unable to engage in natural behaviors to bond and forage – and when instinctual survival impulses to fight or to flee are thwarted in some way – the result can include anxiety, hypervigilance, exaggerated startle responses, attempts to avoid or resist certain situations or actions, fleeing, or responding aggressively. Even tuning out, shutting down, dissociating, or submitting when overwhelmed and unable to fight or flee are common responses in all mammals, as is the tendency to turn to various strategies to cope with the stress or divert the energy.

5. Defensive Accommodations as Management Strategies

This residual energy does not simply go away. It persists in the body, and often forces the formation of a wide variety of symptoms, e.g., anxiety, depression, and psychosomatic and behavioural problems. These symptoms are the organism's way of containing (or controlling) the undischarged residual energy. Levine (1997, p. 20)

These behaviors are known under different names when occurring in humans – addictions, eating disorders, tics, obsessive-compulsive behaviors, and so on – and the research on trauma recognizes that these and other mental and physical health symptoms stem from adverse, chronically stressful or traumatic experiences (Felitti et al., 1998; Karr-Morse & Wiley, 2012). However, the majority of the animal science literature describes these behaviors as "having no apparent goal or function" (Garner & Mason, 2002), in spite of ample evidence to the contrary. Indeed, animal science researchers

will call these behaviors in animals by a more generic term, stereotypies or stereotypic behaviors, or in horses "stable vices". Interestingly, human addictions are still referred to as vices in certain circles, but as society becomes increasingly trauma informed, more and more people and professionals understand these behaviors to be an individual's best attempt at coping with distress, boredom, overwhelm, over-stimulation, confusion, sensory and social deprivation, pain, confinement, trauma or dysregulation. Nevertheless, parallel behaviors in equines – such as circling, box walking, wind sucking, cribbing, weaving, gate pacing, and fence walking, among others – continue to be called vices in the equine world, in spite of having similar causes and serving similar purposes in many cases.

The word vice carries negative connotations. It is discouraged when referring to addictions and other coping methods in humans (such as self-harm, disordered eating, skin/hair picking, and so on) because it implies pathology, moral weakness or defectiveness in the person, as opposed to taking into consideration the circumstances that led to the behavior in the first place. And yet, it seems to be a much slower process to adopt softer and more accurate language when it comes to non-human animals, which also do things like self-mutilate, pull hair or feathers, pick at skin, or engage in other behaviors or movements as signs of duress or disconnection. Houpt and McDonnell (1993) state that *"the most common scientific interpretation is that stereotypies begin as displacement activities, vacuum activities, intention movements, or mimicry. Each of these is presumed to be normal and adaptive in wild animals"* (p. 1265). They further describe each as follows:

- Displacement activities: *"behavioral sequences that appear in an unusual context. [...] Displacement responses are believed to occur with inherent motivational conflicts and or when goal-directed activity is thwarted"* (p. 1265). These behaviors occur when mammals are unable to get to something they want or need, such as food, friends, or freedom of movement when confined, or when experiencing pain, fear or stress, and often decrease when the frustrating or stressful situation is resolved. Examples in various species include yawning, pawing, eating wood or dirt, biting oneself, pulling hair or feathers, excessive licking or self-cleaning, wind sucking, bar chewing, etc.

- Vacuum activities: *"behaviors that were initially evoked by a meaningful stimulus (e.g., skin parasites in the case of flank biting), but that persist after the stimulus ceases"* (p. 1266).
- Intention movements: *"are abbreviated initial portions of behavior sequences"* (p. 1266), such as weaving, circling or pacing being a segment of a larger action sequence towards an impulse to flee or escape confinement.
- Mimicry: *"stereotypies that may evolve by observational learning [...] in association with exposure to other horses that engage in the activities"* (p. 1266), however there is inconclusive evidence showing that horses learn stereotypic behaviors through observing others engaging in the same actions (Wickens & Heleski, 2010).

Human and non-human mammals engage in these behaviors, even though we don't refer to them by the same terminology. Relying on certain behaviors to cope with stress because of being exposed to it by others in our social group (and therefore it being sanctioned and familiar, such as alcohol or drug use), known as learned behavior, aligns with the concept of mimicry. There also appears to be a genetic link to certain stereotypies in horses, just like there appears to be one with addictions in humans (Goldman, Oroszi & Ducci, 2005; Wickens & Heleski, 2010). Self-harm, self-mutilation, skin picking and hair pulling are forms of displacement activities. Certain obsessive-compulsive behaviors and tics could be considered vacuum activities or intention movements. The concept of intention movements being a truncated portion of a larger global action aligns with the concept of the preparatory set of mobilization actions towards survival or nourishment being thwarted, where only a segment of the movement was possible.

