ISES Online Conference 2020

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A big thank you to former Newsletter Editor, **Cristina Wilkins**, who published our fantastic newsletters for many years and has been our guide and mentor as the new team takes over. In this issue we will be reviewing highlights from the very successful Virtual ISES Conference that took place this past August. The talks were provocative, informative, persuasive, and challenged us to reach beyond our hallowed walls of Equitation Science. Still, I *so* missed our coffee breaks after the sessions. At a live conference *this* is where the work of the Society really happens. Our virtual organizers did a splendid job with an opportunity for after session and after conference virtual chat rooms, but I still felt the lack of my face-to-face contact with colleagues. Covid will not be forever, and at some point we can again look forward to at least mask-to-mask contact, though drinking coffee may be challenging.

Toni Henderson

ISES 2020 Virtual Conference

Our president, Orla Doherty, opened the conference with a thank you to conference organizers: **Jane Williams**, **Carissa Wickens**, **Alexandra Morrison**, and **Coleen Brady**. Orla reminded us of the goal of ISES which is to encourage research into the horse-human interaction and to disseminate this knowledge to improve equine welfare. Orla then shared with members some of her early childhood horse and pony books that were her foundation in learning how to ride and care for her first pony. She noted that the excitement and passion that went into expanding her knowledge as a child is precisely what ISES is endeavouring to do today. Members share their ideas and passions, and through scientific research, our knowledge of the horse, the horse-human interaction, and equine welfare continues to grow so that both owners and horses across the world can benefit.

Professor Natalie Waran, Ph.D: A good life for horses: *Challenges and opportunities*

In this talk Natalie Waran encouraged us to look closely and ask hard questions about the quality of life our horses experience, horses who cannot make choices about their management, handling, or whether or how they are ridden. Waran noted that the FEI rules advocate for a "happy equine athlete", but that "happiness" is an elusive concept and poorly defined in the FEI rule book and elsewhere. A horse that is not experiencing negative states or emotions is not necessarily a "happy" horse.

She argued that our sport is under closer scrutiny than ever before, and in order to sustain it we must deal with the court of public opinion and the *Social License to Operate*. Thus, it behoves us to understand and provide a good quality of life for our horses. Waran outlined some of the challenges we face to ensure this good quality of life. First, we need to face the difficult question of whether it is even possible to ensure a good quality of life for horses while using them for sport. And, if it is possible, what would a good life for today's modern sport horse look like? What is *accepted* practice (individual housing and limited foraging opportunities, for example) is not always the *best* practice and does not necessarily ensure a good quality of life. Secondly, owners are often poor judges of a good quality of life, because they are not objective; their personal and competitive goals often conflict with the best interests of the horse. Thirdly, since animals cannot tell us how they feel, we face another challenge in assessing their subjective experiences. We are actually much better at assessing and measuring negative states than positive ones. What does "good" look like from an equine lens?

Waran then described how we might surmount some of these challenges with good science. Preference studies, where researchers study what environmental choices animals make and the strength of their preference (e.g. what kind of housing, bedding, social conditions, handling, etc.) have been used widely with agricultural animals, but have had limited use in equine science. Cecille Mejdell and colleagues, in a series of ingenious studies on blanket preferences, taught horses to target a specific shape that corresponded to a unique consequence ("Blanket off please", "Blanket on please", or "I'll stay as I am thank you"). Once trained (in a mere 14 days) horses clearly communicated their wardrobe preferences in a way that logically corresponded to the climatic

conditions they were experiencing. It appears that horses know what they want and will tell us so when given the chance. And for the record, horses want to be 'naked' much more often than we think they do!

Another opportunity for assessing good welfare is research demonstrating the relationship of various eye and facial expressions to different emotional states. It appears that humans are often fairly accurate at assessing welfare states in species they are familiar with. Developing this approach for use in horses requires further research to determine the most reliable behavioural, postural, and facial indicators of different presumed emotional states. A "trust your eyes' approach would be useful for horse owners, who could then be confident that sad horses *look* sad, and happy horses *look* happy.

Waran advocated for the development of an evidence-based *Quality of Life Assessment Framework* that defines a profile of equine behavioural states to reliably assess equine emotions. This *Quality of Life Framework* could bring science to the stable and help ensure that horses are maintained in a positive welfare state as much as possible. Owners and industry professionals would have the tools to determine what a positive state looks like, and thus identify early warning signs when a positive state was not being maintained. Waran stressed that, "although the secret life of horses is not easy to access, all of us who enjoy our interactions with horses, want our horses to be able to live a good life".

Associate Professor Hayley Randle: How are we doing on the 3 c's? Communication collaboration and change

Hayley Randle gave a shoot straight from the hip talk about how well ISES is doing as an agent of communication, collaboration and change. She reminded us of ISES's mission which is "to promote and encourage the application of research and consequently advance practice which will ultimately improve the welfare of horses in their interactions with humans." The critical cornerstones for achieving this goal have been: 1) Equine ethology, 2) Equine psychology, 3) Learning theory, and 4) Animal welfare.

