International Society for Equitation Science

In association with Equine Sciences, Colorado State University

presents

The 20th Anniversary

International Equitation Science Conference

23rd - 26th July 2025

Improving Connections with Horses through Science

Proceedings produced by

Prof. Hayley Randle

Design H. Randle, Charles Sturt University, Australia

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Charles Sturt University,
Wagga Wagga, NSW, 2678,
Australia.

The International Society for Equitation Science (ISES) is a not-for-profit organisation that chiefly aims to provide a forum for presentation and discussion of advances in equitation science research which will ultimately improve the welfare of horses in their associations with humans.

ISES Aims:

- to encourage basic and applied research into the training and welfare of horses;
- to support researchers studying equitation science;
- to provide an international forum where scientists can communicate and discuss the results of equitation science research;
- to encourage the dissemination and application of scientific knowledge in relation to the way horses are trained, managed, housed and cared for;
- to encourage and support the teaching of equitation science in research and academic institutions, especially veterinary schools, departments of animal science and animal production, agricultural colleges and departments concerned with equids;
- to provide a pool of expertise to national governments, international bodies, industry and to those equine welfare organisations on topics related to equine welfare, behaviour, training and management *and*
- to learn from other disciplines such as applied animal behaviour science, veterinary science, psychology and others.

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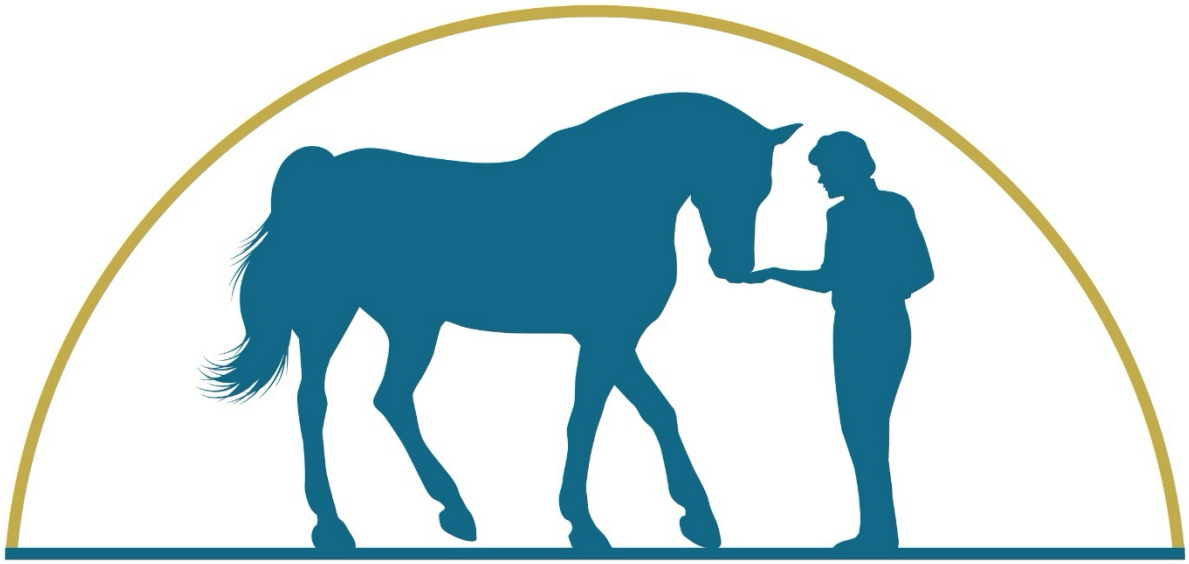

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We are grateful to our Aggie Pride Sponsor, Kandoo Equine, which is dedicated to teaching horse owners how to use evidence-based reinforcement training in everyday handling and riding.
Come and chat with Kate at the conference, or connect online at https://www.kandooequine.com/

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PROCEEDINGS CONTENTS

WELCOME TO THE ISES 2025 CONFERENCE

On behalf of the Organizing Committee and Colorado State University, it is my great pleasure to welcome you to the 2025 International Society for Equitation Science (ISES) Conference.

We are honored to host this global community of researchers, practitioners, educators, and students, all dedicated to advancing the science of horse-human interactions and improving equine welfare. This year's conference theme, Improving Connections with Horses through Science, reflects our shared commitment to evidence-based practices and interdisciplinary collaboration in equitation science.

For those of you attending for the first time: welcome! This conference explores scientific insights into the unique bond between horses and humans and how we can apply this knowledge to enhance equine well-being. In alignment with the ISES mission, the event emphasizes the importance of objective research and the development of best practices that support ethical, evidence-based horse-human interactions. Sessions will explore training, management, and riding practices, and will invite discussion on how we can continue building more compassionate, informed relationships with these remarkably forgiving animals.

Whether you are joining us in person or virtually, we hope you will take full advantage of the opportunities to connect, learn, and contribute to the vibrant exchange of knowledge that defines ISES.

Thank you for being part of this year's conference. We look forward to an engaging, collaborative, and enriching experience together in Fort Collins.

Warmest regards,

Dr Sarah Matlock
Chair Local Conference Organising Committee

International Society for Equitation Science
www.equitationscience.com

PRESIDENT'S WELCOME TO ISES 2025

Welcome to the 20th International Society for Equitation Science Conference! I am delighted to welcome delegates to Colorado State University in Fort Collins, Colorado - a fitting location for our gathering, nestled in the heart of one of America's most significant equestrian regions. This conference marks a historic milestone for ISES in North America. While we have held conferences on this continent before - at Michigan State University in 2007 and the University of Delaware in 2013 - returning to the United States after twelve years feels particularly significant. Fort Collins represents not only our third conference on American soil but also a homecoming to a community that has long embraced the intersection of science, animal welfare, and equestrian practice.

The research presented at this conference continues to build upon ISES's foundational mission to provide objective, evidence-based knowledge that ultimately enhances the welfare of horses in their associations with humans. As we gather in 2025, the need for evidence-based approaches to equine training, management, and welfare has never been more critical. Public interest in the welfare of horses used for sport continues to grow. ISES is well placed in the equestrian community to provide guidance on best practices.

Throughout this conference, you will encounter research that spans the breadth of equitation science - from fundamental studies of equine learning and behaviour to applied investigations of training techniques, equipment effects, and welfare assessment. Each presentation represents countless hours of careful observation, data collection, and analysis, all united by our shared commitment to improving life for horses.

For those attending their first ISES conference, you are joining a uniquely collaborative and welcoming scientific community. Our society has always prided itself on bridging the gap between rigorous academic research and practical application. Whether you are a researcher, trainer, veterinarian, student, or passionate equestrian, your perspective contributes to the rich dialogue that makes our conferences so valuable.

I particularly encourage you to attend presentations outside your immediate area of expertise, engage with our poster sessions, and participate in the discussions that follow each presentation. Some of the most significant advances in equitation science have emerged from these informal exchanges of ideas between researchers and others from different backgrounds and disciplines.
As I reflect on ISES's journey since our founding, I am struck by how far we have come in establishing equitation science as a respected and essential field. Our position statements on critical welfare issues, our evidence-based training principles, and our growing network of researchers, practitioners and supporters continue to influence policy and practice around the world.

This conference also represents an opportunity to look forward. The strategic priorities outlined in our new plan emphasize our role as positive disruptors - using evidence to challenge practices that may compromise horse welfare while celebrating and promoting those that enhance it. As we work toward expanding our reach and engagement conferences like this one remain central to our mission.

I extend my heartfelt gratitude to the Local Organizing Committee at Colorado State University, whose dedication has made this gathering possible. Their efforts, combined with the support of our generous sponsors, ensure that we can continue to provide a forum for the presentation and discussion of advances in equitation science research.

To our plenary speakers, session chairs, and all researchers presenting their work - thank you for contributing to the body of knowledge that drives our field forward. To our student participants, you represent the future of equitation science, and your fresh perspectives and enthusiasm are invaluable to our community's continued growth.

As we embark on this conference together, let us remember that every piece of research presented here, every discussion held, and every connection made serves a greater purpose, the welfare of horses and the enhancement of their relationships with humans. In a world where evidence-based practice is increasingly valued, equitation science stands as a beacon for scientifically grounded approaches to working with these remarkable animals.

Welcome to Fort Collins, welcome to ISES 2025, and thank you for your continued commitment to excellence in equitation science.

Dr Kate Fenner
Honorary President International Society for Equitation Science

ORGANISERS & CONTRIBUTORS

ISES 2025 LOCAL CONFERENCE ORGANISING COMMITTEE (LCOC)

Dr Sarah Matlock *LCOC Chair* (Colorado State University, USA)
Dr Sarah King *Scientific Committee Chair* (Colorado State University, USA)
Dr Sarah Reega *Programming Chair* (Colorado State University, USA)
Nina Ekholm Fry *Engagement Chair* (University of Denver, USA)

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Dr Sarah King (Colorado State University, USA)
Dr Sarah Reega (Colorado State University, USA)
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Colleen Brady (Purdue University, USA)
Lisa Ashton (Hartpury University, UK)
Paul McGreevy (Sydney University, Australia)

BIOGRAPHIES

Local Conference Organising Committee

Dr Sarah Matlock | Colorado State University, USA

Sarah is an Assistant Professor in Colorado State University's (CSU) Equine Sciences program. Since 2017, she has led the development of CSU's Equine Behavior Program, which now includes several equine behaviour courses as well as undergraduate and graduate research opportunities. In 2023, Sarah co-founded the Applied Animal Behavior and Learning Lab (AABL), an interdisciplinary, interspecies behavior lab at CSU. AABL's mission is to improve human-animal interactions by helping others better understand the emotional and physical needs of animals—especially horses—and how compromising those needs can affect the human-animal bond. Sarah also serves on the Colorado Horse Development Authority Board and is Chair of the 2025 International Society for Equitation Science Conference, which will be hosted in Colorado this summer. Her previous work includes developing low-stress methods for gentling Mustangs, validating an applied equine behaviour-tracking tool for monitoring management and training-related behaviours, and identifying early signs of stress in equine-assisted service horses. Sarah is passionate about advancing education and research in equine behaviour, particularly as it relates to the well-being of domestic horses.

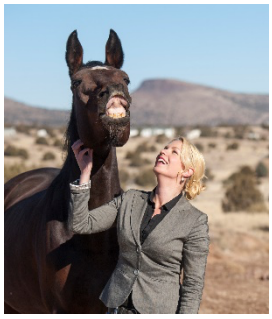
Dr Sarah King | Colorado State University, USA

Dr Sarah King is a Research Scientist at the Natural Resource Ecology Laboratory at Colorado State University and Co-Chair of the International Union for the Conservation of Nature (IUCN) Species Survival Commission (SSC) Equid Specialist Group. Her work has focused on applying mammal behavioural ecology research to conservation of endangered species or management of abundant species. She has conducted research on small mammals (Mt. Graham red squirrel and small mammals in the Colorado mountains), and led conservation projects in Mongolia, but most of her career has been spent studying the ethology and ecology of wild and feral equids. Sarah gained her B.Sc. and Ph.D. from Queen Mary, University of London. Her PhD was one of the first studies on the behavioural ecology of Przewalski's horses after their reintroduction to the wild in central Mongolia, and later she was Project Manager of a reintroduction effort of Przewalski's horses in western Mongolia. Over 10 years Sarah worked in collaboration with USGS to lead behavioural aspects of research into feral horses and burros in the American west. She was lucky enough to adopt a mustang from one of her field sites in 2022. Sarah is a certified animal trainer (Karen Pryor Academy Certified Training Partner) and runs her own animal training and behaviour consulting business in Fort Collins, as well as contributing her skills to the Humane Society of Boulder Valley.

Dr Sarah Reega | Colorado State University, USA

Sarah is finishing her doctoral program and Graduate Research Assistantship at the Temple Grandin Equine Center at Colorado State University. In August 2025, she will start a Postdoctoral Research position at the Human Animal Partnerships and Interactions (HAPI) Lab at Purdue University. Sarah holds a PhD from Colorado State University, a MSc from the University of Edinburgh, and a BSc from the University of New Hampshire. Sarah's research has been focused in equine-assisted services, horse-rider interactions, and equitation science since her undergraduate career. Sarah also holds multiple equine-assisted services credentials, including her Advanced Therapeutic Riding Instructor, Certified Therapeutic Riding Instructor, and Equine Specialist in Mental Health and Learning certifications. Sarah currently teaches Equine Behavior and Therapeutic Riding Instruction at Colorado State University. Sarah also teaches therapeutic/adaptive riding lessons at the Temple Grandin Equine Center, and she mentors multiple instructors in-training. Sarah has competed through the highest level of endurance, and she also competes in eventing.

Nina Ekholm Fry | University of Denver, USA



Nina Ekholm Fry is the Director of Equine Programs at the Institute for Human-Animal Connection at University of Denver and a faculty member in the Graduate School of Social Work and the Graduate School of Professional Psychology where her work focuses on the inclusion of equine interactions in psychotherapy and on equine behaviour and welfare. She is the faculty coordinator of the Human-Animal-Environment Interactions in Social Work MSW specialization and leads the Post-Master's Equine-Assisted Mental Health Practitioner Certificate program. She has a background as a competitive rider and equine behaviour consultant, and as an academic professional actively engaged in national and international organizations for both human and equine wellbeing.