During artillery bombardments, as the soldiers tried to recover and prepare themselves for battle, a fairly large number of them remained frozen in the mud of the trench, locked in the posture of self-defense. Many of the soldiers never recovered from this posture. They remained physically frozen, blind, deaf, mute and with numerous tics for the rest of their institutionalized lives. Shell shock and its sensorimotor responses reflected freeze/dissociation in the face of overwhelming helplessness. So here we have a continuum of symptoms, experiences, and

behavior that reflect all of the sensorimotor syndromes of trauma. The freeze "discharge" is a completion of the act of self-defense, and it extinguishes procedural memory of the trauma. When a "discharge" occurs in a patient during psychotherapy, it looks not only like the act of self-defense, but also very much like the patterns of movement in hysteria. Both of these states also reflect the repetitive movement patterns that we call "tics", which also represent incomplete replications of failed muscular actions of self-defense (Scaer, 2012, p. 128).

Consider the classic Disney story of Dumbo the elephant. When Dumbo was teased by humans due to his large ears, his mother mounted an aggressive defense response to protect her son and hit the offender with her trunk. In the wild, such natural defenses occur on a routine basis and are understood as normal and justified. However, within human society, the norms are different, and a trauma-informed lens is often lacking. In Dumbo's case, his mother was punished by separating her from her son, locking her away in a confined space with a sign marked "mad elephant", and preventing her from fighting, fleeing or engaging in maternal nurturing and other natural behaviors that promote comfort and well-being. Dumbo's mother was further abused by being whipped in an attempt to prevent her from potentially harming other humans; instead of the protective behaviors being recognized as a sign that the animals' safety and security were compromised. In the scene immediately following the chaos at the circus, Dumbo's mother is shown locked away in confinement, dead eyed, shifting her weight from one foot to the other. This weight shifting in confined mammals can either be considered self-stimulating displacement activity in a sensory- and socially-deprived environment, or an intention movement showing a repeated segment of the thwarted action that is prevented from occurring (flight response) due to confinement, or both (self-stimulating through the repeated attempt at engaging the small portion of the flight response that was possible given the circumstances). Perhaps not surprisingly, when given the opportunity to complete the sequence of thwarted action and engage in natural impulses, tics and other apparently self-stimulating or stereotypic behaviors can resolve in some cases (Levine, 2015).

A number of researchers have been focusing on the neurobiological underpinnings of stereotypies in mammals, and comparing these with human equivalents. For instance, the parallels between human obsessive-compulsive disorder (OCD) and compulsive behaviors in non-human mammals are numerous, and occur in the face of restraint, environmental or social deprivation or stress (in humans, as well as in family pets, laboratory animals, and caged animals and birds). For instance, serotonin deficiencies occur in compulsive behaviors in both horses in humans, and serotonin reuptake inhibitors (SRIs), antidepressants that also help with anxiety, are used in both horses and humans for the same purpose. Human OCD and similar stereotypies in animals also both involve altered functioning of the basal ganglia and an underactive prefrontal cortex, which are involved in modulating compulsive behaviors (Chacko, Corbin & Harper, 2000; Eilam, Zor, Szechtman & Hermesh, 2006; Garner & Mason, 2002; Dodson & Shuster, 2005; Mink, 2006; Rapoport, 1990; Saint-Cyr, Taylor & Nicholson,1995; Wickens & Heleski, 2010).