As with many presenters, Randle too addressed the *Social License to Operate*. She emphasized that the public now, more than ever before, has an enormous influence on the future of our sport due to the massive dissemination of knowledge (and, unfortunately, lack of knowledge) on social media, and has become a big driver in horse welfare, particularly in the competitive arena. She also noted

that much of this massive distribution of information, though well-intentioned, is not always well-informed. Clearly then, our three Cs are critical.

Communication: She noted that not only does our science need to be sound (incorporating the 3Rs of rigorous, robust, and reliable), but we have to distill and disseminate that science to be accessible and available to a broad audience of horse owners and horse enthusiasts. It is key that we engage the horse owning and general public in such a way that they don't simply tune-out from an overload of scientific mumbo-jumbo.

Collaboration: ISES needs to continue to collaborate with other researchers, both within the equine industry and with other animal industries. Although ISES has increased the availability of evidence-based information to practitioners, Randle admits that we are still largely preaching to the converted. We need to ensure we speak the same language as our intended recipients.

Change: To *make* change happen, we need to understand *how* change happens, and that the *best practice* is not always the *best fit.* Sometimes we may need to make smaller scale, acceptable changes that will diffuse push back, and eventually lead to the changes we would like to see being embraced more willingly and positively. For example, veterinarian education is increasingly emphasizing the principles of learning theory for handling horses during treatment with the intention to decrease stress and increase safety for all.

Randle concluded by reiterating that ISES needs to take the role of a *Positive Influencer*. Although doing good science is an integral part of this process, ISES must take a more active stance in finding ways to bring the equine community along to make the necessary changes in the equine industry.
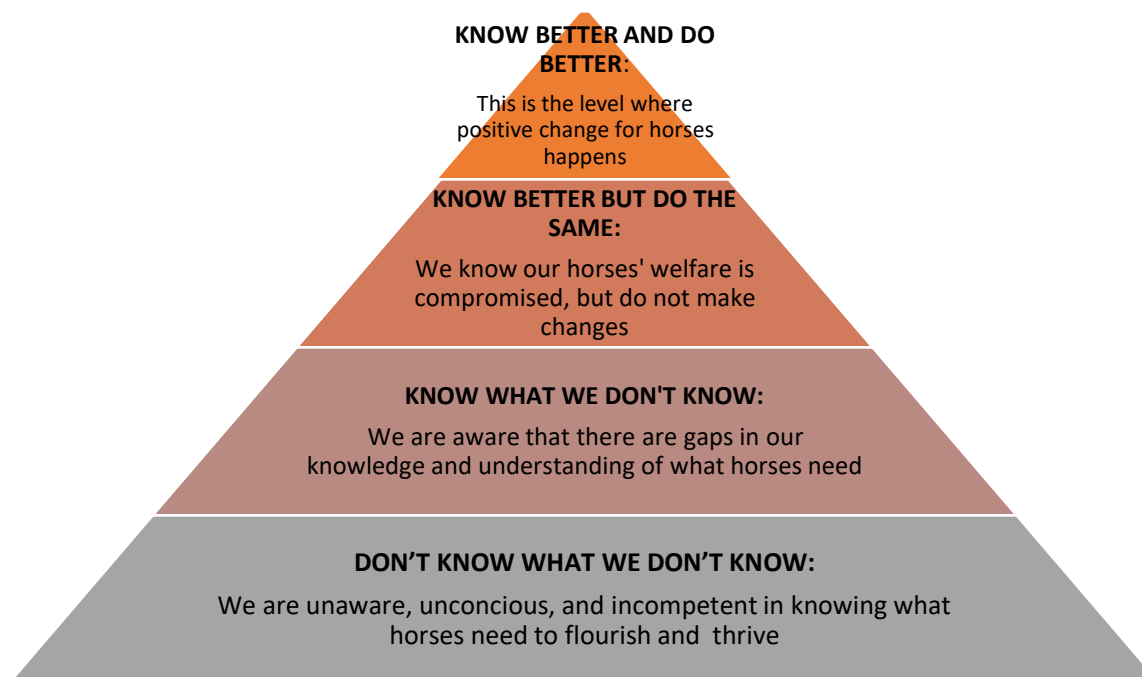
Lisa Ashton: What we know matters

Lisa Ashton gave a very electric talk (no small feat with virtual delivery!) using the metaphor of the movie "Matrix" (which I now feel is a must see) to explore how we ensure optimal welfare for our horses and how we disseminate knowledge for horses' benefit.

Ashton maintained that all of our interactions with horses can be seen from the perspective of a relationship bank account. We need to, in all our interactions, sustain enough deposits to balance the withdrawals. Transport, horse showing, vet interventions, or losing an equine friend withdraw from our relationship bank account. Clarity of training, meeting horses' ethological needs for companionship, forage and agency, place small deposits, and build better relationships. With every human/horse interface, we constantly need to ask, "What is in it for the horse?"