Clever Hans lecture speaker

Rick Hester | Cheyenne Mountain Zoo, USA

Rick Hester is the Curator of Behavioral Husbandry for the Cheyenne Mountain Zoo in Colorado. He oversees all the zoo's behaviour programming. His work includes the zoo's animal training for husbandry, medical, and public show behaviours, environmental enrichment, developing programs to improve problem behaviour situations, the zoo's formal animal welfare assessments, and exhibit design for behaviour goals. He has worked at Cheyenne Mountain Zoo since 2006. He spent 10 years working as an animal keeper caring for a wide variety of species, including small primates, great apes, penguins, African lions, and bears. In 2015, he started working with Dr Susan Friedman and began to understand the importance of behaviour analysis and its application for animals in human care. He has curated the zoo's behaviour programs since 2018, is affiliative faculty at Colorado State University in the Department of Biology and a consultant and course co-instructor for Susan Friedman's Behaviour Works LLC.

Plenary speakers

Andrew McLean | Equitation Science International, Australia

Andrew is a clinical and forensic ethologist specializing in animal cognition, equine learning/training and welfare science. As an independent scientist, Andrew has authored and co-authored in excess of 80 research and review papers and conference presentations and 10 horse and elephant training texts. In 2020, he co-authored the most recent Five Domains Model of Animal Welfare, focusing on human-animal interactions. Andrew has been co-winner of the Eureka Science award and the Premio Flambo Award for Animal Welfare (Italian Equestrian Sports Federation). In 2014, he was awarded the John H Daniels Fellowship from the USA National Sporting Library, Virginia and in 2016, he was King Scholar invitee at the University of Arkansas.

Andrew has dedicated the past couple of decades to teaching evidence-based horse training and management across Western Europe, the US, Canada, South Africa and New Zealand. He has coached four Olympic medalists, seven National Equestrian Federations and in 1996 he coached the Indian Eventing team to win its first ever medal in international competition using techniques that he derived from his understanding of equine learning and cognition. Andrew founded and directed the Australian Equine Behaviour Centre in 1995 and is currently the CEO of Equitation Science International. He is Patron of Pony Club Australia and as a former Director, instigated a revolutionary syllabus that leads the world in equestrian education for young riders. Andrew is also Founder of the Human-Elephant-Learning Programs Foundation, a not-for-profit charity that delivers evidence-

based elephant training, management and conservation education across South and Southeast Asia supported by various government organisations, and the Australian representative of the IUCN Asian Elephant Specialist Group.

A winner of the Advanced section of the famous Gawler Three-Day-Event in 1989, Andrew has enjoyed a decorated and diverse equestrian sport career, having represented Australia in three-day eventing and competed in State and National titles in FEI dressage, eventing and showjumping and was the Australian National Champion in Tetrathlon in 2018 in the 32+ age group.

Andrew's commitment to horse welfare globally is demonstrated by his recent collaboration with the FEI to assist with advancing their equine welfare commitment. Andrew's remit is to foster uptake of the ISES Training Principles to promote optimal welfare and sustainability in horse sports. Given his sustained commitment to equine welfare throughout both his equestrian and academic careers and this recent collaboration, Andrew is perfectly positioned to ensure that contemporary principles of animal welfare are adopted and upheld in all corners of the world, through his thoughtful and non-judgmental approach to the education of riders, trainers, coaches and judges who need to know what they don't know.

Gemma Pearson | Royal (Dick) School of Veterinary Studies, University of Edinburgh, UK

Gemma combines her time between research and outreach as Director of Equine Behaviour at The Horse Trust and running a referral clinic for clinical equine behaviour cases where she is based at the University of Edinburgh. After working in ambulatory practice Gemma undertook a rotating residency programme in the equine hospital alongside an MScR investigating horse veterinarian interactions. Subsequently she completed her CCAB (certified clinical animal behaviourist) exam and her PhD thesis *Stress in equids undergoing veterinary care and the development of interventions that positively influence the horses' experience*. This work has been disseminated through the popular 'Hold Your Horses – low stress veterinary care' course via BEVA. As well as continuing with her own research she supervises several students at PhD, MSc and undergraduate level. In 2022 she was recognised as the first species specific RCVS specialist in Veterinary Behavioural Medicine (Equine) and then awarded Fellowship of the Royal College of Veterinary Surgeons in 2024 for Meritorious contributions to clinical practice. Gemma is frequently invited to lecture internationally, as a recognised expert in this field and an excellent communicator. She has also been invited to provided expert opinion in working groups for organisations such as the Scottish government, FEI, FRCVS and BHA. In her spare time she has competed up to advanced level endurance on a homebred horse as well as enjoying competing in affiliated dressage and eventing. Currently she is retraining a Thoroughbred recently retired from racing.

Professor Paul McGreevy | University of Sydney, Australia

Paul is a riding instructor, veterinarian and ethologist. His PhD focused on the functional significance of stereotypic behaviour in stabled horses. Based at the Sydney School of Veterinary Science, he is the author of over 300 peer-reviewed scientific publications and seven books and has received numerous international awards for his research and teaching innovations.

Keynote speaker

Cristina Wilkins | University of New England, Australia

Cristina Wilkins is a PhD candidate at the University of New England (UNE), Australia, researching the One Welfare outcomes of human-horse interactions. Her work in exploring how equipment-related pressures affect equine welfare led to an invited presentation to the FEI Veterinary Committee earlier this year. Cristina collaborates with leading welfare scientists on practical tools for assessment, including the Mellorater app, and she developed UNE's online course *Applying the Five Domains Model to the Welfare Assessment of Sport and Recreation Horses*. A former international eventing competitor, coach, official, and long-time editor of *Horses and People* magazine, Cristina combines academic research with deep industry experience. Her science communication and advocacy have supported welfare initiatives across equestrian and racing organisations. She served on the ISES Council (2011–2019) and is a co-author of *The 2020 Five Domains Model Including Human–Animal Interactions in Assessments of Animal Welfare*. Cristina lives in Queensland, Australia.

Proceedings

Hayley Randle | Charles Sturt University, Australia

Hayley is Professor of Equine Science, making national and international contributions to animal welfare science. She has an Australian government appointed role as chair of the NSW Animal Welfare Advisory Committee, is an active member of The National Primary Industries Animal Welfare Research, Development and Extension Strategy organization (NAWDRES) and holds international journal Associate Editor positions. She has had Honorary ISES Council and Trustee roles for ISES, and is an Honorary Fellow. She likes nothing more than seeing her students thrive and is very proud of both her undergraduates contributing to change in the equine industry and post graduate students engaged in cutting edge equitation science research. In her spare time, she enjoys spending time with her mob of horses, dogs, long suffering partner and dirt biking teenage son.

THE ISES TRAINING PRINCIPLES

Human and horse welfare depend upon training methods and management that demonstrate

1.Regard for human and horse safety

- Acknowledge that horses' size, power and potential flightiness present a significant risk
- Avoid provoking aggressive/defensive behaviours (kicking/biting)
- Ensure recognition of the horse's dangerous zones (e.g., hindquarters)
- Safe use of tools, equipment and environment
- Recognise the dangers of being inconsistent or confusing
- Ensure horses and humans are appropriately matched
- Avoid using methods or equipment that cause pain, distress or injury to the horse

"Disregarding safety greatly increases the danger of human-horse interactions"

2.Regard for the nature of horses

- Ensure welfare needs lengthy daily foraging, equine company, freedom to move around
- Avoid aversive management practices (e.g., whisker-trimming, ear-twitching)
- Avoid assuming a role for dominance in human/horse interactions
- Recognise signs of pain
- Respect the social nature of horses (e.g., importance of touch, effects of separation)
- Avoid movements horses may perceive as threatening (e.g., jerky, rushing movements)

"Isolation, restricted locomotion and limited foraging compromise welfare"

3.Regard for horses' mental and sensory abilities

- Avoid overestimating the horse's mental abilities *(e.g., "he knows what he did wrong")*
- Avoid underestimating the horse's mental abilities *(e.g., "It's only a horse...")*
- Acknowledge that horses see and hear differently from humans
- Avoid long training sessions (keep repetitions to a minimum to avoid overloading)
- Avoid assuming that the horse thinks as humans do
- Avoid implying mental states when describing and interpreting horse behaviour

"Over- or underestimating the horse's mental capabilities can have significant welfare consequences"

4.Regard for current emotional states

- Ensure trained responses and reinforcements are consistent
- Avoid the use of pain/constant discomfort in training
- Avoid triggering flight/fight/freeze reactions
- Maintain minimum arousal for the task during training
- Help the horse to relax with stroking and voice
- Encourage the horse to adopt relaxed postures as part of training (e.g., head lowering, free rein)
- Avoid high arousal when using tactile or food motivators
- Don't underestimate horse's capacity to suffer
- Encourage positive emotional states in training

"High arousal and lack of reinforcement may lead to stress and negative affective states"

5.Correct use of habituation/desensitization/calming methods

- Gradually approach objects that the horse is afraid of or, if possible, gradually bring such aversive objects closer to the horse (systematic desensitization)
- Gain control of the horse's limb movements (e.g., step the horse back) while aversive objects are maintained at a safe distance and gradually brought closer (over-shadowing)
- Associate aversive stimuli with pleasant outcomes by giving food treats when the horse perceives the scary object (counter-conditioning)
- Ignore undesirable behaviours and reinforce desirable alternative responses (differential reinforcement)
- Avoid flooding techniques (forcing the horse to endure aversive stimuli)

"Desensitization techniques that involve flooding may lead to stress and produce phobias"

6.Correct use of Operant Conditioning

- Understand how operant conditioning works i.e., performance of behaviours become more or less likely as a result of their consequences.
- Tactile pressures (e.g., from the bit, leg, spur or whip) must be removed at the onset of the correct response
- Minimise delays in reinforcement because they are ineffective and unethical
- Use combined reinforcement (amplify pressure-release rewards with tactile or food rewards where appropriate)
- Avoid active punishment

"The incorrect use of operant conditioning can lead to serious behaviour problems that manifest as aggression, escape, apathy and compromise welfare"

7.Correct use of Classical Conditioning

- Train the uptake of light signals by placing them BEFORE a pressure-release sequence
- Precede all desirable responses with light signals
- Avoid unwanted stimuli overshadowing desired responses (e.g., the horse may associate an undesirable response with an unintended signal from the environment)

"The absence of benign (light) signals can lead to stress and compromised welfare"

8.Correct use of Shaping

- Break down training tasks into the smallest achievable steps and progressively reinforce each step toward the desired behaviour
- Plan training to make the correct response as obvious and easy as possible
- Maintain a consistent environment to train a new task and give the horse the time to learn safely and calmly
- Only change one contextual aspect at a time (e.g., trainer, place, signal)

"Poor shaping leads to confusion"

9.Correct use of Signals/Cues

- Ensure signals are easy for the horse to discriminate from one another
- Ensure each signals has only one meaning
- Ensure signals for different responses are never applied concurrently
- Ensure locomotory signals are applied in timing with limb biomechanics

"Unclear, ambiguous or simultaneous signals lead to confusion"

10.Regard for Self-carriage

- Aim for self-carriage in all methods and at all levels of training
- Train the horse to maintain:
    - gait
    - tempo
    - stride length
    - direction
    - head and neck carriage
    - body posture
- Avoid forcing any posture
- Avoid nagging with legs, spurs or reins i.e., avoid trying to maintain responses with relentless signaling.

"Lack of self-carriage can promote hyper-reactive responses and compromise welfare"

CONFERENCE ETIQUETTE

It is wonderful to have you at this conference. We want everyone to get the most out of the event and to go away feeling enriched. There are a few important ways that we can ensure that this is the case. Obviously, all of us are professionals which will mean that we are familiar with the importance of

- treating everyone with respect and consideration,
- communicating openly and thoughtfully with others and being considerate of the multitude of views and opinions that are different than your own,
- being respectful and mindful in your critique of ideas,
- being an active listener, turning off your mobile phone and avoiding exiting the room during a talk *and*
- being mindful of your surroundings, your fellow participants, sponsors, conference volunteers, and venue hosts.

We also ask that you respect the rights of our presenters in relation to their research presentation material. Sharing insights and key messages from presentations with your network or social media is encouraged, as long as you are not posting specific research aspects of an author's presentation. Recording of research presentations for use later or posting directly onto social media is not appropriate. This may only be done with the permission of the authors.

We hope you have a great time!

KEY INFORMATION ABOUT ISES 2025 ABSTRACTS AND PRESENTATIONS

The abstracts in these proceedings are arranged in the order in which they appear in the scheduled programme.

Oral research presentations are denoted by O.

Poster presentations are denoted by P.

For each presentation entry in the schedule only the presenting author is listed.

The full list of authors and the email of the corresponding author are provided with each abstract.

Direct links are provided to abstracts from the schedule.

Abstracts commence at page 32.