Human addictions and non-human animal stereotypies also share parallels in terms of contributing factors and progression. In particular, they are associated with various stressors, painful experiences (in the womb, during and after birth and beyond), deprivation, confinement, boredom, and the absence of consistent, secure interactions with caregivers and other members of one's species (attachment ruptures). In fact, altered function in neurotransmitters can occur as early as within one week of separation from the mother. These include altered levels of norepinephrine, which leads to fearfulness, hyperactivity and increased sensitivity to stressors; decreases in oxytocin, which modulates mood, anxiety, and aggression; and reduced dopamine receptors in the areas of the brain involved in motivation, reward, addiction and craving (Maté, 2012). In his summary of the research in this area, Maté, 2012) states that in the absence of natural or endogenic opioids derived from secure attachment relationships, mammals turn to external sources. For instance, maternally deprived rats in lab conditions have a higher propensity to take cocaine. This behavior was found even in rat pups away from their mothers for only one hour a day during the first week of life (extreme deprivation was not required to increase the risk of addictive behaviors). Studies also found that pups

weaned from their caregivers after 2 weeks were more likely to drink alcohol than pups weaned after 3 weeks. Similarly, monkeys taken from their mothers and raised in peer groups were found to have lower levels of serotonin, were more aggressive, and tended to drink alcohol to excess. Furthermore, mammal babies that receive physical contact and nurturing from their parents (touch, licking, being held) have more receptors for naturally occurring benzodiazepines. This is interesting given the high risk for dependence on pharmaceutical benzodiazepines in humans with poly-substance abuse, usually in combination with opioid dependence (Longo & Johnson, 2000) – both of which are neurotransmitters affected by early trauma and early adverse experiences. Finally, stress, trauma and early developmental ruptures[5] are known to:

- Increase cortisol, a stress hormone that damages the dopamine system, shrinks the hippocampus (involved in memory and emotions) and disturbs brain development;
- Increase adrenaline (hyperarousal);
- Increase vasopressin, resulting in hypertension; and
- Make individuals more easily triggered by stress, more anxious, more distressed, more reactive, and more hypervigilant.

As a specific example, cribbing in equines has a direct parallel to addictions and OCD in humans, and the behavior has a number of similar causes and serves similar purposes depending on the individual animal. A review of the literature includes the following factors underlying cribbing, linked to stress, trauma, attachment ruptures, environmental and social deprivation, and thwarted ability to engage in natural behaviors (Budzynska, 2014; Dodson & Shuster, 2007; Hemmings, McBride & Hale, 2007; Houpt & McDonnell, 1993; Wickens & Heleski, 2010):

- Serotonin and opioid deficiency (cribbing releases endogenous opioids, and taking SRIs and opioid antagonists reduce the behavior)

5 For a review of the links between trauma, attachment, neurotransmitters, Porges' polyvagal theory and Pankepp's emotional drives, see Lanius (2014).

- Stress (cribbing horses are more reactive to stressors, and cribbing reduces cortisol and heart rate)
- Basal ganglia dysfunction (similar to compulsive behaviors in other animals and humans)
- Early weaning (similar to early attachment ruptures in humans and other animals)
- Gastrointestinal irritation due to high concentrate / low forage diets and possible stress from early weaning (e.g., ulcers in foals)
- Foals stalled and not kept on grass post-weaning
- Inadequate turn out in adult horses
- Lack of control over the environment
- Boredom, inactivity and frustration
- Personality traits
- Social deprivation (limited contact with other horses)
- Breed predisposition (higher risks for cribbing found in thoroughbreds and warmbloods, which are typically found in competitive disciplines with limited freedom of movement and social contact)
- Male horses/stallions are at higher risk (stallions are often housed separately in isolation)

Interestingly, cribbing is rarely seen in donkeys and mules, largely because they are typically not confined in stalls or fed high concentrate foods, and instead are usually kept on pasture where they can roam and engage in more natural behaviors (Wickens & Heleski, 2010).

6. A Trauma Lens for All Mammals

The movement towards trauma-informed care, services and organizations over the past few decades has helped to shift how we view human responses to abnormal circumstances. A common quote repeated in association with the idea of a trauma lens for

humans is "it's not what's wrong with you, it's what's happened to you and how you adapted to survive." Another similar perspective as applied to parenting is, "the child isn't being difficult; they're having a difficult time". The emphasis is less on pathology, defectiveness, or weakness, and more at seeing mental and physical health issues and behaviors as evidence of the impact of adverse conditions and a person's best attempt at adapting or coping.