Ashton noted that *what we know matters,* and that we can view this as a pyramid of knowledge. We have represented her pyramid below:

KNOW BETTER AND DO BETTER:
This is the level where positive change for horses happens

KNOW BETTER BUT DO THE SAME:
We know our horses' welfare is compromised, but do not make changes

KNOW WHAT WE DON'T KNOW:
We are aware that there are gaps in our knowledge and understanding of what horses need

DON'T KNOW WHAT WE DON'T KNOW:
We are unaware, unconcious, and incompetent in knowing what horses need to flourish and thrive

Ahston added that *who we are* matters more than *what we know*. We may find ourselves in situations where the expert is not legitimate, where the person with the least amount of knowledge has the loudest voice. And if ISES members are only talking to other ISES members we are talking to those in our own "echo chambers" (i.e. where we encounter beliefs or opinions that mirror our own), and we do not advance welfare for horses. Ashton advocated that in order to make real change for horses, we must step down from our ivory towers and share equitation science more widely. By incorporating the four pillars of legitimacy, transparency, communication, and trust we begin to earn social *acceptance* of horses in sport, and ultimately social *approva*l.

Ashton encouraged us to create community, to connect, and to shine praise on what we are doing optimally, rather than punish those doing harm. Punishment is equally ineffective for people as it is for horses and usually produces the opposite effect to what was desired. It does not benefit horses, and makes the punished person aversive to the deliverer of the punishment and to their message. As Ashton stated, "Shame is not a tool for horse justice". Rather, our key to improving equine

welfare is collaboration, consensus, and communication. She argued (as did other speakers throughout the conference) that we are all responsible for cultivating our social license.

Ashton reminded us of the 1999 movie *The Matrix* which depicts a dystopian future where human beings are trapped in a simulated reality (the Matrix) and harvested by intelligent machines as an energy source to keep the machines running. She noted that the horse training environment is an equestrian "Matrix", with our horses trapped in a reality not of their choosing. In the movie, the lead, Neo, can take the red pill, which is the truth (the reality of the situation), or the blue pill (to keep his perception of the world the same). Placing the spotlight on horse training, Ashton urged us to swallow the red pill – to use evidence-based knowledge to learn the truth and grow our understanding of how horses feel, and to act on it.

Dr Andrew McLean: *Interaction of biomechanics and learning theory in dressage*

Andrew McLean took us on a fascinating and detailed journey about what we need to do to train a horse to the upper levels of dressage and the essential biomechanics that help us get there.

He noted that all movements in dressage, even at the higher levels, are achieved by getting the limbs to go forward and back, to go sideways, and to go higher. And we can do this at a walk (4 beat), trot (2 beat) and canter (3 beat). He then reviewed learning theory basics, both Associative Learning (Operant and Classical Conditioning) and Non-Asssociative Learning (Habituation and Sensitization). He noted that Operant Conditioning's Positive and Negative Reinforcement need to be considered in their arithmetical sense (adding and subtracting) rather than a moral one (as in good and bad). We can have the addition of something the horse wants, to make a behaviour more likely to reoccur (Positive Reinforcement: PR), or the removal of something the horse doesn't want – something mildly annoying – to make the behaviour more likely to reoccur (Negative

Reinforcement; NR). McLean's quote from Tom Roberts is one I plan to steal for future talks and articles, as nothing explains negative reinforcement (or removal reinforcement) so succinctly and so simply:
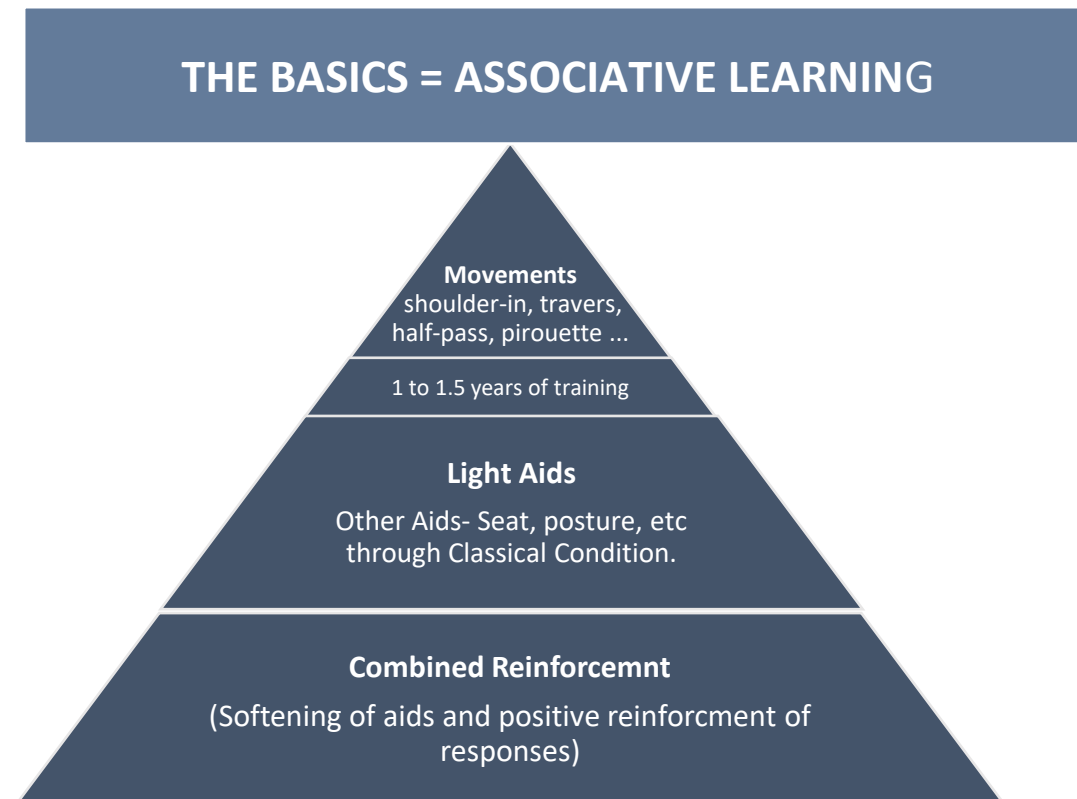
"When you sit on a pin, why do get off?"
"Because it hurts."
"No. You get off because it stops hurting."
McLean stated that this is key to successful NR training. It is vital to remember "that pressure *must* stop; otherwise the horse is in a bad place."