INTERNATIONAL SOCIETY FOR EQUITATION SCIENCE 2025

CONFERENCE SCHEDULE

23rd July 2025 | Pre-conference activity & Early Check-In Reception

8.00 am - 5.00 pm	**Cheyenne Mountain Zoo Private Tour/ Cooperative Care Training** Colorado Springs, Colorado
8.10 am	Bus Departs Lory Student Center, Transit Center
8.25 am	Bus Departs Hilton Hotel
11.00 am	Zoo Tour and Activities *Please bring money for lunch at the zoo (variety of choices available).*
2.00 pm	Buses depart back to Fort Collins
6.00-8.00 pm	**Conference Welcome Reception and Early Check-In** Heavy appetizers and cash bar Lory Student Center, University Ballroom 1101 Center Ave Mall, Fort Collins, CO 80521

24th July 2025 | Scientific Day 1 & Clever Hans Lecture

7.00-8.00am	**Conference Check-In** Breakfast served Lory Student Center, Entry way to Ballrooms C and D 1101 Center Ave Mall, Fort Collins, CO 80521
8.10 am	**Official welcome** Dr Sarah Matlock, CSU Conference Chair Dr Kate Fenner, ISES President Lory Student Center, Ballroom C
8.30am	**Plenary #1: Dr Andrew McLean** Chair Dr Kate Fenner PL1: From prejudice to principles: how a 'first principles' approach offers the only future in human-horse interactions. Lory Student Center, Ballroom C
9.30 am	**Poster Blitz: Round one** Posters in Ballroom C; refreshments in Ballroom D
10.30-11.50 am	**Scientific Session 1: Equine Learning Theory** Chair Dr Andrew McLean Lory Student Center, Ballroom C
10.30 am	O1: Positive punishment and negative reinforcement in horse training - two sides of the same coin? *Cathrynne Henshall (Charles Sturt University, Australia)*
10.50 am	O2: Characterizing bit and noseband use in therapeutic riding programs in the United States: a survey study. *Sarah Reega (Colorado State University, USA)*
11.10 am	O3: Low stress veterinary care in the equine hospital: past, present and future directions. *Eleanor Girgis (University of Edinburgh, UK)*
11.30 am	O4: Habits are hard to break - a study of habit induction, extinction and reinstatement of responses to an automated electronic operant device in horses. *Cathrynne Henshall (Charles Sturt University, Australia)*
11.50-11.56 am	**Poster Presentation Flash Talks 1** Chair Dr Sarah Matlock Lory Student Center, Ballroom C
11.50 am	P1: Innovative approach to resolving lack of impulsion in horses: The science of memory reconsolidation. *Sophie Côté (Équin Communication, Canada)*
11.53 am	P2: An investigation of conflicting behaviour of horses and riders during non-completion events in show jumping. *Gabor Tatai (Loránd Eötvös University, Hungary)*
11.56 am	P3: Emotional contagion in human-horse interactions: Investigating the role of stress and body language in emotional transfer. *Dan Manolachescu (Faculty of Veterinary Medicine, Romania)*
12.00-1.00 pm	**Lunch** (provided) Lory Student Center, Ballroom D
1.00 pm	**Plenary #2: Dr Gemma Pearson** Chair Dr Sarah Reega PL2: Is it pain or behaviour? An introduction to equine behavioural medicine. Lory Student Center, Ballroom C

2.00-4.00 pm	**Scientific Session 2: Equine Pain and Behaviour** Chair Dr Gemma Pearson Lory Student Center, Ballroom C
2.00 pm	O5: Behind the bridle: Understanding facial expressions in horses before and after riding. *Aveil Oberhammer (University of Guelph, Canada)*
2.20 pm	O6: Developing a fixed descriptor list for qualitative behavioural assessment of pain in horses. *Olivia Curry* (*The University of Edinburgh, UK)*
2.40 pm	O7: Does pain impact how horses react to sound? *Rebecca Thompson (Virginia Tech., USA)*
3.00-3.20 pm	**Refreshments** Refreshments in Ballroom D
3.20 pm	O8: 'Happiness' in horses? The use of a prediction error paradigm in assessing equine affective state. *Cathrynne Henshall* (*Charles Sturt University, Australia)*
3.40 pm	O9: Eyes on the prize, how visual attention impacts dressage scoring. *Inga Wolframm (Van Hall Larenstein University of Applied Sciences, The Netherlands)*
4.00-4.15pm	**Poster Presentation Flash Talks 2** Chair Nina Ekholm Fry
4.00 pm	P4: Equine emotions: how equestrians perceive, attribute, and recognize emotional states. *Cathrynne Henshall (Charles Sturt University, Australia)*
4.03 pm	P5: Impact of an online course on affective state in horses to create human behaviour change. *Colleen Brady (Purdue University, USA)*
4.06 pm	P6: Attitude of German sport horse and thoroughbred trainers on training less than three year old horses; an interview-based analysis. *Joerg Aurich (Vetmeduni, Austria)*
4.10-4.45 pm	**Poster Blitz: Round two** Posters in Ballroom C; Refreshments in Ballroom D
4.45-7.00pm	**No Conference Activities**
7.00-9.00 pm	**Clever Hans Lecture: Rick Hester, Cheyenne Mountain Zoo** Chair Dr Sarah King CH1: Engineering environments with reasons to behave. Lory Student Center, Ballroom C

25th July 2025 | Scientific Day 2 & Evening Banquet

7.00-8.00 am	**Conference Check-In** Breakfast served Lory Student Center, Entry way to Ballrooms C and D 1101 Center Ave Mall, Fort Collins, CO 80521
8.00 am	**Welcome** Dr Sarah Matlock, CSU Conference Chair Lory Student Center, Ballroom C
8.05 am	**Keynote speaker: Cristina Wilkins** Chair Nina Ekholm Fry K1: Seeing Pressure: Evidence and responsibility in modern equitation. Lory Student Center, Ballroom C
9.05 am	**Poster Blitz: Round three** Posters in Ballroom C; Refreshments in Ballroom D
10.05-11.55 am	**Scientific Session 3: Equitation Science** Chair Cristina Wilkins Lory Student Center, Ballroom C
10.05 am	O10: A wicked problem: Systemic issues surrounding Canadian equestrian dressage. *Megan Ross* (*University of Prince Edward Island, Canada)*
10.25 am	O11: Why equestrians use auxiliary reins on horses, their biomechanical perceptions and barriers to human behaviour change. *Mikaela Tapuska* (*University of Edinburgh, UK)*
10.45 am	O12: Identifying the starting point for using computer vision methods accurately to enhance standards in equine sports. *Camie Heleski (University of Kentucky, USA)*
11.05 am	O13: Equine weight carrying limit practices in U.S. equine-assisted services programs. *Ellen Rankins* (*Colorado State University, USA*)
11.25 am	O14: Investigation into leisure horse owners' perception of welfare/quality of life assessment frameworks. *Liane Preshaw (The Horse Trust, UK*)
11.45-11.54am	**Poster Presentation Flash Talks 3** Chair Dr Sarah Reega Lory Student Center, Ballroom C
11.45 am	P7: Evaluation of the Welfare of Urban Carriage Horses in Malta: a holistic approach. *Pantaleo Gemma (University of Bologna, Italy)*
11.48 am	P8: Science Meets Comics: A Case Study of Equine Science Dissemination in the Form of a Graphic Novel in the Finnish Market. *Nina Ekholm Fry (University of Denver, USA)*
11.51 am	P9: Are equestrian qualifications supporting equine welfare? A thematic analysis of British Horse Society's Stage 3-5 examination syllabi. *Victoria Lewis (Hartpury University, UK)*
11.54 pm	P10: What is Welfare? A Qualitative Study into Perceptions of Equine Welfare of Horse Owners. *Victoria Lewis (Hartpury University, UK)*
12.00-1.00 pm	**Lunch** (provided) Lory Student Center, Ballroom D
1.00 pm	**PLENARY #3: Prof. Paul McGreevy** Chair Dr Sarah King PL3: Whither goest thou, Equitation Science? Lory Student Center, Ballroom C

2.00-3.00 pm	**Scientific Session 4: Equitation Science – various topics** Chair Prof. Paul McGreevy Lory Student Center, Ballroom C
2.00 pm	O15: Learning about lesson horses: The influence of rider level on heart rate variability parameters and under saddle behaviour in riding lesson horses during work. *Caleigh Copelin (University of Guelph, Canada)*
2.20 pm	O16: News from the field: how wild equid research can contribute to domestic equid welfare. *Sarah King (Colorado State University, USA)*
2.40 pm	O17: Good physical performance of the rider contributes to horse welfare. *Anne-Maarit Hyttinen* (*University of Jyväskylä, Finland)*
3.00-3.20 pm	**Refreshments** Refreshments in Ballroom D
3.20 pm	O18: Working towards consensus on nasal-based acoustic sounds (NBAS) in horses: insights from pilot data. Chloe Young (*University of Kentucky, USA)*
3.40 pm	O19: Retrospective analysis of compliance with Reg. EC 1/2005: Examination of Trade Control and Expert System for the transport of horses to and from Southern Italy. *Pantaleo Gemma* (*Università di Bologna, Italy)*
4.00-4.15 pm	**Poster Presentation Flash Talks 4** Chair Nina Ekholm Fry Lory Student Center, Ballroom C
4.00 pm	P11: Could equine penile tumescence ('dropping') be a useful indicator of equine affective state? *Cathrynne Henshall (Charles Sturt University, Australia)*
4.03 pm	P12: The Influence of landscape features on equine behaviour: A GPS-based analysis of semi-natural environments. *Inga Wolframm (Van Hall Larenstein University of Applied Sciences, The Netherlands)*
4.06 pm	P13: AHA hippotherapy conceptual framework 2024. *Joann Benjamin (Therapy Services at RO, California, USA)*
4.10-4.30 pm	**Refreshments** Refreshments in Ballroom D
4.30-5.00 pm	**Student Awards** Chair Prof. Paul McGreevy Committee Members Dr Colleen Brady and Lisa Ashton Lory Student Center Ballroom C
5.00-5.15 pm	**Conclusion of presentations: Moving forward** Chair Dr Kate Fenner and Dr Cath Henshall
5.15-7pm	**No Conference Activities**
7.00-9.00pm	**Conference Banquet – SOLD OUT!** ***Additional Ticket Required for this Event** Special Guest Prof. Temple Grandin Agave Room at the Rio 149 W. Mountain Avenue, Fort Collins, Colorado

26th July 2025 | Practical Day at CSU's Equine Center

7.30 am	**Bus Pick-Up**
7.30 am	Bus Leaves Bustang Stop Corner of Meridian St. and Plum St.
7.40 am	Bus Leaves the Hilton
8.00 am	**Welcome and breakfast** Chair Dr Sarah Matlock CSU Equine Center 735 S. Overland Trail, Fort Collins, Colorado
8.30 am	**Presenter #1: Tammy McCormick Donaldson** Chair Nina Ekholm Fry Saddle fitting – horse conformation and biomechanics
9.45-10am	**Break and refreshments**
10.00 am	**Presenter #2: Rachael Draaisma** Chair Dr Sarah King Equine scent work – the tool and medicine to achieve and maintain healthy homeostasis
11.15-12.15 pm	**Lunch** (provided)
12.15 pm	**Presenter #3: Dr Jennifer Fitzpatrick** Chair Dr Sarah Reega Digital technology to improve riders
1.45 pm	**Mix-n-Mingle with refreshments**
2-4.00 pm	**Temple Grandin Equine Center Tour and Program Overview** Chair Dr Sarah Matlock Tour Guides: Dr Sarah Reega, Dr Caiti Peters, Dr Ellen Rankins, Dr Sherry Butler and Dr Sarah Matlock
2.00 pm	**Welcome & break into groups** Chair Dr Sarah Matlock
2.10 pm	**Walk next-door to TGEC**
2.15 pm	Rotation one
2.35 pm	Rotate
2.40 pm	Rotation two
3.00 pm	Rotate
3.05 pm	Rotation three
3:35 pm	Rotate
3:40 pm	Rotation four
4:00 pm	**Conclusion and farewell** Chair Dr Sarah Matlock and Dr Kate Fenner B.W. Pickett Arena
4.15 pm	**Buses return to Hilton and CSU** **Break in Conference Activities**
6.30-8.30 pm	"Get the Mind and the Feet will Follow" Film Festival Winner Chair Dr Andrew McLean Behavioral Sciences Building, Room 131 Colorado State University 410 W Pitkin St, Fort Collins, CO 80523, USA

Practical day presenters

Tammy McCormick Donaldson

Saddle fitting - horse conformation and biomechanics

Poor saddle fit is a major but often overlooked cause of discomfort, pain, and long-term physical issues in horses. This session will explore how conformation affects saddle fit in both English and Western saddles and offer practical guidance for identifying fit problems. The demonstration will also cover interim solutions, and share findings from recent research showing how certain pads can reduce pressure and pain behaviours. With no formal certification standard in the U.S., this session empowers horse owners and professionals to make informed choices that align with equine welfare.

Rachaël Draaisma

Equine scent work - the tool and medicine to achieve and maintain healthy homeostasis

Rachaël Draaisma introduces scent work as a powerful tool for enhancing equine well-being by reawakening horses' natural tracking instincts. In domestic settings, horses rarely get to search for food, water, or companions—yet this activity offers profound mental and physical benefits. Through tailored scent work exercises, horses experience reduced frustration, improved self-regulation, and increased relaxation, especially those on box rest or with limited stimulation. More than just enrichment, scent work strengthens the horse-handler bond and expands the horse's comfort zone. In her practical demonstration, Rachaël showcases how horses can be taught to track food and follow scent trails, emphasizing the importance of reading subtle body language and calming signals—skills she has refined over 22 years, now focused exclusively on equids.

Jennifer Fitzpatrick

Digital technology to improve riders

Horse riding lessons have always been carried out via auditory learning. Not all riders are aware of their position even when the coach discusses it with them, often they cannot feel it. Not having awareness of positional faults can have detrimental consequences on how a horse performs, develops and their welfare. This session will look at how a range of digital technology and equipment can allow riders to recognize positional faults in a different way to improve their position, thus reducing negative impacts on horses.