Adopting a trauma lens is equally relevant to other mammals. Even though normal equine responses to poor welfare or environmental conditions are still frequently viewed as abnormal, inconvenient, offensive, or incomprehensible in the eyes of humans (Cooper & Mason, 1998), there are more and more voices in the fields of animal welfare and ethology that are encouraging a similar compassionate view or reframing of animal behavior. That is, that it is not what is wrong with the animal, it is about what has happened to it and how it has adapted to survive its life circumstances and experiences (and, indeed, how it responded to past or current interactions with humans or living conditions). In an article pertaining to the use of animals in research settings, Reinhardt (2004) summarized the views of a number of experts advocating for a more compassionate view of these behaviors. Although the term trauma lens is not used, the perspective they promote is identical.

It is the artificial environment in which stereotypies develop that is "abnormal" as it does not allow the animals to satisfy basic behavioral needs. The label "abnormal" would be more fitting for the inadequate confinement condition rather than for the subject's unsuccessful attempt to adjust to it. We tend to project abnormality onto animals rather than onto the people who create deficient living quarters for them. It would be fair to first focus on the husbandry conditions, study the environmental factors that lead to the development of abnormal behaviors, and then correct these factors in order to prevent abnormal behaviors in the future. These unsuccessful attempts of adjusting could also be described as "behaviour indicative of an abnormal environment". Many stereotypies are signs of frustration, with the subject being chronically thwarted from expressing basic activities (p. 3).

Note the parallels between the statement that these "vices" stem from basic activities being thwarted, and the premise in this article that trauma and its various manifestations and coping mechanisms result from similar thwarted efforts. Note also the parallels between the historical tendency to blame the animal for not adapting to unnatural, inhumane or confusing treatment or conditions (which sadly is still a perspective that exists today), and the pattern of "victim blaming" that continues to be entrenched in human society.

Mason (2006) proposed that a more accurate definition of stereotypic behaviors be adopted in the literature and in the broad fields of animal science: *"Stereotypic behaviors are repetitive behaviours induced by frustration, repeated attempts to cope, and/or central nervous system dysfunction"* (p. 326). This definition reflects the impact of conditions such as stress, confusion, trauma, isolation, confinement, neglect, abuse, training methods, and other circumstances (that are either current, or have occurred in the past and are persisting in spite of better conditions). This is a significant improvement over the more common claim that these behaviors are without any apparent goal or function, which merely serves to deny or dismiss the experience of animal distress. However, going as far as to name these experiences or behaviors in animals as evidence of trauma or addictions remains a leap that most reference works appear hesitant to make. Indeed, a review of articles and websites discussing stereotypies in animals in various settings rarely, if ever, made mention of trauma or attachment ruptures as contributing to these behaviors (language used when referring to human experiences), preferring instead to use wording such as early weaning and maternal or environmental deprivation that seem to minimize the impact through sterile language. This is not unusual for trauma, which is, by its very nature, something appalling that societies throughout time immemorial have shied away from. As so eloquently expressed by Herman (1992), *"the ordinary response to atrocities is to banish them from consciousness. Certain violations of the social compact are too terrible to utter aloud: this is the meaning of the word unspeakable"* (p. 1).

It may be for this reason that some sources continue to describe stereotypies in non-human animals as functionless or purposeless (Garner & Mason, 2002), in spite of clear evidence to the contrary. It is easier to turn a blind eye to their true causes than to face the reality of animal suffering at the hands of humans and associated dissonant guilt or shame. Indeed, renowned evolutionary biologist Marc Bekoff states *"over the years, I've noticed a curious phenomenon. If a scientist says that an animal is happy, no one questions it, but if a scientist says that an animal is unhappy, then charges of anthropomorphism are immediately raised. This "anthropomorphic double-talk" seems mostly aimed at letting humans feel better about themselves"* (Bekoff, 2009, n.p.). Naming equivalent responses in behaviors in animals by vague euphemisms that downplay the reality of what is going on is the same as calling the death of innocent civilians in warfare "collateral damage" – it disconnects us from the truth of the matter, the reality of those suffering, in a way that sanctions atrocities for specific purposes through a form of linguistic tranquilization. Why not call stereotypies in non-human animals "coping behaviors", "management strategies" or even "addictions" and give them the respect of acknowledging that these are compensatory in response to unsatisfactory conditions? The terms "vices", "stereotypies", "vacuum behaviors" and so on either cast blame, imply pathology, or are clinical expressions that minimize, deny, create distance between the observer and the animal being observed, thereby reducing empathy. In failing to call a spade a spade, we continue to perpetuate blindness to an issue that is staring us right in the face.