McLean also explained Combined Reinforcement (using both PR and NR at the same time) which amplifies the release of pressure by rewarding the behaviour we want. We may tap a horse's leg's lightly until he moves that leg (NR) and then reward him with a treat when he does (PR). Thus, the horse is doubly rewarded by the termination of the mildly annoying tapping and secondly with the treat.

THE BASICS = ASSOCIATIVE LEARNING

Movements
shoulder-in, travers, half-pass, pirouette …

1 to 1.5 years of training

Light Aids

Other Aids- Seat, posture, etc through Classical Condition.

Combined Reinforcemnt

(Softening of aids and positive reinforcment of responses)

GO Gait Tempo Length	**TURN HINDLEGS** Direct & Indirect	**TURN FORELEGS** Direct & Indirect	**STOP** Gait Tempo Length

In the slide above McLean stated that the four pillars of Associative Learning (Go, Turn hindlegs, Turn forelegs, and Stop), form the foundation of all the upper level movements. Initially, we train the horse with Operant Conditioning (primarily through the pressure and release of NR and augmented by positive reinforcement). Our goal is to apply combined reinforcement so well that we "have shrunk those aids to the tiniest invisible signal that the horse can detect", eventually moving to a classically conditioned signal (e.g. I tighten my stomach muscles just before applying rein pressure and the horse learns to slow the gait on this initial cue, so that the rein pressure is almost redundant). Once these basic responses are working well, the dressage "movements" (shoulder-in, travers, half-pass, etc.) involve training a sequence of the basic responses through shaping – rewarding closer and closer approximations of the desired behaviour.

Interface between learning and biomechanics
McLean then detailed a breakdown of the equine brain, and described how the brain forms the interface between learning and biomechanics. The *substantia nigra* is a central component of the brain's dopamine pathway, and thought to be crucial in the facilitation of locomotion. McLean noted that this is why it is important to control the legs. When we train the legs to give the right answers, this makes for a safe horse and one that is less stressed. Also of note, is the *amygdala* – the centre of the fear response. McLean explained that fear responses can be learned in a single event, are not easily extinguished, and can reoccur in spontaneous recovery when we least want them. Thus, he stressed that in all training, we want to keep the horse in a low threshold place to avoid activation of the amygdala.

Biomechanics
In the third portion of his talk, McLean stated that all transitions between and within gaits occur within three beats of rhythm. Light Aid (this is the ask or the "Please"), Stronger Aid (only if necessary, the "Do it"), and Release (which is the "Thank you"). McLean's biomechanic insights included: **tempo** (surprisingly precise in dressage), **timing of aids** (training will be more efficient if aids are given on the swing phase of the gait), **bend** (the amount of bend in terrestrial mammals is inversely related to body mass – cats are much bendier than horses), and **symmetry and asymmetry** (horses, and riders, will have a tendency to be asymmetrical and this will have predictable consequences in their performance).

McLean also discussed the *Central Pattern Generator (CPG)*, a neural circuit (responsible for walking, swimming, breathing, etc.) that operates without input from higher brain functions. Gaits are under the control of the CPG, but tempo requires higher level brain input. Teaching flying changes, for example, is challenging because the gaits themselves are controlled by these internal mechanisms, but the horse must learn how to intercept that automatic process according to a cue. McLean also pointed out the asymmetry of the diagonal pairs and how that affects the horse's

crookedness and slightly unequal propulsion and deceleration capacities. He pointed out that dressage riders would do well to recognise the potential of altering the acceleration/deceleration of individual diagonal couplets to achieve straightness and lightness. Fascinating!