27th July 2025 | Via Nova workshop

7.30 am	**Bus Pick-Up**
7.30 am	Bus Leaves Bustang Stop
7.40 am	Bus Leaves the Hilton
8.00 am	**Welcome and Breakfast** Chair Dr Sarah Matlock CSU Equine Center 735 S. Overland Trail, Fort Collins, Colorado
8.15-3.00 pm	**Via Nova "Priority to Positive" Workshop** (lunch and snacks will be provided)
3.00 pm	Buses return to the Hilton and CSU

SCIENTIFIC ABSTRACTS

Scientific session 1: Equine Learning Theory

PLENARY #1

FROM PREJUDICE TO PRINCIPLES: HOW A 'FIRST PRINCIPLES' APPROACH OFFERS THE ONLY FUTURE IN HUMAN-HORSE INTERACTIONS

Andrew McLean

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The 20th anniversary of the International Society for Equitation Science (ISES) conferences is testament to two decades of meteoric progress in equitation science. Since its inception in Melbourne in 2005, ISES has played a pivotal role in enhancing our understanding of horse behaviour, learning and welfare leading to the development of 'First principles' in equitation science. The evolution of these principles call to question traditional, anthropomorphic and teleological explanations of horse behaviour. For horse riders, trainers, coaches and judges, a 'first principles' approach provides clear guideposts to the future in a world now tethered to public scrutiny. Following the progress of the FEI Equine Ethics and Wellbeing Commission, the nascent 'FEI Principles of Training,' emerged from ISES principles coupled with the adoption of the FEI Ethical Framework, offering potential and clarity in both educational and regulatory contexts. This plenary underscores the breadth and importance of establishing first principles for a compassionate and scientifically-informed future for horse training and welfare. *Back to Scientific day 1 schedule*

O1

POSITIVE PUNISHMENT AND NEGATIVE REINFORCEMENT IN HORSE TRAINING-TWO SIDES OF THE SAME COIN?

Cathrynne Henshall, Hayley Randle, Nidhish Francis and Rafael Freire

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The International Society for Equitation Science position statement on aversive stimuli in horse training advises that while aversive stimuli use for negative reinforcement is appropriate, positive punishment should be avoided. Current definitions of what constitutes positive punishment and negative reinforcement focus on the behaviour intended to be modified, rather than the horse's experience. That is, the focus of positive punishment is behaviour that occurs before the aversive stimulus is applied (whether it has been suppressed) whereas the focus of negative reinforcement is behaviour that occurs after the stimulus is removed (whether it will be repeated). However, horses experiences their lives continuously, and neuroscience research suggests that it is likely animals' responses to aversive stimuli are on a continuum involving distinct and overlapping patterns of neural activation that underpin behavioural and emotional responses to the stimuli. When horses are exposed to stimuli with noxious properties such as pressure from bits or spurs, diverse brain regions will be activated. The nociceptive characteristics of the stimuli engage the amygdala, periaqueductal grey, primary somatosensory cortex, anterior insular, anterior cingulate cortices and thalamus which process the sensory, affective and motivational characteristics of the stimulus to collectively influence emotional state and resulting behavioural responses to escape its effects. The successful termination of those aversive effects is accompanied by neurobiological activity to support consolidation of memories about how the stimulus was escaped so the response can be repeated in the future, as well as possibly, emotions such as relief. These patterns of brain activity occur continuously, from stimulus exposure to stimulus termination. Therefore, the use of an aversive stimulus which causes an ongoing behaviour to cease (punishment) and whose termination follows the performance of a separate behaviour (reinforcement), is like to rely on a punishment-reinforcement continuum. It seems reasonable therefore, to consider dispensing with the strict division between positive punishment and negative reinforcement and consider horses' responses to aversive training stimuli as likely involving the continuum. The benefits of this recalibration would include providing a deeper insight into common training problems, such as when behaviour is not suppressed after apparent punishment or is not strengthened after apparent reinforcement. Whilst advice to avoid the use of strongly aversive stimuli in horse training is essential to safeguard horse welfare, it could be argued that adoption of the concept of the punishment-reinforcement continuum would more accurately reflect what horses are likely to experience when exposed to aversive stimuli during training.

Layperson message

Aversive cues are used in horse training, such as the pressure caused by bits or spurs to control horse behaviour; either after a response is given (positive punishment) or in order to motivate a response (pressure removed in negative reinforcement). Pressure-release in negative reinforcement is deemed acceptable whereas pressure applied to eliminate a behaviour (punishment) is not. However, neuroscience research suggests animals experience positive punishment and negative reinforcement on a continuum, meaning that irrespective of the trainer's intensions, the use of aversive stimuli in horse training is experienced as unpleasant and thus can negatively affect their welfare. *Back to Scientific day 1 schedule*

O2

CHARACTERIZING BIT AND NOSEBAND USE IN THERAPEUTIC RIDING PROGRAMS IN THE UNITED STATES: A SURVEY STUDY

Sarah Reega, Sarah Matlock, Sharon Butler and Caiti Peters

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The use of tack, including nosebands and bits, has the potential to impact horse behaviour, learning ability, and wellbeing. While there has been growing attention on assessing equine wellbeing in therapeutic riding (TR), as well as increased research on nosebands and bits in able-bodied riding, studies have yet to specifically examine noseband and bit use on the heads of TR horses. TR horses are often ridden by novice riders learning to use reins, and simultaneously led by the head from the ground, presenting a unique situation for tack structure and function. However, there are no established guidelines or best practices regarding tack use on the heads of TR horses. Therefore, the purpose of this study was to characterize noseband and bit use practices on TR horses, and to explore factors which are considered in the decision-making process for noseband and bit use on TR horses. An anonymous online survey was distributed to PATH Intl. TR instructors. 403 complete responses were retained for data analysis. Summary statistics were calculated in Excel. Open-ended responses were coded using inductive content analysis (Excel; Nvivo). Binary logistic regression analysis was performed (SPSS). Of the 403 respondents, 306 (76%) indicated that at least some of their horses wear bitted bridles during TR sessions; the subsequent results pertain to these 306 respondents. Respondents used bitted bridles on 63% of their TR horses, on average. The majority of respondents used snaffle bits on at least some horses (n=274, 90%), while fewer reported using curb bits (n=60, 20%). The majority of respondents reported the use of single-jointed (n=241, 79%) or double-jointed mouthpieces (n=169, 55%). Significant predictors of bit use included horses having more than one tack option (OR=3.677, $p<0.001$) and respondents reporting higher proportions of moderately advanced and advanced riders (OR=7.962, p=0.001). Use of nosebands and curb bits varied across regions of the country. Over half of respondents (n=203, 66%) used cavesson nosebands on at least some horses, whereas other types of nosebands were less common. Respondents indicated that at least some of their participants' reins attached to various points of a halter (n=250, 65%), directly to the bit (n=217, 57%), and to the bitless bridle (n=206, 54%). This descriptive study lays a foundation for future research to investigate how specific tack on the head of the horse affects wellbeing and learning in TR horses to ultimately inform evidence-based practices.

Layperson message

Previous research has shown that equipment used on the head of the horse can impact horse behaviour, learning, and overall wellbeing. There is no standard practice regarding equipment use on therapeutic riding horses' heads, an important consideration given that these horses are often simultaneously ridden by novice riders and led from the ground. A survey which characterized bit and noseband use found wide variation in practices. It is important to understand which equipment is being used, along with how and why it is being used, in order to inform future research and best practices for therapeutic riding horse wellbeing. *Back to Scientific day 1 schedule*

O3

LOW STRESS VETERINARY CARE IN THE EQUINE HOSPITAL: PAST, PRESENT AND FUTURE DIRECTIONS

Eleanor Girgis[1], Kevin McPeake[1], Scott Pirie[1], Padraig Kelly[1] and Gemma Pearson[1,2]

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The provision of veterinary care (VC) can cause significant stress to equine patients; this may be exacerbated in hospital settings due to sudden management changes and compromised fulfilment of their ethological needs. However, over time, the profession has made significant progress in the provision of low-stress VC. Traditionally, across the profession, there has been heavy reliance on physical restraint to control patients who display unwanted, and potentially dangerous, behavioural responses during VC. However, such methods may cause significant emotional distress, physical discomfort and fail to address the underlying emotions and motivators driving the unwanted behaviour. Consequently, these methods may contribute towards worsening emotional and behavioural responses for future VC and may have a negative impact on equine welfare. Recent years have seen an increased use of training methods based on learning theory to reinforce more desirable behaviour during VC. Initially, this application of learning theory was rather mechanical in nature, with limited appraisal of, or response to, the equids' emotional state. Despite this, these methods were effective and represented the first stage in an important culture change. With time, more emphasis has been placed on the equids' emotional state and, more recently, there has also been an increase in the use of anxiolytic psychopharmaceuticals, as an adjunct, to help patients cope with stress. For example, despite a stable influx of patients each year at the University of Edinburgh's equine hospital, the average number of patients prescribed trazadone per month has increased from a mean of 0.75 patients per month in 2021, to 5 patients per month in 2025. As such, the authors propose that a multimodal approach, combining learning theory, judicious use of psychopharmacology, minimally invasive techniques, considerate handling (e.g., touch gradient), and environmental management, will be key in advancing low-stress care. This review aims to reflect on the past, present and future state of low stress VC provision for Equidae. As a busy referral hospital, serving a variety of equids and clientele, the University of Edinburgh's equine hospital is well placed to serve as a model to demonstrate the challenges and rewards of the application of low stress VC in a real-life setting. Furthermore, this review aims to promote further progress and to serve as a foundation for future research in this field.

Layperson message

Over the last decade there have been significant changes in the provision of low stress veterinary care within the equine veterinary profession. Whereas traditionally there was a culture that placed culpability on the horse for poor compliance and relied upon physical restraint to control patients, over recent years there has been a shift towards a horse-centric model that evaluates the patient's emotional state and adjusts the approach accordingly. *Back to Scientific day 1 schedule*

O4

HABITS ARE HARD TO BREAK: A STUDY OF HABIT INDUCTION, EXTINCTION AND REINSTATEMENT OF RESPONSES TO AN AUTOMATED ELECTRONIC OPERANT DEVICE IN HORSES

Cathrynne Henshall[1], Michael Mendl[2], Sebastian McBride[3], Andrew Hemmings[4], Natalie Waran[5], Jane Williams[6] and Hayley Randle[1]

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Horses frequently undergo multiple training processes in their lives, for example, when owners seek to retrain unwanted habits. Habitual responses are mediated by a neural network that automatically triggers the response, making them resistant to extinction, a source of frustration for owners. Habitual operant responding was induced in horses (n=21, 10 yrs±4.55) who then underwent extinction and reinstatement of the response. Horses were trained to operate a semi-automated electronic operant device to obtain food rewards. After hearing a Start Tone (400hz-ST), horses touched a 30cm x 30cm capacitive touch sensor mounted in a frame with their nose/lips triggering the Correct Tone (600hz) followed by the delivery of a feed reward 1s later (Acquisition-A). After reaching the learning criterion of 8 consecutive correct responses within 20s of the ST in a once daily session of up to 20 trials, horses underwent three (once daily) 20 trial overtraining habit induction (H) sessions, in which they were rewarded for all responses occurring within 45s. The following day, horses underwent an extinction (E1) session in which no rewards were given. This session continued until there were no response to the ST (and for 20s after the ST) in 5 consecutive trials. This procedure was repeated (E2) the following day and once the extinction criterion had been reached, the rewarded touch response was reinstated (R). Despite the higher learning criterion for A versus E1, there was no significant difference between the mean number of trials to reach the criterion in the two learning contexts (t_{19}=-0.192, p=0.85 A: 44.15 [16.1 SD], E: 45.15 [16.73 SD]. There was, however, a significant difference in response latencies (s±SD) between all phases of the study, with substantially lower latencies in the H phase: (Chi-squared$_6$=268.04, p<0.0001, A: 19.71 [27.97], H1: 5.19 [6.97], H2: 4.78 [6.48], H3: 3.91, [4.92], E1: 11.75 [8.54], E2: 15.70, [11:75], R: 6.94, [9.1]. Habit induction is indicated by the fourfold reduction in response latencies between H3 and A and the slow extinction of the response in E1 in which no trials were rewarded. In a retraining context, habitual responses undergo extinction slowly and are subject to spontaneous recovery. To take a horse-centred approach, trainers should factor into their training schedules and approaches that extinction of unwanted behaviour may require multiple sessions, and that reinstatement of unwanted responses can rapidly occur (as evidenced by shorter latencies to reinstate than acquire responses).

Layperson message

Horses readily develop habits and retraining horses to no longer perform unwanted behaviour is very common, however the unwanted behaviour may return which may give rise to strong punishment or beliefs that the horse is being deliberately disobedient. This study confirms that when a behaviour

has become a habit, it can take as long to learn not to perform the behaviour as it took to learn it in the first place, and that the old habit can quickly reappear. When expecting horses to unlearn a habit, trainers should be patient and not blame the horse if it reappears.