This is not to say that casting blame or judgment is a useful solution or response to this information, or that this perspective is being provided in an effort to induce shame. This lens is also not being provided with the intention of discrediting any specific training approach, equine discipline or animal husbandry method. However, shame, guilt, self-blame and judgment are often common but unintended reactions when faced with new information that might result in a questioning of past or even current actions. This is no different from the guilt that arises when discussing the impact of attachment ruptures or dysregulation on children with their parents or caregivers, in an effort to heal and find new solutions moving forward. In both cases, self-compassion and a deep empathy for oneself are crucial when we come face to face with unresolved activation

that makes it difficult to integrate new ideas – hence the importance of a trauma lens once again. Learning and connected relationships are compromised when we become triggered, and facilitated the more we are able to notice and allow those emotions and sensations to move through and return to a settled state. The majority of people who have animals (or children) are well intended and do the best they can based on their existing knowledge, experiences, circumstances and resources available to them. Learning is an ongoing and evolving process for everyone that can be a bumpy road at times – to err is part of our shared humanity. However, along with growth come not only mistakes but the opportunity to repair and improve interactions and living/working conditions. An important perspective in family therapy is the concept of "good enough parenting" (Winnicott, 1973), that one does not need to be perfect in order to adequately raise children. The same is true when being stewards of the equines in our care. Intentionality, our own capacity for self-regulation when exploring new ways of being and doing, and compassion for the animals and ourselves goes a long way.

Drawing the connections between human and equine (indeed, all mammalian) responses to stress, trauma and unnatural conditions is perhaps a political act. It requires us to look beyond ourselves to see the common birthright we share as mammals and, in so doing, question and gently shift what we say and do without falling into the traps of defensiveness or despair. In spite of our differences, we are very alike. Herman (1992) stated that *"the systemic study of psychological trauma therefore depends on the support of a political movement. Indeed, whether such study can be pursued or discussed in public it itself a political question [...] Advances in the field occur only when they are supported by a political movement powerful enough to legitimate an alliance between investigators and patients and to counteract the ordinary social processes of silencing and denial. In the absence of strong political movements for human rights, the active process of bearing witness inevitably gives way to the active process of forgetting. Repression, dissociation, and denial are phenomena of social as well as individual consciousness"* (p. 9). I would suggest that her words apply to non-human animals as well, who need us to marshal efforts and mobilize this advocacy on their behalf. Indeed, as stated by Siebert (2006) in his reporting about the parallels between human and elephant experiences of trauma,

For Bradshaw, these continuities between human and elephant brains resonate far outside the field of neuroscience. "Elephants are suffering and behaving in the same ways that we recognize in ourselves as a result of violence", she told me. "It is entirely congruent with what we know about humans and other mammals. Except perhaps for a few specific features, brain organization and early development of elephants and humans are extremely similar. That's not news. What is news is when you start asking, what does this mean beyond the science? How do we respond to the fact that we are causing other species like elephants to psychologically break down? In a way, it's not so much a cognitive or imaginative leap anymore as it is a political one."

Too much about elephants, in the end – their desires and devotions, their vulnerability and tremendous resilience – reminds us of ourselves to dismiss out of hand this revolt they're currently staging against their own dismissal. And while our concern may ultimately be rooted in that most human of impulses – the preservation of our own self-image – the great paradox about this particular moment in our history with elephants is that saving them will require finally getting past ourselves; it will demand the ultimate act of deep, interspecies empathy (n.p.).

Whether human, elephant, equine, or otherwise, the message is the same: a trauma lens requires interspecies empathy, the ability to understand our similarities in terms of biology, natural drives and instincts, and also in what happens when these drives are thwarted. This is not to say that there are no differences between mammalian species, that humans are not different in unique ways from other mammals, or that there are no individual differences amongst members of a particular species. These are also givens and important to consider when trying to understand the experiences of others. However, we cannot discount the foundational birthright of shared traits and responses as mammals as a lens through which to consider not only animal behavior but human behavior[6]. Since animal models of understanding stress responses are being increasingly drawn upon in the treatment of trauma in humans, the reverse is also therefore

6 Just as anthropomorphism in its various forms proposes using human experiences as a starting place for understanding other animals' behaviour, animalomorphism (what I call mammaliomorphism) for using animal experiences as a starting place for understanding human behaviour. Both "are like two sides of an arch, supporting one another" (Tallis, 2016).