In McLean's image below we see the location of the Central Pattern Generators, the reduced influence of the brain regarding gaits, the feedback from the limbs, the wiring of the diagonal couplets and the predominance of forelimb control.
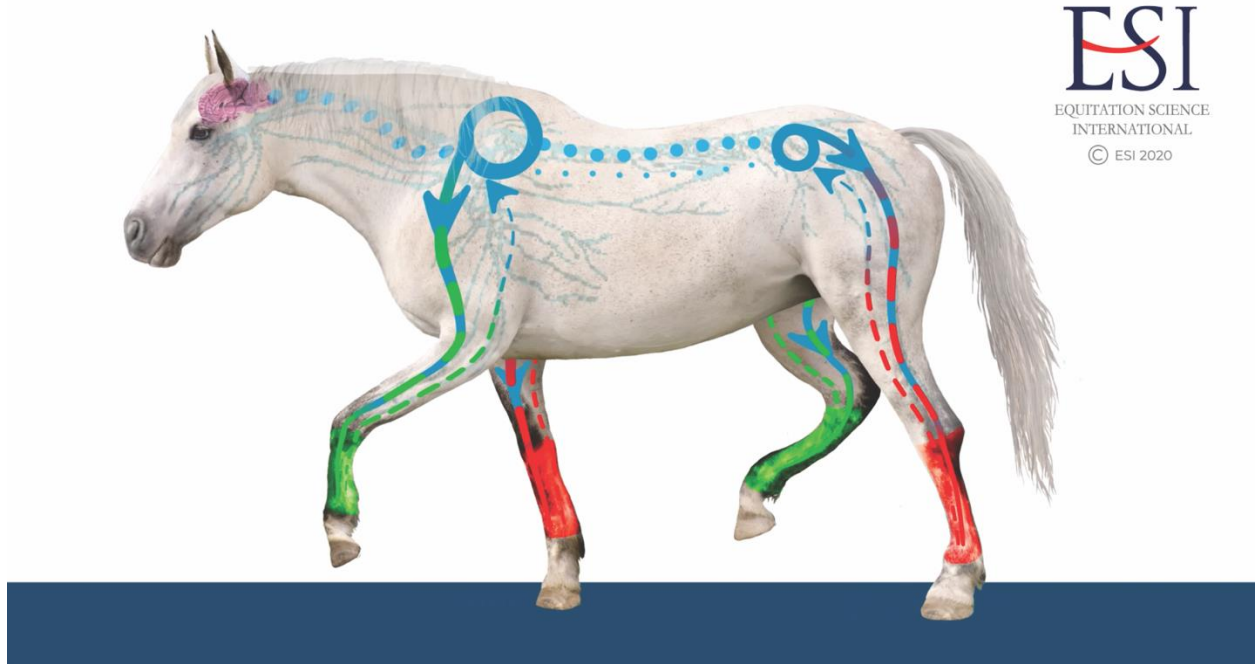
Dr Katrina Merkies: *A match made in heaven: The road to horse and human well-being*

Katrina Merkies began by introducing her audience to the concept of Umwelt – a German word meaning "surrounding world", which describes the notion that different species have vastly different ways of seeing the world, based on species specific perceptual abilities and proclivities. Individuals create and maintain their unique Umwelt – a very thin slice of all available worlds – guided by their exclusive evolutionary histories. Merkies stressed that even though we may share the same environment with our horses, their umwelt will be very different than ours, and that we need to be sensitive to and to honour this difference. She then provided a wealth of the latest literature on how horses sense and perceive their world and the humans with whom they interact.

Apparently, horses are much more adept at reading human emotions than we might think and can do so by reading our body language, our smell, our tone of voice, and our facial expressions. For example, research indicates that horses are quite astute at reading human facial expressions even from a photograph, and show discomfort and stress (elevated heart rate, licking, chewing, and looking away) when viewing a photograph of an angry looking person as opposed to a neutral looking person. There is also evidence to suggest that horses may be able to follow human pointing gestures (although they are not the geniuses that dogs are in this department), and to share emotional states measured through synchronicity of heart rates. The jury is still out on whether horses form true attachment bonds to humans (measured in the four pillars of attachment:

proximity seeking, secure base, safe haven, and separation distress), but they do respond more positively to handlers with whom they have had positive experiences.

Merkies also tackled the other side of this equation by looking at research on how adept humans are at reading equine emotions. For example, the *Pain Grimace Scale* has identified equine facial expressions of pain, that correspond to physiological indicators of pain. Since horses are evolutionarily designed to suffer silently (appearing compromised is not a great idea when the next predator comes around), these objective measures of our horse's suffering will be essential tools in enriching the human/equine relationship. Merkies emphasized that regardless of how good we may be at reading behavioural indicators of distress, it is important to note that the absence of indicators does not necessarily equate to the absence of distress.

I have included Merkies' comprehensive Reference List at the end of this newsletter – a treasure trove of the latest science in the human-horse relationship. Invaluable!