Back to Scientific day 1 schedule

P1

INNOVATIVE APPROACH TO RESOLVING LACK OF IMPULSION IN HORSES: THE SCIENCE OF MEMORY RECONSOLIDATION

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Lack of impulsion is characterized by a resistance or a refusal to increase the pace in response to the rider's aids. Various methods to condition and train the horse are typically used in these cases. However, if the problem persists and no medical cause for the problem is identified, it is necessary to search for an alternative solution. Recent advances in the neuroscience of learning offer this innovative alternative: memory reconsolidation (MR). Lack of impulsion, being a learned behaviour, can be unlearned via MR by acting directly on the neural circuits causing its symptoms. The unlearning process, scientifically validated since 2004, is based on neuroscientific principles that have practical application in training. Studies have shown that this process has a different impact on the nervous system than conventional training methods. The MR process follows several key stages applied in strict compliance with the horse's tolerance thresholds, with careful monitoring of its behavioural markers. First, the target learning is activated by a relevant stimulus, such as the human request for acceleration. Next, a contradictory experience is introduced, creating a mismatch between what the horse has learned to anticipate (resistance or refusal to accelerate, stress escalation) and the actual experience in the intervention (stress release). This discrepancy destabilizes and unlocks the synaptic encoding and is repeated 2-3 times, allowing the learning to be rewritten and reconsolidated in a new form, effectively ending symptoms. The subject of the case study is an 8-year-old Oldenburg dressage gelding presenting with a lack of impulsion at the trot and canter. Despite tack changes, veterinary interventions and conditioning training, the problem remained unchanged. During liberty sessions lasting 10 minutes, the practitioner stimulated the horse's natural forward movement, rigorously respecting handler position angles. When the horse lacked impulsion, the practitioner allowed the horse to freely experience the biological completion of its stress response and ended the session, which contradicted and unlearned the horse’s learned expectation to be constrained and escalate in stress. This process was successfully replicated in 11 cases, with horses showing full resolution in 4-6 sessions (follow-up 7-10 years). The horses' performance and well-being improved, offering trainers and riding schools a quick, effective solution for behavioural issues. This method helps horses to become receptive to riders and can positively impact competitions. By addressing memory, MR provides lasting benefits, extending to other equine-related problems.

Layperson message

Lack of impulsion is a common problem for riders. Conventional training methods offer limited options, and sometimes no physical cause is found. A new approach called memory reconsolidation (MR) offers an evidence-based solution that completely and durably resolves the issue. MR targets the horse’s brain, helping it to “unlearn” the resistance. By creating new experiences that these horses are not expecting, the intervention rewrites the learned lack of impulsion behaviour in memory. This method has shown promising results, with horses becoming more relaxed, responsive, and performing better after just a few sessions, providing a lasting solution to the impulsion problem. *Back to Scientific day 1 schedule*

P2

INVESTIGATING CONFLICTING BEHAVIOURS BETWEEN HORSES AND RIDERS DURING NON-COMPLETION EVENTS IN SHOW JUMPING

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Show jumping performance hinges on effective rider-horse cooperation. Breakdowns in this relationship may lead to non-completion (NC) events - withdrawals, retirements, or eliminations, frequently symptomatic of conflict and associated with equine welfare risks. Applying the Five Domains Model rider behaviours during NC events in Hungary were investigated. Four hundred and forty videos from the 2023–2024 Hungarian show jumping seasons where riders began but did not finish a course were analyzed. Rider demographic data were matched with video-coded behavioural outcomes. Independent, qualified reviewers performed coding using Fédération Équestre Internationale (FEI) standards. A 10% subsample was double-coded (94% inter-coder agreement). Statistical analysis involved chi-square tests, correlation tests, Principal Component Analysis, and Latent Class Clustering (XLSTAT). Rider age was weakly related to average course height (Kendall τ=0.177, $p<0.001$), while NC frequency was weakly negatively correlated with competition level (Polychoric correlation r=-0.295). Neither of these variables follow a normal distribution. Clustering yielded four rider profiles: Young Advanced (~17 yrs, 111 cm, 4.2 NCs), Intermediates (~26 yrs, 109cm, 2.8 NCs), Professionals (~31 yrs, 117 cm, 10 NCs) and Amateurs (~16 yrs, 94 cm, 2.3 NCs). Amateurs displayed the highest rate of punitive behaviour (68.4%), followed by intermediates (43.1%) and young advanced riders (41.9%). Professionals demonstrated the lowest rate of abuse (29.8%) and the highest incidence of calming responses. A significant association was found between rider profile cluster and behavioural response ($\chi^2(9)=28.5$, $p=0.001$). The findings of this study suggest rider age and experience are inversely related to occurrence of abusive responses in NC events. Amateur riders, typically those who are younger, may lack the emotional regulation and training to respond constructively under stress. Enhanced rider education, emphasizing equine behaviour and positive reinforcement, is recommended to improve welfare and performance.

Layperson summary

Show jumping demands close teamwork between horse and rider. Over 400 cases were examined where riders failed to complete a course, often due to mistakes or rule violations. Younger, less experienced riders were more likely to react with punishment such as pulling reins or using a whip, while older, more experienced riders tended to remain calm. This suggests that better training and awareness could reduce harmful behaviour and improve both horse welfare and competition outcomes. *Back to Scientific day 1 schedule*

P3

EMOTIONAL CONTAGION IN HUMAN-HORSE INTERACTIONS: INVESTIGATING THE ROLE OF STRESS AND BODY LANGUAGE IN EMOTIONAL TRANSFER

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Emotional contagion in human-horse interactions has been widely studied, yet the role of body language in stress transfer remains underexplored. This study investigated whether human emotional states, particularly anxiety, affect horses, and whether the mechanism of transfer is primarily nonverbal, via body language. A repeated-measures, within-subjects design was used to assess 33 human-horse interactions. Human participants were classified into high-anxiety (HA) and low-anxiety (LA) groups based on State-Trait Anxiety Inventory (STAI-S) scores and heart rate (HR) measurements. Two interaction conditions were tested: (1) Free-Style (FS), where participants moved and expressed emotions naturally; and (2) Constrained-Style (CS), where movement and expression were restricted using sunglasses, a mouth-covering bandana, and metronome-paced steps. Horse responses were evaluated via heart rate variability (HRV) and a validated behavioural ethogram scored at three time points: baseline, contact, and recovery. Two-way ANOVAs revealed that horses exhibited significantly greater physiological and behavioural responses during HA-FS interactions compared to HA-CS (HRV: $p=0.025$; Ethogram: $p=0.002$), indicating an increased reactivity when human anxiety was visibly expressed. In contrast, CS interactions yielded no significant differences between HA and LA groups (HRV: $p=0.573$; Ethogram: $p=0.294$), suggesting that constrained body language successfully mitigates emotional contagion. Additional comparisons between HA-FS and LA-FS further supported this pattern (HRV**:** $F(1,64)=4.92$, $p=0.028$; Ethogram $F(1,64)=13.78$, $p=0.0003$), while no significant differences were found in LA-FS vs. LA-CS interactions, likely due to natural emotional regulation by experienced handlers.

Layperson message

These findings imply that horses do not directly perceive human emotional states in the absence of expressive cues but instead respond to visual and postural indicators. Structured and neutral body language may therefore buffer equine stress responses during interaction with humans.

Back to Scientific day 1 schedule

Scientific session 2: Equine Pain and Behaviour

PLENARY #2

IS IT PAIN OR BEHAVIOUR? AN INTRODUCTION TO EQUINE BEHAVIOURAL MEDICINE

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Problematic behaviours in horses are common, they may occur when ridden (e.g., rearing, bucking), during horse-human interactions on the ground (e.g., human directed aggression such as biting or kicking) or outside of interactions with people (such as separation anxiety from other horses). These problematic behaviours can be dangerous and frequently result in a breakdown of the horse-human relationship. Owners often struggle to sense make about why the problem is occurring and where to get help. The most common question they ask is how to determine if the problem is due to pain or a behavioural problem? This plenary will explain why the wrong question is being asked! It will explore the relatively new discipline of equine behavioural medicine and propose a systematic approach to investigating and treating problematic behaviours. This approach considers the relative contributions of cognitive, emotional and physical pathology in the development and maintenance of problematic behaviours. *Back to Scientific day 1 schedule*

O5

BEHIND THE BRIDLE: UNDERSTANDING FACIAL EXPRESSIONS IN HORSES BEFORE AND AFTER RIDING

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Lesson horses often experience poorer welfare than other horses, yet the causes remain unclear. Facility owners may assume that beginner riders place less strain on these horses, but this assumption has not been thoroughly investigated. Given that lesson horses are ridden by riders of varying skill levels, we aimed to explore how rider experience impacts their welfare. The Equine Facial Action Coding System (EquiFACS) was used to assess changes in facial expressions of horses (n=35) before and after beginner and advanced hunter/jumper lessons. Video recordings ranging from 2-20s were taken pre- and post-lesson, recorded at a standardized angle when horses were free from distraction. A single blind observer coded the presence of EquiFACS facial action units (FAUs) in the video clips using a binary yes/no system. A generalized linear mixed model with repeated measures evaluated the effects of rider level, time and their interaction on the occurrence of FAUs, with horse experience and sex as fixed factors. Rider level did not influence any FAU occurrence (all $p>0.1041$), except for AU24 (lip presser), which was twice as frequent during advanced lessons (14.88%) compared to beginner (7.44%; $p=0.005$). Time influenced AU145 (blink; $p=0.0407$), AD38 (nostril dilator; $p=0.0016$), and AD81 (chewing; $p=0.0331$), with their occurrences being higher pre-lesson (41.94%, 40.32%, and 12.10%, respectively) compared to post-lesson (29.03%, 22.58%, and 4.03%, respectively). Horses with >7 years' experience as a lesson horse exhibited more occurrences of AD38 compared to those with <7 years of experience ($p=0.0440$). Horses with <3 years' experience showed a higher prevalence of AUH13 (nostril lift; $p=0.0442$) and AU16 (lower lip depressor; $p=0.0245$) than horses with >3 years' experience. Geldings showed a lower prevalence of AD38 ($p=0.0164$) and AU16 ($p=0.0210$) compared to mares. These results suggest that rider skill level does not influence the facial expressions of riding lesson horses. However, the process of preparing for the lesson elicited increased FAUs previously associated with negative affective states, potentially reflecting stress related to the anticipation of the upcoming activity, or the handling involved prior to riding. In contrast, horses with more years of experience exhibited fewer FAUs associated with negative affective states, suggesting that they may become habituated to the routine of riding lessons over time. This information can help determine the appropriate workload for riding lesson horses and emphasize the importance of consistency to reduce stress.

Layperson message

This study examined how the facial expressions of lesson horses change before and after riding lessons with beginner and advanced riders. The results indicate that rider skill level does not influence the facial expressions of riding lesson horses, but horses showed more facial expressions associated with negative emotions before lessons, possibly due to anticipation of the activity or the handling process. Horses with more experience showed fewer changes in their facial expressions, suggesting they may become more accustomed to the routine over time. This information can help to inform appropriate workload for riding lesson horses. *Back to Scientific day 1 schedule*

O6

DEVELOPING A FIXED DESCRIPTOR LIST FOR QUALITATIVE BEHAVIOUR ASSESSMENT OF PAIN IN HORSES

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Accurate pain assessment in horses is essential for improving welfare and guiding evidence-based clinical management. However, many existing pain assessment tools require specialised training or are under-utilised in clinical practice. Qualitative Behaviour Assessment (QBA) has been applied across species to assess affective states and welfare, including pain assessment in farm animals such as cattle and sheep, but has yet to be used for equine pain assessment. This study aimed to develop a standardised list of QBA terms for identifying pain-related behaviour expressions in horses. Using Free Choice Profiling (FCP) methodology, 10 observers generated descriptive terms, statistically analysed to identify scoring patterns. A focus group refined and produced a structured list. A total of 72 video clips were created to capture a broad range of emotional expressions before and after routine field castration. Video data were collected pre-operatively (baseline), on the day of surgery, and up to six days post-operatively, with filming in the horses' home environments to minimise stressors. 20 video clips were selected for Phase 1 to represent diverse emotional expressions. An additional 52 were used for scoring, standardised and randomised to prevent selection bias. Ten observers, including equine veterinary surgeons, veterinary nurses, academics, and equine science students, participated in a two-phase FCP process: Phase One, observers independently generated 105 descriptive terms characterising equine expressive behaviour using 40 video clips. Phase Two, observers used their self-generated terms to score behaviour across 52 video clips. Data were analysed using Generalised Procrustes Analysis (GPA) and Principal Component Analysis (PCA) to assess inter-observer agreement. The GPA consensus profile explained 63.66% of variation between observer scoring patterns and was significantly higher than the mean Procrustes statistic of 100 randomised profiles (37.39±0.1447; $p<0.001$), indicating strong agreement. The analysis identified three primary dimensions of equine expression: Dimension One: relaxed/calm/content–frustrated/agitated/unsettled (39.9%); Dimension Two: uncomfortable/drowsy/quiet–inquisitive/curious/seeking (15.1%) and Dimension Three: sociable/friendly/interactive–agitated/annoyed/stressed (9.6%). A two-round focus group refined 105 terms into a fixed QBA list of 21 for assessing pain-related behaviour. The first round streamlined the list, while the second, involving expert discussions, finalised the terms and ensured a broad range of emotional expressions were captured across four quadrants of the Arousal-Valence Model. By adopting a 'whole animal' approach, QBA offers a holistic, scientifically robust, and user-friendly method for detecting subtle behaviour changes. With further validation, this tool could enhance pain detection, support clinical decision-making, and improve equine welfare.

Layperson message

Horses can feel pain, but it's not always easy to recognise. Vets and horse owners need simple and reliable ways to recognise pain to provide the right care. Experts watched 92 videos of horses before and after routine castration to study what emotions were expressed through changes in body language. Experts generated a list of 21 key emotions that may vary when horses are or are not in pain, using this list for analysis may help indicate how a horse is feeling. This list will be tested further in research studies to help improve pain detection and welfare. *Back to Scientific day 1 schedule*

O7

DOES PAIN IMPACT HOW HORSES REACT TO SOUND?