reasonable to consider – that trauma-informed care principles for humans are applicable to the care and well-being of other animals. The most common principles include: *consent, safety, choice, voice, control, empowerment, trust, collaboration, compassion and trauma awareness*. When these principles are fostered to the degree that is reasonably possible, in combination with a restoration of the ability to engage in natural drives and fulfill biological and social needs for relationship, they support a more solid foundation upon which recovery from stressful and traumatic experiences can occur. In essence, this represents a shift away from repeatedly re-enacting the same dynamics to a renegotiation and resolution of adverse conditions. For instance, trauma-informed principles are being integrated into the rehabilitation of elephants that have experienced trauma:

Just as we now understand that elephants hurt like us, we're learning that they can heal like us as well. Indeed, Misty has become a testament to the Elephant Sanctuary's signature "passive control" system, a therapy tailored in many ways along the lines of those used to treat human sufferers of post-traumatic stress disorder. Passive control, as a sanctuary newsletter describes it, depends upon "knowledge of how elephants process information and respond to stress" as well as specific knowledge of each elephant's past response to stress. Under this system, there is no discipline, retaliation or withholding of food, water and treats, which are all common tactics of elephant trainers. Great pains are taken, meanwhile, to afford the elephants both a sense of safety and freedom of choice– two mainstays of human trauma therapy – as well as continual social interaction. (Siebert, 2006, n.p.)

Although they may not all use the language of a trauma lens, an increasing number of trainers, owners, and practitioners of equine-facilitated interventions are turning to or promoting similar principles and ideas in their work and relationships with horses as well (Carruthers, 2010; Datz, 2017; Equine Facilitated Wellness Canada, 2015; Kohanov, 2007; Jobe, 2017; Jobe & Shultz-Jobe, 2016; Parent, 2016; Rees, 2017; Resnick, 2005; Wright, 2017, among others). This perspective includes being able to detect when equines (indeed, when human clients as well) are socially engaged or experiencing stress or confusion that is within a window of tolerance; when they are in fight, flight, freeze, submission/compliance beyond the window of tolerance, collapse

or dissociation/tuned out; and when they are managing adverse experiences through compensatory behaviors. A trauma lens on equine welfare and well-being also includes identifying and capitalizing on opportunities that allow horses, donkeys and mules to fulfill their natural needs for movement, play, socialization, foraging and exploration of their environment, as well as opportunities to develop the equine equivalent of an "earned secure" attachment pattern with humans and other horses as a result of consistency, patience, trust and attuned interactions. Just as we would encourage human therapists and other helping and learning professionals to find balance and focus on self-care, so, too, should this be encouraged for the animals that are partnered with in offering healing and growth interventions. Trauma-informed principles are important to consider for all beings involved in equine-based interaction programs, both human and equine alike, and offer new possibilities and directions for the human-animal alliance.

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About the Author

Sarah Schlote, MA, RP, CCC, SEP is a registered psychotherapist, Somatic Experiencing Practitioner, and founder and director of The Refuge: Centre for Healing and Recovery and the EquuSpirit: Healing with Horses program. She is the creator of Equine-Facilitated Trauma Therapy, an integrative approach combining attachment theory, touch work, polyvagal theory, ego state work and trauma-informed care principles into equine-assisted interventions along with Somatic Experiencing. (referred to as EQUUSOMA). She completed a trauma-focused master's in Counseling Psychology, conducted her thesis research on animal- and equine-facilitated interventions, and was involved in the development of ethics and standards for AAT in Canada. She has pursued training in trauma neuroscience, mammalian stress psychophysiology, touch work, and table work, including Somatic Experiencing, EMDR, Body Memory Recall, attachment-focused therapy, parts work for structural dissociation, trauma-focused Integrative Equine-Facilitated Wellness, nature-assisted therapy and is currently

learning the foundations of Natural Lifemanship. Her work is experiential, relational, depth oriented, somatic and embodiment focused, and promotes safety, consent, choice, voice, and empowerment for all sentient beings involved. A seasoned and sought after speaker on trauma-informed care and trauma-specific therapy, Sarah is also a longstanding mindfulness practitioner, SE training assistant, and perpetual student of horsemanship.

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