Dr Paul McGreevy and Dr Kate Fenner: *E-BARQ: A flagship tool for equitation scientists*

Paul McGreevy and Kate Fenner gave conference participants an introduction to The Equine Behavior Assessment and Research Questionnaire (E-BARQ)- a sister of C-BARQ, (the canine equivalent), designed by James Serpell of the University of Pennsylvania, which now has data on over 85,000 dogs. The purpose of E-BARQ was to develop a data base sufficiently large to overcome respondent bias, monitor horses over time, and potentially inform us about how horses should be managed and trained – which traditions make sense to retain and which traditions need to go. In short, the more we know about horses (for example, by identifying behaviours that may be predictive of undesirable or dangerous behaviours) the more we can enhance equine welfare, and

the safer we can be when working with them. E-BARQ covers three main areas of our interaction with horses:

1. Temperament – what the horse does on its own–a kind of personality measure
2. Equitation – which relates to how horses react when handled and ridden
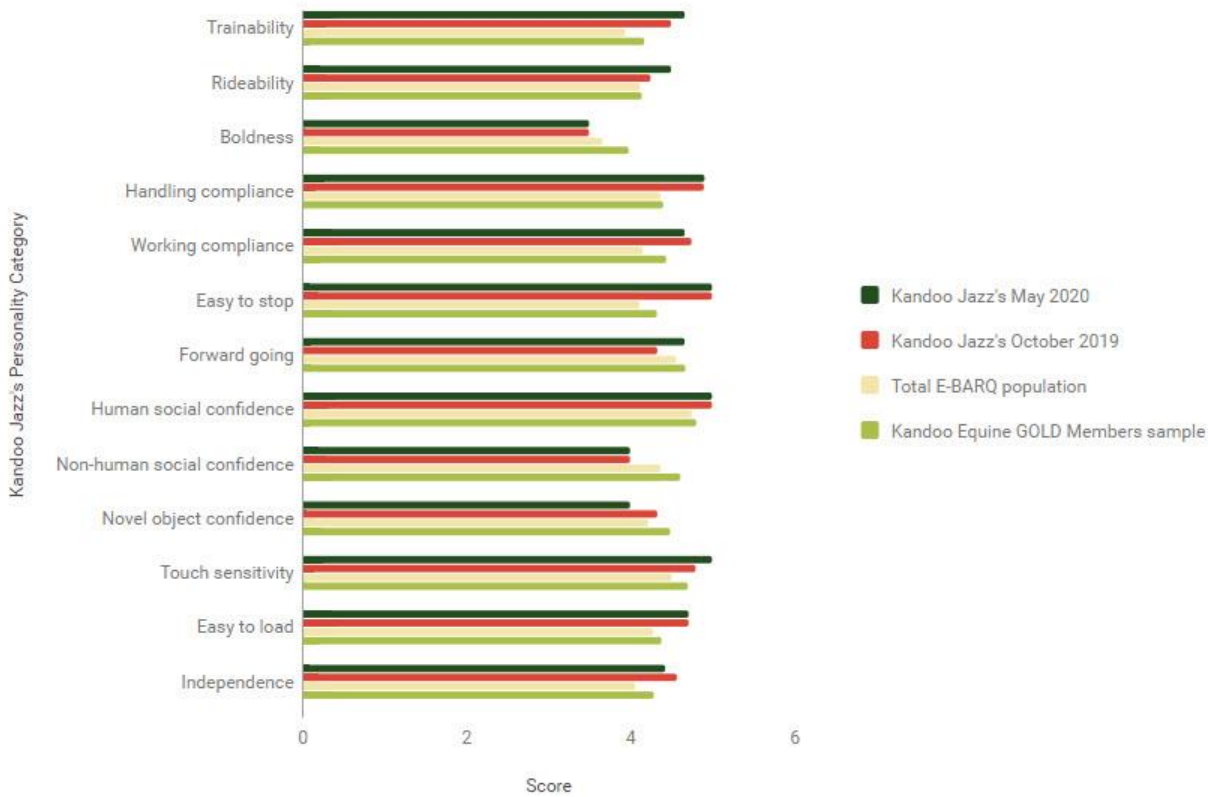3. Equipment and management – which includes tack, housing, feeding, etc.

After an international panel of vets, trainers, equine behaviourists, discipline specialists, elite riders, etc. brainstormed on the kinds of questions that would be useful, the pilot E-BARQ survey went out to 1300 horse owners. From the pilot results, researchers identified 26 personality factors, 16 equitation factors, and 13 maintenance and gear factors. The final version of E-BARQ includes 97 multiple choice questions and can be completed on a computer or mobile device in about 20 to 30 minutes.

E-BARQ results give owners a score on the following variables: Trainability, Rideabilty, Boldness, Handling Compliance, Working Compliance, Easy to Stop, Forward Going, Human Social Confidence, Non-Human Social Confidence, Novel Object Confidence, Touch Sensitivity, Easy to Load, and Independence. Owners can see how their horse changes over time (by completing the measure at 6-month intervals), how their horse compares to their group's average (e.g. trainers may set up private riding groups), and how their horse compares to the broader equine population.