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Pain is often an under recognized cause of behaviour problems in animals. Specifically in horses, pain behaviours are frequently missed. Owners often continue to ride horses that display pain related behaviours. While some owners and riders may attribute more obvious behaviours such as bucking or rearing to pain, other more subtle behaviours such as sound sensitivity may also be indicators of pain. Recent canine research has found that dogs with orthopaedic pain may develop generalized sound sensitivities. In this presentation, the results of the current study on sound sensitivities related to equine pain will be discussed. Horses experiencing different levels of lameness were tested to see if they showed different responses to a sudden noise. Lameness was evaluated using the Equinosis Lameness Locator and this lameness evaluation was used to divide horses into three categories: Low Lameness, Moderate Lameness, and High Lameness. Horses then underwent a five-day study examining whether they habituated or sensitized to a once daily airhorn stimulus. To evaluate the behavioural response, response latency and duration of behaviour disruption was measured in addition to assigning a reaction score and behaviour change score. Heart rate data were collected before, during, and after the sound stimulus. The behaviour change score was an evaluation of behaviour between day one and day five. While zero low lameness horses had a worsening reaction between day one and day five, two moderate lameness horses and three high lameness horses showed increased behaviour change scores. Additionally, one horse in the high lameness and one horse in the moderate lameness group began avoiding the feed pan on the final days of testing. Using a linear mixed model, the relationship between lameness and heart rate response was evaluated. In the high lameness horses only, the heart rate immediately before the air horn on day five was significantly higher when compared to day one ($t(51)=2.13$, $p<.05$). To date there is not see a clear pattern of sensitization among higher lameness horses. However, recognizing sound sensitivities as a potential pain behaviour could help horses to be treated sooner. A decrease in sound sensitivities as a result of treated pain could lead to decreased unwanted behaviours such as spooking and therefore a better human and horse relationship.

Layperson message

Pain behaviours in horses are frequently missed. While some owners and riders may attribute more obvious behaviours such as bucking or rearing to pain, other more subtle behaviours such as sound sensitivity may also be indicators of pain. Recent canine research has found that dogs with orthopaedic pain may develop generalized sound sensitivities. In this presentation the results of the current study on sound sensitivities related to equine pain will be presented. If subtle pain behaviours can be recognized sooner, horses with unwanted behaviour may be able to be treated sooner which could lead to better human and horse relationships. *Back to Scientific day 1 schedule*

O8

'HAPPINESS' IN HORSES? THE USE OF A PREDICTION ERROR PARADIGM IN ASSESSING EQUINE AFFECTIVE STATE

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Evidence-based indicators of positive affective state in horses are currently insufficient. This study aimed to bridge this gap by identifying and measuring potential markers of positive affective state using a reversal learning Prediction Error (PE) paradigm. A prediction error is defined as the difference between an expected outcome and the actual outcome, and can be either positive (better than expected) or negative (worse than expected). Positive PEs (PPE), stimulate dopamine release and are associated with positive emotions, whereas a worse than expected outcome leads to the opposite: a negative PE (NPE). Twelve Thoroughbred geldings (11.67±4.03 years) were trained to make a spatial discrimination between a rewarded and unrewarded location by operating a device involving two independent 35 cm x 30 cm panels (left and right), and positioned at 1m from the ground. On depressing the target panel, a mechanical mechanism delivered a food reward, whereas responses to the non-target panel were unrewarded. After familiarisation to the device (F:1-2 days), horses underwent original learning (OL) PPE generation in which responses to the target panel (left) were shaped (days 3-6) until horses reached a criterion of 8/10 correct consecutive responses. In the reversal phase (R), the target panel location was switched to the right panel to generate a NPE. After a period of behavioural extinction, horses eventually learnt to respond to the reversed panel and generated a new PPE. Latency of correct responses, panel press duration, and behaviour, heart rate (HR), spontaneous blink rate (SBR) and eye temperature (ET) were analysed to assess affective state. Eleven horses completed OL in 5.82±0.83 days, with one failing to reach criterion. SBRs significantly increased as horses progressed through OL and R compared to F ($F_{7,188}$=4.03, $p<0.001$). There were no significant differences in HR or ET according to phase or change in PE valence (all $p>0.05$). During R, horses performed more behaviours associated with frustration and discomfort (e.g., 'stomping' $p<0.001$ and 'chew bucket' $p<0.003$) than their final OL session, thus linking behaviour associated with negative affective state to NPE. This study identified SBR as a proxy measure for positive affective state and combined behavioural indicators of both negative and positive valence in horses undergoing a prediction error paradigm. These results support research into not only the identification of negative emotions, but the active promotion of positive emotions in horses.

Layperson message

This study investigated how horses behave and may feel when required to solve a problem using a device that released food when they pressed a particular panel with their noses. Horses underwent a 'prediction error' training protocol that included them not receiving food when expected - leading to a negative affective state, e.g., 'frustrated' and vice versa leading to a positive affective state, e.g., 'happy'. Measurements including learning success, horse behaviour, Spontaneous Blink Rate (SBR), eye temperature and heart rate were analysed to reveal that SBR may be useful in assessing how a horse is feeling and therefore their welfare. *Back to Scientific day 1 schedule*

O9

EYES ON THE PRIZE - HOW VISUAL ATTENTION IMPACTS DRESSAGE SCORING

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Transparent judging is essential for fairness and equine welfare, yet the complexity of horse-rider interactions makes judging prone to cognitive heuristics. This study investigated how visual fixation patterns, judge position, riding level, and horse-rider combinations impact scoring. Three FEI-certified Grand Prix judges assessed fourteen horse-rider combinations from Advanced Medium to Grand Prix Dressage, each performing a dressage test at their level twice. Judges were seated at C, B, and E and wore Tobii Pro Glasses 3. Total Number of Fixations and Average Duration of Fixation were measured for five anatomical Areas of Interest (front, back, feet, rider, and arena) across eight movements. Linear regression models (α=0.05) assessed predictor impacts on movement scores. Regression models were significant for five of eight movements, explaining 55.3%–67.5% of variance. Judge position was significant for collected walk (β=-.61, $p<0.01$), collected canter (β=-0.44, $p=0.01$), extended trot (β=0.55, $p<0.05$), and halt (β=-0.78, $p<0.01$). Riding level was significant for collected walk (β=0.43, $p<0.01$), extended canter (β=0.35, $p<0.05$), flying change (β=0.48, $p=0.05$), and halt (β=0.52, $p=0.001$). In extended trot, fewer fixations on the back (β=-0.77, $p=0.001$) correlated with higher scores, while in extended canter, shorter fixations on the back (β=-0.56, $p<0.05$) and longer on the front (β=0.63, $p<0.05$) were associated with higher scores. Visual gaze patterns suggest that the front of the horse contains more salient information, thus requiring more attention, while the back is briefly checked if the horse moves well. Judge position also impacts scores, either due to different viewing perspectives or interpretation. Rider level influenced final scores, suggesting a halo bias, where experience level affects overall perception. While fixation patterns offer insights into judging priorities, results indicate judges rely on additional cognitive shortcuts. Understanding these strategies can refine training, improve scoring consistency, and enhance equine welfare through clearer performance expectations.

Layperson message

Transparent judging is vital for fairness and equine welfare, yet the complexity of horse-rider interaction can lead to assessment bias. Eye tracking technology can help determine what judges focus on when evaluating horse-rider combinations. When awarding higher scores in extended canter, judges fixated less on the back and longer on the front, likely because it contains more relevant information, when there is little time. Judge position and rider experience also affected scores, suggesting differences in perspective and cognitive biases. Understanding what judges look at can improve judging consistency and safeguard equine welfare by being clear about what harmonious performances look like. *Back to Scientific day 1 schedule*

P4

EQUINE EMOTIONS: HOW EQUESTRIANS PERCEIVE, ATTRIBUTE AND RECOGNIZE EMOTIONAL STATES

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Accurately identifying equine emotions is crucial for horse welfare, yet studies show that even experienced professionals often misinterpret them. Misattributions can lead to inappropriate handling, highlighting the need to understand how people perceive horse emotions. This Swedish 12-question survey explored which of nine emotions (fear, curiosity, joy/happiness, love/affection, frustration/anger, sadness, excitement, grief, surprise) respondents attribute to horses (believe they can experience, A), have personally observed (O) and how they identify them. Of the 2,786 responses, the majority were women (98%), aged 25-54, horse owners (81%) with over 11 years of horse experience (81%) but not equine professionals (82%). The most commonly attributed and observed emotions were fear (A:97%, O:99%,) curiosity (A:97%, O:98%), joy/happiness (A:92%, O:95%), love/affection (A:90%, O:95%), and frustration/anger (A:84%, O:91%). Sadness (A:72%, O:89%) and excitement (A:74%, O:87%) were also frequently reported, but more often observed than attributed. In contrast, grief (A:45%, O: 81%), surprise (A:56%, O:66%), and anxiety (A:34%, O:59%) were less commonly reported or attributed. Respondents relied more on body language than facial expressions, though the latter was still deemed important ($W=4{,}55 \times 10^6$, $p<0.001$). Principal components (PC) analysis revealed differences in body areas used for emotion identification: movement related indicators (e.g., legs, tail) explained more variance in PC1, while eyes, nostrils and mouth were more relevant for PC2. Cluster analysis identified three clusters (C): C1 (84% of respondents) had a higher proportion of females compared to C2 ($p=0.022$), were younger than C3 ($p<0.001$), had less experience with horses than C2 and C3 ($p=0.012$) but higher professional involvement than C3 ($p=0.008$). C1 had a relatively high likelihood reporting observations of all listed emotions, whereas C2 demonstrated a low likelihood of observing these emotions. C3 was unlikely to report observing excitement, surprise, anxiety, and particularly unlikely to report frustration/anger, but highly likely to report love/affection. Regarding sources of knowledge, most respondents relied on common sense/intuition (82%), followed by scientific articles (70%) and advice from industry professionals (such as for example trainers or veterinarians 62%) with less reliance on social media (30%) or sport associations (9%). While the majority of emotions were both attributed and observed at high percentages, there were gaps in emotions that were observed compared to attributed. That the range and valance of identified emotions varied depending on demographic factors such as age, gender, personal experience and professional involvement, along with the high reliance on experience/intuition could be a source of the misidentification of emotions reported in other studies and highlights the needs for targeted education.

Layperson message

Being able to correctly identify the emotional state of horses is important to ensure appropriate handling and care, as well as protecting the safety of riders and handlers but studies have shown that people may not correctly identify equine emotions. Horse people reported that they have seen

or believe that horse can experience a wide range of positive and negative emotions. Body language and also facial expression were the most commonly used indicators of emotion by respondents who mostly relied on their intuition to detect emotions, suggesting a need for further education to assist people to accurately identify equine emotions. *Back to Scientific day 1 schedule*

P5

IMPACT OF AN ONLINE COURSE ON AFFECTIVE STATE IN HORSES TO CREATE HUMAN BEHAVIOUR CHANGE

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Educational programs to enhance horse welfare have focused on physiological states for decades. However, contemporary assessment of horse welfare has expanded to include behavioural interactions and mental state. The mental domain (affective state) is intricately interwoven with the other states, and is often less understood by horse owners. The purpose of this study was to determine if participants in the interactive online course Recognizing Affective States in Equine (RAiSE) used information from the course to change how they interacted with horses. All data are self-reported by the participants, and the reported behaviour changes were not observed by the research team. RAiSE consists of five modules focused on the importance of the affective state in welfare assessment, horse communication, understanding the senses, abnormal states, and behavioural interactions of horses. Course participants were recruited through social media, and completed a pre-survey, a post-survey, and a post-post survey (PPS) 90 days following course completion. The descriptive and qualitative data reported focused on intent and changes of management from the PPS. Of 118 participants enrolled by January 1, 2025, 45 had completed the PPS by March 10, 2025. Respondents (n=45) were 87% female. Mean age was 49.36±16.9 years, and mean horse experience (reported on a scale of 1-100) was 73.3±23.9. Most of the respondents (60%) reported riding casually, while 22% participated in competitions, and 16% identified as professional riders/coaches/trainers. Nearly all respondents (97.8%) agreed with the statement they wanted to implement assessment of affective state in horses in the next year, and 88.6% indicated they had already begun implementing assessment of affective state in their horse interactions. Participants (75.6%) reported altering handling and management practices based on information they learned in the course. They indicated an increased awareness and attention to assessing affective state, specifically looking for signs of stress, discomfort and pain, and then modifying their interactions with the horses in response to those signs. Modifications reported included more patience when handling, and determining the intensity of training sessions. Those that did not alter any handling or management practices indicated it was due to either their horses already being in an optimal situation (15.5%) or they were not in a position to make those changes (8.8%). This study demonstrated that the online course RAiSE increased intention, and short-term application, of affective state in participants' horse handling and management.

Layperson message

Many studies in equine welfare science indicate that there are challenges for horse owners of all experience levels in assessment of affective state, and therefore, developing a holistic understanding of their horse's welfare. The purpose of this study was to determine if an asynchronous online course focused on the affective state changed how course participants assessed the welfare of horses and how they interacted with them. Participants reported that they had an increased awareness of affective state, and planned and/or already had implemented changes in their interactions with horses to be more responsive to the mental domain.