McGreevy and Fenner noted that the E-BARQ will be an invaluable tool for researchers, veterinarians, trainers, equine behaviourists, and all equine enthusiasts. Some of the current E-BARQ research projects now underway include: How equine independence and boldness are influenced by age, the association between in-hand behaviours and ridden behaviours, how the number of riders on horses impacts their behaviour, and the relationship between rider gender and horse rideability.

To access the E-BARQ, and complete a survey, please visit: https://www.e-barq.org/ On completion of the survey, participants will receive a "Share & Compare" graph (see below). If you have a group of horses that you would like to monitor, perhaps as a riding coach, breeder, or veterinarian, please visit https://www.e-barq.org/groups

Kandoo Jazz's E-BARQ Results

Legend:
- Kandoo Jazz's May 2020
- Kandoo Jazz's October 2019
- Total E-BARQ population
- Kandoo Equine GOLD Members sample

Categories (Kandoo Jazz's Personality Category, y-axis) vs Score (x-axis):
Trainability, Rideability, Boldness, Handling compliance, Working compliance, Easy to stop, Forward going, Human social confidence, Non-human social confidence, Novel object confidence, Touch sensitivity, Easy to load, Independence

McGreevy and Fenner stressed that your involvement will be making a valuable contribution to the future of equine welfare, contribute to research, and allow you to learn something about your relationship with your own horse. As Andrew McLean commented on the E-BarQ:

In terms of communication and collaboration with the equestrian world, this research represents immense value… It's a gift to researchers who are able to extract lots of data and show (or not) associations between variables in management and riding horses that we could never have done before, because of the large sample sizes needed. If E-BARQ becomes only 10% as successful as the canine version (C-BARQ) then it will still have been an outstanding contribution to horse folk everywhere … For the lazy equitation science researcher much of the hard yards are already done and will continue to be added to as time goes on. Please everybody, recognise the value of this and get your students, federations etc. involved in E-BARQ.

Dr David Marlin: *The impact of COVID-19 on horses and their owners*

Dr David Marlin spoke about his research team's March/April 2020 first phase survey, across three nations (UK, Australia & New Zealand, and the US) with the goal of developing a better understanding of how the COVID-19 Coronavirus is impacting the equestrian industry over time. With this information, the researchers seek to convey more targeted advice to stable managers, owners, and industry professionals. Key questions concerned the impact of:

- Reduced Income: Both to those who generate an income for horses and those who have lost jobs and subsequently their ability to care for horses
- Owners' access to their horses
- Access to services such as vets, etc.
- Availability of feed and other essential items

Marlin's key results paint a fascinating picture of similarities and differences in how COVID has impacted horse owners across the three regions. For all three regions COVID's impact was relatively benign for horse owners who kept their animals at home, but much greater for those who had horses at a boarding facility. Asked whether they were still riding, for the UK and US again the impact was greater for owners who boarded out – a sizeable percentage (from 36% to 61%) were not able to ride or have access to their horses, some (28%-35%) could continue riding but with modified activities or constraints on time etc. However, in the Australia and NZ region, few differences were reported. As to what COVID measures were being taken, there was a large range across the kinds of measures and across regions, with the UK reporting the strictest protocols. Across all three regions a small percentage felt there had not been a disruption in the availability of equine services (vet, etc.) but the majority had concerns that they would feel this impact in the future. As to how worried owners were about COVID, its financial impact, and owners' ability to provide for horses, this was a big concern. Across all three regions, a third to just under a half were worried.

In the thematic analysis, Marlin's group found that horse health and welfare and owner well-being were common themes across all three regions, but there were some clear differences. Australia

reported greater concerns about future availability of feed, the US reported more concerns about human well-being, economics, and the impact of restricted time with their horses. UK respondents were more concerned about risks associated with increased stabling, social media pressure, and the ongoing impact on equine welfare.

Marlin summed up with a list of recommendations including providing guidance to support horse owners such as where to access financial assistance, and with science-based information about COVID (no, you cannot get COVID from your horse!).

As restrictions ease across the general population (e.g. equestrian competition has restarted in some areas), COVID's impact on the equestrian community will change. The latest update from David informs me that his group relaunched the survey during October and November and are now analyzing data to see where these nations are now, and how we have progressed in terms of horse health and welfare.

Roly Owers and Dr Julie Fiedler*: Social License: Where are we now?"*


In this talk, Roly Owers and Julie Fiedler took an in-depth look at *Social License to Operate (SLO),* and what that means at a practical level for equestrian sport in 2020. Owers notes that the horse world is facing a global challenge, as horse ownership and horse sport is on an "ethical tightrope walk". Social media and news headlines can be scathing of the equestrian world and that negative messaging shapes a public perception that cannot be ignored. If we are not accountable, ethical, and transparent our SLO can be compromised.

These presenters stressed that our understanding of what *good welfare* means changes as science gives us new information. We have moved from a focus on purely physical well-being with the *Five Freedoms Model*, to now include mental well-being and quality of life in the *Five Domains Model*. We now see the need to provide opportunities to *thrive*, rather than simply *survive* (Mellor 2016). Mental well-being is incorporated in the three Fs of friends, forage, and freedom (Fraser, 2012). Owers questions whether today's sport horses are having these needs met. Few sport horses have the opportunity for equine social bonding or grazing for 17 hours per day as they would be in their

natural state. Just because we have managed our horses in a particular way for a very long time, does not necessarily mean it is the optimal way.

In the slide below, Owers describes the four ascending levels of Social Licence from *1)Psychological identification* – where there is a high level of trust from the community and shared responsibility from all stakeholders, to *2)Approval* – where the industry has established credibility and support, to *3) Acceptance/Tolerance* where the community is listening to the industry but activities are closely monitored to *4) Withdrawn* – where there is a rejection of the industry by the community, and operations may be shut down. Owers suggested that the equestrian industry is hanging on at Level 3 of Acceptance/Tolerance, but we have seen examples, like greyhound racing in some parts of the world, where public opinion can be withdrawn and end an industry's social license to operate.
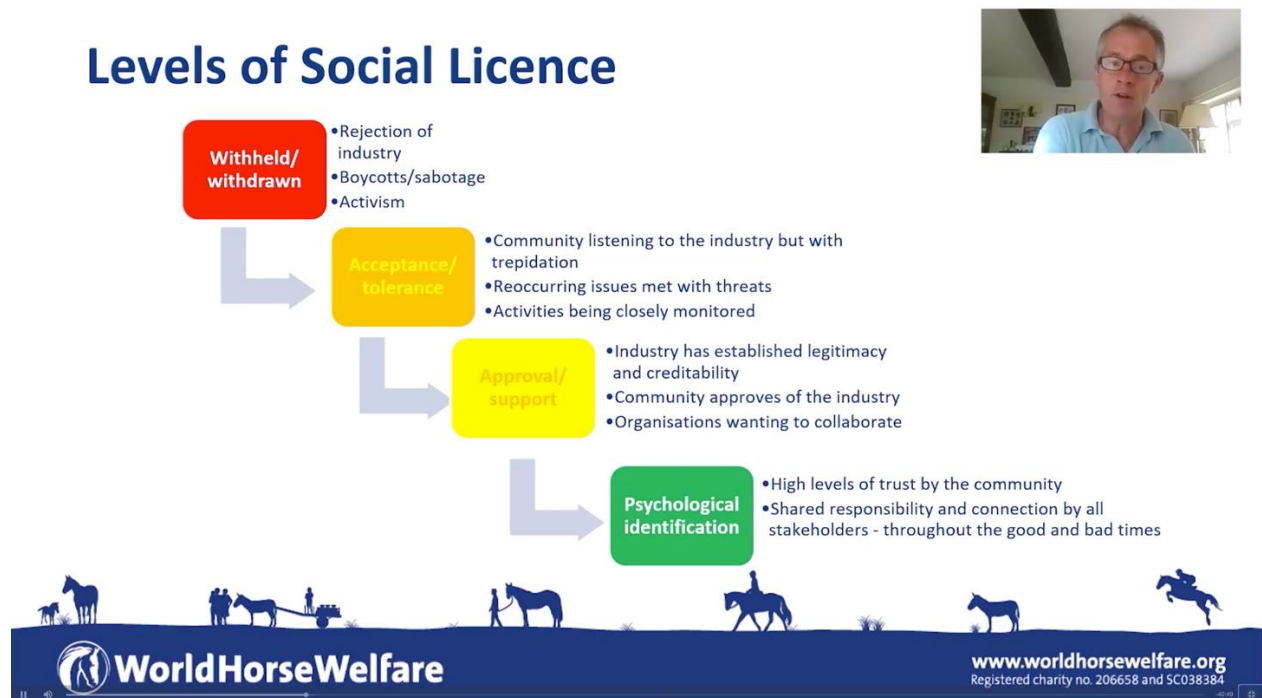
At a practical level, Owers emphasized that we need to take the perspective of someone who is not a horse person and see the equestrian world through their eyes. We need to bring to light what the horse-human relationship really means, articulate the ethical bases of horse sport, and speak about horses as individuals rather than commodities. And finally, we have a collective responsibility to constantly challenge the status quo as science informs us about better ways to manage our horses.

Julie Fiedler added to the conversation, stressing that our sport is now being communicated to the world through social media, and we need to foster a climate of trust, credibility, and legitimacy. "Trust is no longer assumed to 'just happen' because the organization has 'good' governance, people, and practice. Trust needs to be negotiated every day with members, stakeholders and the public."

Fiedler noted that to create and communicate positive stories, that become part of a long -term plan to make a positive *Digital Hoofprint*, we need to translate evidence-based information to the interested public and make that knowledge accessible. Fiedler then spoke about her own research project which will not only examine current welfare practices in various equine industries, but

explore industry professional's forecast of equine welfare practices that will be essential to making their sport sustainable in the future. Fiedler concluded that "every sport, every organization will need to work out what it means to keep and maintain a social license to operate … and what it might look like when it is lost."

Katrina Merkie's *A Match Made in Heaven* References

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