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P6

ATTITUDE OF GERMAN SPORT HORSE AND THOROUGHBRED TRAINERS ON TRAINING LESS THAN THREE-YEAR-OLD HORSES: AN INTERVIEW-BASED ANALYSIS

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The training of two-year-old horses is discussed controversially. Before deciding on a legally binding minimal age for training, the German Federal Ministry for Food and Agriculture has initiated experimental studies on the mental and physical maturity of young horses, named the Horsewatch Project. This is complemented by a status quo analysis on the initial training in Warmbloods (WB) and Thoroughbred racehorses (TB), two very different sectors of the equine industry. We have analysed the opinion of trainers preparing WB stallions for breed registry licensing (n=10) and TB trainers (n=10) on procedures for initial training and the rationale behind their practice. Data were gathered through formal, semi-structured interviews, the majority of which were conducted face-to-face, followed by a tour of the stables and premises. WB stallion preparation is performed on larger stud farms preparing between three and 30 stallions annually. TB trainers held a license as public (n=9) or owner trainers (n=1). The number of horses in training ranged from 10 to 85 including up to 30 yearlings. WB stallions enter a 10–12-week preparation training at 28 months of age with lunging, showing at hand, training in an automated horse walker, and jumping without rider. The initial TB training started at 18 months of age with habituation of horses to tack and saddle, mounting of a rider in the stable or in a horse walker, riding in the horse walker and slowly progressed to racetrack training. All WB and most TB horses were kept in individual boxed with contact to neighbours through a grid partition except for two TB training yards with solid box walls on all sides. All horses were fed hay ad libitum or three times daily and, except for two TB yards were kept on straw. All horses had daily access to outdoor paddocks. The trainers except one TB trainer opposed group housing of horses in training because of a high risk of injuries. Only one TB trainer gives his horses daily pasture access with horses separated by sex. TB yearlings that are overstrained will remain in training but are often not raced before they are three years old. WB stallions that appear overstrained are often castrated, kept on pasture for one more year and are then trained and sold as riding horses. Trainers emphasized that slowly increasing demands and occasionally pause training are more relevant for horse welfare than increasing the age for initial training.

Layperson message

Horses may be overstrained when trained at a young age. We have interviewed trainers preparing Warmblood stallions for breed registry licensing and Thoroughbred trainers on their training procedures. Trainers emphasized that horses need an individual approach, with demands increasing slowly. Horses are stabled individually with daily access to individual outdoor paddocks. All trainers except one opposed group housing because of the risk of injuries.

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CLEVER HANS LECTURE

ENGINEERING ENVIRONMENTS WITH REASONS TO BEHAVE

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A challenge in zoos is engineering environments that support active animals. Current approaches largely focus on the activity with little attention to the outcomes those activities produce. As a result, animals often engage for short periods of time and with little diversity in what they do. What is missing in this approach is an answer to the question, why? Why should an elephant do X? Or a penguin do Y? Outcomes are the purpose of behaviour. The problem we are solving could reasonably be said to be boredom, when boredom is understood as a lack of reinforcers in the environment. When we focus our attention on programming the outcomes of behaviour (reinforcers) in addition to the behaviour itself, more diverse behaviour emerges, and we generate lasting engagement. This presentation discusses our recent efforts to engineer zoo environments rich with reinforcers and the framework that has developed to guide future programs. *Back to Scientific day 1 schedule*

Scientific session 3: Equitation Science

KEYNOTE

SEEING PRESSURE: EVIDENCE AND RESPONSIBILITY IN MODERN EQUITATION

Cristina Wilkins

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Drawing from image datasets collected for my PhD research into the One Welfare outcomes of human-horse interactions in sport, and with the support of an interdisciplinary team, I raised concerns with international authorities about equipment-related pressures, leading to an invited presentation to the FEI Veterinary Committee. That experience, and the responses it provoked, raise important questions about accountability, evidence and systemic dysfunction. This plenary will build on that moment, revisiting the solutions we proposed and their alignment with the ideas of foundational thinkers in ethology and animal welfare science. It will be an invitation to bring core principles, including those embedded in the ISES Training Principles, into dialogue with current knowledge about pressure, learning, and motivation. At the centre of this dialogue are the horse's experience and the ongoing challenges of advancing equitation and welfare science with clarity, responsibility, and the scientific weight needed to bring about meaningful improvements. *Back to Scientific day 2 schedule*

O10

A WICKED PROBLEM: SYSTEMIC ISSUES SURROUNDING CANADIAN EQUESTRIAN DRESSAGE

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Competitive dressage is facing public scrutiny due to concerns for the welfare of horses, placing the sport's social license to operate in jeopardy. Limited research has focused on a holistic understanding of how dressage training is conducted in practice and how dressage training practices may be influenced by systems and organisations like Equestrian Canada and the International Equestrian Federation. The objectives of this study were to 1) explore the cultural context of the Canadian dressage industry, including how horse welfare is integrated into the culture, and 2) investigate coaches' and riders' perceptions and experiences with the use of horses for dressage sport. An ethnographic case study approach was employed for data collection, where M.R. spent approximately 2 to 6 weeks with each of the four participating Equestrian Canada Certified dressage coaches, and their riders (at least four riders per coach for a total of 19 riders). Data collection included conducting at least one in-depth interview with each participating coach and rider and recording fieldnotes based on informal conversations M.R. had with participants and her direct observations of dressage lessons. Interviews and fieldnotes were analyzed using reflexive thematic analysis, leading to the development of three themes (1) the relationship between systems including equestrian governance, research and practice, (2) how these systems foster a culture of contradiction within the equestrian industry and (3) the "equestrian dilemma" which highlights how participants navigate their love for horses with the demands of the sport. Findings highlight that governing bodies like the International Equestrian Federation shape industry norms and may contribute to equestrians' experience of cognitive dissonance, wherein rewarded dressage practices may contradict with training practices that promote horse welfare. The systemic issues faced by the dressage industry may be represented as a "wicked problem" requiring solutions that target systemic change.

Layperson message

The welfare of horses used for competitive dressage have been under increased scrutiny, placing its social license to operate in jeopardy. This study looked at how ideas about horse welfare are shaped within dressage culture and how coaches and riders experience using horses during training. Results suggest that governing equestrian bodies shape perceptions of welfare and may contribute to a culture of contradiction where what is rewarded in dressage competitions contradicts with "good' horse welfare practices. This disconnect may create cognitive dissonance among athletes where equestrians may feel pressure to choose between their horse's welfare and competitive success.

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O11

WHY EQUESTRIANS USE AUXILIARY REINS ON HORSES, THEIR BIOMECHANICAL PERCEPTIONS, AND BARRIERS TO HUMAN BEHAVIOUR CHANGE

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Auxiliary reins (AR) such as draw reins, side reins, and running martingales are commonly employed by equestrians but have also been linked to equine welfare concerns. To better understand the reasons why equestrians use AR, this study aimed to identify factors influencing behaviour and related barriers to using AR less. A secondary aim was to determine if equestrians who use AR understand their likely biomechanical function. An online survey collected 570 responses from equestrians worldwide, with 344 (60.4%) indicating that they had or would use AR on their horses. Data were statistically analysed for associations using Pearson's Chi-squared, Fisher's Exact, or Mann-Whitney U tests; correlations were calculated using Kendall's tau (significance: $p<0.0025$). Following statistical analysis, participation in equestrian competition was found to be significantly associated with the use of AR ($n=570$, $Chi^2_1=20.42$, $p<0.001$). Equestrians who presently used or would use AR ($n=273$) tended to have lower biomechanical knowledge scores than those who no longer used AR ($n=71$, $W=11213$, $p=0.029$). Open responses were analysed using thematic analysis and drawing on the Behaviour Change Wheel as a deductive framework. Most of the biomechanical (related to movement of the horse's muscles and skeleton) changes equestrians reported to have observed following the use of AR were not supported by scientific evidence, implicating a lack of knowledge as both a factor influencing behaviour and barrier to using AR less. Social influence from those within an equestrian's immediate environment and lack of physical riding or training skill were primary drivers to start using AR. However, once human behaviours were established, perceived horse characteristics and lack of rider ability emerged as the most prominent barriers to reduced AR use. Current findings suggest that gaps may exist within equestrian training, and AR likely provide a means to bridge those gaps as equestrians strive to attain skill mastery within equestrianism. Future research is warranted to identify how to better teach equestrian skill and biomechanical knowledge within riding programs to reduce reliance on AR.

Layperson message

Equestrians were surveyed about their use of auxiliary reins on horses and their perceptions of effects likely exerted by this equipment on the horse's movement. Initially, use was encouraged by an equestrian's social circumstances and lack of physical skill, while present-day use of auxiliary reins continued due to perceived horse characteristics or lack of rider ability. Most reported changes in the horse's movement following the use of auxiliary reins lacked evidence to support them. Equestrian training programs should be examined for insufficiencies to reduce reliance on auxiliary reins and risk of associated equine welfare concerns. *Back to Scientific day 2 schedule*

O12

IDENTIFYING THE STARTING POINT FOR USING COMPUTER VISION METHODS ACCURATELY TO ENHANCE STANDARDS IN EQUINE SPORTS

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The equine industry faces increasing societal pressure to enhance equine welfare, especially in competition settings. Applying scientific knowledge to real-life scenarios remains challenging. This study explored computer vision-based technologies to assess equine affective states and welfare. The development of reliable AI-based tools requires a robust ground truth, built on balanced datasets annotated by experts. This was achieved through evaluation by 10 specialists in equine behaviour in a virtual meeting and afterwards, during a workshop at the 2024 ISES Conference in New Zealand, where 37 equine professionals assessed 30 dressage competition videos. Each video was classified as positive, negative, or neutral based on behavioural indicators relevant to equine welfare in sport. Negative indicated the presence of conflict behaviours; positive reflected signs of relaxation and harmony that could merit reward; and neutral referred to the absence of both negative behaviours and clear indicators of relaxation. For the development of a deep learning-based affective state classifier, the open-source software Social LEAP Estimates Animal Poses (SLEAP, version 1.3.0) was used. This software enables training algorithms to detect key points via 2D pose estimation. The first step involved defining key landmarks and the framework for annotation. The resulting model used 23 key points, including ears, forehead, nostrils, chin, neck, withers, rump, tail base, middle, and end, as well as each hoof, knee, hock, stifle, and shoulder. Labelling was performed on one-third of the frames per video in sequence. Although manually selecting "ideal" frames with clear horse visibility could optimize training, a diverse and challenging dataset was prioritized to reflect real-world conditions. Initial tests included 30 videos of 5 to 10 seconds, totalling 5,191 frames. Different architectures were tested (LEAP, RESNET, and UNET), with UNET yielding the best results based on key metrics: Object Keypoint Similarity (0.76898), Precision (0.97920), Recall (0.99017), and Average Distance between annotated and predicted points (9.97256). Optimal values for the first three are 1, and 0 for distance, making 9.97256 a promising result for accurate landmark detection. The keypoints that were more easily identified were: Nostril, chin, forehead, ears, neck, withers, rump and tail base. The findings highlight the potential of deep learning models, in detecting equine affective states. The development of such technologies should be analysed in detail to avoid invalid conclusions and assessments when being applied in real-life scenarios. These results reinforce the viability of AI-driven tools to enhance equine welfare assessment in competition settings.

Layperson message

Measuring equine welfare in competition and applying current scientific knowledge to enhance equine sports can be challenging. This study explored how artificial intelligence (AI) can help by analysing horse body movements in videos. Experts classified 30 dressage competition videos based on horse emotions, creating a foundation for AI training. A computer algorithm was then trained to track 23 key body points, like ears, neck, and tail, to detect emotional states. The best AI model showed promising results. However, these tools must be carefully tested before real-world

use. AI could become a valuable tool to improve horse welfare in competitive settings.
Back to Scientific day 2 schedule

O13

EQUINE WEIGHT CARRYING LIMIT PRACTICES IN U.S. EQUINE-ASSISTED SERVICES PROGRAMS

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Equine-assisted services (EAS) is an umbrella term for services (horsemanship, therapy, and learning) integrating horses to benefit humans. As in any human-equine interaction, ensuring equine welfare during these interactions is critical. Limiting the weight carried by equids is one aspect of ensuring welfare. Even though equine weight carrying limits are recommended or required in the EAS industry, little is known about how these limits are established. Representatives from fifty programs providing EAS in the U.S. completed an online survey focused on if and how equine weight carrying limits are determined and implemented. Data were summarized (counts and percentage) using SAS (v9.4). Nineteen (38%) programs were not accredited by an organization. The remainder were accredited by Professional Association of Therapeutic Horsemanship International (PATH Intl; premier accredited centers: n=10; member centers: n=5), Certified Horsemanship Association (CHA; n=3), Spirit Horse (n=1), and Global Federation of Animal Sanctuaries (GFAS; n=1). Four (8%) programs had a general rider or client weight limit policy of either 82 or 91 kg (180 or 200 lbs) established based on experience (n=3), general observation of the equids (n=3), historical precedence (n=2), and 20% of the equines' body weight (n=2). The other 46 (92%) programs had weight carrying limits for each individual equine in the program. Thirty-five (76%) programs used a protocol that included assessing specific variables such as age of the equine (n=34), fitness (n=32), health (n=32), soundness (n=32), behaviour (n=30), muscling (n=29), body condition score (n=28), balance (n=25), 20% of the equine's body weight (n=21), length of the back (n=20), condition of the hoof (n=19), bone density (n=14), breed (n=11), and strength and length of the loin (n=11). The remaining eleven (24%) programs used experience (n=9), general observation of the equines (n=11), 20% of the equine's body weight (n=6), and veterinarian consultation (n=1) to set individual weight carrying limits. Current practices for determining equine weight carrying limits are variable, therefore further research is needed to establish best practices.

Layperson message

One aspect of ensuring equine welfare during human-equine interactions is limiting the weight carried by the equine. Despite recommendations or requirements to implement equine weight carrying limits in the equine-assisted services industry, little is known about how these recommendations are put into practice. A survey of equine-assisted services programs in the United States revealed that practices are variable. The largest number of programs (76%) implemented protocols that involved assessment of specific variables like equine age and soundness. Additionally, using 20% of the horse's body weight in these determinations was common. Further research is needed to establish best practices. *Back to Scientific day 2 schedule*

O14

INVESTIGATION INTO LEISURE OWNERS' PERCEPTION OF HORSE QUALITY OF LIFE ASSESSMENT FRAMEWORKS

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Formal frameworks have been developed to support valid, reliable and feasible on-yard assessment of horses' quality of life (QoL) i.e. welfare over time. Preliminary evidence suggests they are rarely used and, to-date, no studies have investigated why. Most horses in Great Britain are used for leisure activities and it is important to understand whether and how their owners might use these frameworks in practice. Part of a larger study, the aim was to determine leisure horse owners' perceptions of horse QoL assessment frameworks. Focus groups (FGs), advertised via social media, were attended in person (n=5 FGs, n=21 participants) and online (n=3 FGs, n=15 participants). Participants watched a presentation introducing various QoL frameworks, demonstrating different assessment methods and rating scales: Horse Grimace Scale (n=8 FGs); Observer Approach Test (n= 5 FGs); Qualitative Behaviour Assessment (n=7 FGs); Mobility Scoring (n=8 FGs); and a QoL chart (n=7 FGs). Feedback was sought on the frameworks' format, language and ease of use, and whether they would use it, record the results or attend training before using it. Sessions were recorded, transcribed, anonymised and analysed using thematic analysis. Notably, participants felt the frameworks offered limited value compared with the assessments they performed as part of their normal horse-care practices. Participants discussed instinctively assessing measures included in the frameworks as part of a more holistic evaluation e.g., during a wider range of contexts/activities, such as tacking up and riding, and observing horses for longer than stated in the guidance. Some participants felt the framework could not be applied to their situation e.g., the guidance required the horse to be assessed in the stable but their horse lived out 24/7. Participants often stated they would not record results or would not know what to do with them. Participants discussed concerns about interpreting rating scales or terms used in the descriptors. However, many said they would not undertake training. Participants suggested the frameworks would be useful for other people or in certain situations e.g., new owners, unfamiliar horses or after noticing a change. These results highlight why QoL assessment frameworks are unlikely to be used by owners under real-life conditions and therefore offer limited value beyond research. When producing alternative resources to help owners monitor their horses' QoL, researchers and charities should utilise behavioural science and collaborate with owners throughout the development stage to ensure they are perceived as fit for purpose by the user.

Layperson message

Researchers have developed formal frameworks that can be used consistently by the same and different people to provide relevant information about a horse's wellbeing. The results of this study indicate that leisure horse owners felt the frameworks offered limited value compared with the instinctive and holistic wellbeing assessments they performed as part of their normal horse care practices. When producing alternative resources to help owners monitor their horses' wellbeing,

researchers and charities should utilise behavioural science and collaborate with owners throughout the development stage to ensure they are perceived as fit for purpose by the user.
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P7

EVALUATION OF THE WELFARE OF URBAN CARRIAGE HORSES IN MALTA: A HOLISTIC APPROACH

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Urban carriage horses have long been part of cultural heritage, but there is limited evidence-based legislation to protect their welfare worldwide. This study evaluated the welfare of 60 urban carriage horses in 43 stables in Malta using a new, tailored protocol that assessed both the animals and their owners. The protocol was based on established welfare principles, the AWIN protocol, expert input, and literature review. Assessments included interviews with keepers, focusing on feeding, health, housing, and human-animal interactions. Partial Indices (PI) were calculated for both owners and horses by first determining the average score per category using the given formula. Each response was assigned a score (0, 1, or 2), and the weighted average was computed based on the number of occurrences of each score. To aggregate scores and derive Principal Aggregate Indices (PAI), the PI values for both owner and horse levels were weighted at 20% and 80%, respectively. The overall results were obtained by averaging the PI values across all horses for each owner, providing a structured classification of welfare status. At the animal level, 30% of the horses were evaluated during breaks at their place of work, while 70% were assessed in their stables, depending on owner availability. The welfare assessment revealed that health scores were the highest among the four-principle aggregate index with an average of 97.29 and several owners achieving the maximum score of 100. This suggests that most owners prioritize medical care and disease prevention, leading to excellent overall horse health. Behavioural scores were generally high but displayed some variability. While most horses were able to express natural behaviours and showed no signs of distress, a few cases required further attention. Stables were categorized into four welfare profiles based on PAIs: Excellent, Satisfactory, Unsatisfactory, and Unacceptable, with rankings further refined using the Traffic Light System. Among 32 owners, 66% were rated "Excellent" and 34% "Satisfactory," with no cases of lower classifications, indicating a generally high standard of equine care. The mean Total Welfare Index (TWI) of 86.41 suggests that horses are in good health, well housed, and displaying appropriate behaviour. Feeding was identified as the main area needing improvement, with concerns about meal quality quantity, and consistency. The study introduces a new welfare protocol for carriage horses in Malta, highlighting both positive aspects and areas for development. It underscores the importance of high welfare standards and suggests policy and guideline development to support continuous improvement.

Layperson message

Urban carriage horses have long been part of cultural traditions, but growing concerns about their welfare and limited legislation highlight the need for better protection. This study evaluated the welfare of 60 horses in 43 Maltese stables during the summer using a new protocol based on four key welfare principles: health, housing, feeding, and behaviour. Results showed strong performance in health and housing but identified feeding as the weakest area, with concerns about food and water adequacy. The study emphasizes the importance of improving feeding practices and developing

welfare policies to ensure the ongoing welfare of carriage horses in Malta.
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P8

"SCIENCE MEETS COMICS": A CASE STUDY OF EQUINE SCIENCE DISSEMINATION IN THE FORM OF A GRAPHIC NOVEL IN THE FINNISH MARKET

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There is a substantial body of scientific knowledge on equitation and equine welfare, but a key challenge remains: how can this knowledge be made available to the majority of horse owners and other equestrians who do not read scientific publications or scientific books? Graphic novels and comic-book art are versatile forms of storytelling, based on the interplay of sequences of images and text. While mostly used for entertainment, there also are some nonfiction graphic novels to communicate history and science such as physics. To our knowledge, no nonfiction graphic novels or book-length comics have been published on the cognition, ethology, or welfare science of any species of animal in languages spoken in Europe. In this case presentation, a nonfiction, science-based graphic novel as a means for public communication of science and its dissemination within the Finnish market in the Finnish language is discussed. In 2023, a Finnish science communication company, Arador Innovations, developed the book, *Hevosen mieli. Tiedettä sarjakuvana (The Mind of a Horse. Science Meets Comics)* to attempt a new method for public communication of science with the aim of a substantial, positive impact on equine welfare. Several challenges were addressed in the process: (1) selecting the right team of science communication and science illustration professionals, (2) delivering information and incorporating reference materials to readers ranging from children to adults as well as beginners to advanced equestrians, (3) managing psychological factors such as guilt and shame when readers are faced with information that may conflict with their own practices, and (4) choosing the most effective marketing strategies for the equestrian sector in the current Finnish market. The number of copies sold so far of *Hevosen mieli* exceeds the average number for non-fiction books on any topic in Finland by a factor of four. This case presentation discusses innovative ways for the scientific community to effectively disseminate information about equine welfare to the public.

Layperson message

Scientists know more than ever about how the mind of a horse works, how to motivate them in training, what they feel, and how to ensure their well-being. Such knowledge has great potential to improve the lives of horses and people alike. However, up-to-date scientific knowledge is not easily accessible to the public. A new approach to science communication is a nonfiction graphic novel, first tested within the Finnish language market. This includes considerations for selecting the right development team, considering a broad audience and psychological factors, and choosing the most effective means for raising awareness of the book's existence. *Back to Scientific day 2 schedule*

P9

ARE EQUESTRIAN QUALIFICATIONS SUPPORTING EQUINE WELFARE? A THEMATIC ANALYSIS OF BRITISH HORSE SOCIETY'S STAGE 3-5 EXAMINATION SYLLABI

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The aim of equestrian coaching qualifications is to equip individuals with the knowledge, skills, and competencies required to effectively train, coach, and manage riders and horses. To promoting safe, ethical, and evidence-based practices in equestrian sports and activities, equestrian qualification must include the most up-to-date, ethical, and scientifically supported methods. The aim of this study is to evaluate the inclusion of the 5 Domains Model (Mellor, 2020) and ISES first training principles, and to identify gaps in current practices. This process will enhance the quality of equestrian education and professional standards, ensuring graduates are equipped to promote horse welfare effectively. The online and publicly accessible 2024 British Horse Society Stage 3-5 qualification specification documents underwent a reflective qualitative analysis, where the content were coded and themed. Areas of alignment and discrepancy to the Five Domains (D#) and ISES First Principles (P#) were identified, with higher and lower order themes emerged. Results identified that all the qualifications demonstrated a level of conformity related to the domains of health and nutrition (D1,2 &3), and safety for the rider (P1). Other aspects of the ISES First Training Principles and 5 Domains are not widely considered or included, specifically mental and sensory capacities of horses (P3, D4), emotional states (P4, D4), and modes of learning such as habituation (P5), operant (P6) and classical conditioning (P7). These results demonstrate a need to revise the current qualifications documents to ensure comprehensive welfare education across all levels. In addition, the study also identified specific practices within the syllabi that conflict with ISES First Principles, including the use of some aversive training equipment, and certain methods of restraint. These conflicts indicate a lack of rigour in updating the specifications with humane and scientifically validated training methods. Analysing equestrian qualification syllabi and identifying gaps is key to improving the relevance, quality, and ethics of equestrian education. By recommending the integration of evidence-based practice, the Five-Domain Model, and ISES First Training principles ensures future professionals are equipped to support rider success and horse welfare. This promotes a more informed, humane, and science-driven equestrian industry.

Layperson message

British Horse Society Stage 3–5 qualification documents were reviewed to identify gaps in how equine welfare and training principles are addressed. While physical health, nutrition, and rider safety feature strongly, there is limited focus on key welfare aspects such as the horse's mental and sensory experiences. Additionally, the correct use of operant and classical conditioning, as promoted by the ISES First Training Principles, is not consistently integrated. Discrepancies between current qualifications documents and ethical, evidence-based practices, highlights the need for revisions to ensure comprehensive welfare education, alignment with scientifically supported training methods to improve professional standards in equestrian education.

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P10

WHAT IS WELFARE? A QUALITATIVE STUDY INTO PERCEPTIONS OF EQUINE WELFARE OF HORSE OWNERS

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Equine welfare is a growing concern, influencing the equestrian industry's social licence to operate. While existing literature broadly addresses welfare issues, there is limited understanding of horse owners' specific perspectives on welfare in the context of ownership and riding. This study aims to identify what aspects horse owners consider essential to safeguard equine welfare. An online survey comprising 8 open questions was disseminated via social media. Survey data were analysed qualitatively using reflexive thematic analysis. The survey received 428 complete responses. Thematic analysis led to the identification of four higher-order themes: Equine Husbandry, Human-Horse Interaction, Equitation, Personal Development and Ethics. Aspects relating to Equine Husbandry were mentioned most. Horse owners considered aspects relating to housing and management more important to overall equine welfare. Within this theme, lower-order themes such as the ability to have year-round turn out were most prominent. On the theme of Human-Horse Interaction, respondents highlighted the importance of understanding horse behaviour and the ability to identify signs of stress and pain to ensure their welfare, as well as ethical considerations for treating horses as sentient beings deserving respect and with the avoidance of anthropomorphism. On the theme of Equitation, ethical training principles were highlighted, including a sound knowledge of tack and equipment. Most participants commented negatively on the use of whips and spurs. Respondents emphasized the importance of qualified coaches who focus evidence-based principles of training and welfare. But they highlighted that some coaches had entrenched, indoctrinated theories that compromised welfare, which had an impact on their personal development and ethics. Owners also expressed the need for a multidisciplinary approach to equine management particularly seeking advice and guidance from veterinarians, professional farriers and saddle fitters. Despite widespread awareness of welfare considerations, findings suggest the persistence of a knowledge-practice gap. Focusing on vocational education and evidence-based training at the yard level are recommended to enhance the application of welfare principles in equestrian practices.

Layperson message

Equine welfare is crucial for maintaining the equestrian industry’s social licence to operate. This study explored horse owners’ perspectives on key welfare aspects through an online survey (n=428). Responses revealed four main themes: Equine Husbandry, Human-Horse Interaction, and Equitation, Personal Development and Grounded Ethics. Owners prioritized proper housing, turnout, and management. They emphasized understanding horse behaviour, ethical training, and evidence-based coaching. Concerns were raised about outdated training methods. Despite strong awareness of welfare issues, a gap remains between knowledge and practice, highlighting the need for improved education and training at the yard level to support better welfare outcomes.

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Scientific session 4: Equitation Science – various topics

PLENARY #3

WHITHER GOEST THOU, EQUITATION SCIENCE?

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The early days of the International Society for Equitation Science were characterised by enthusiasm and ambition; tempered by caution. We set out to uncover truths about human-horse interactions while considering stakeholder concerns. Over two decades, our achievements have stemmed from that initial excitement, as confidence in both our discipline and our data, allow us to transition from cautious steps to bold strides. In celebrating equitation science's 20th year, our role is more pivotal than ever, given equitation's abiding reliance on aversive stimuli, and the growing focus on horse sports' social-license-to-operate. This evolution creates opportunities to strengthen our community and to offer guidance and warnings to stakeholders. The need for caution is arguably greater among regulators, following their recent adoption of the precautionary principle. The future for our discipline remains exciting, with advances in smart textiles, real-time hormone assays, machine learning, and imaging expanding the horizons of equitation science and welfare.
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O15

LEARNING ABOUT LESSON HORSES: THE INFLUENCE OF RIDER LEVEL ON HEART RATE VARIABILITY PARAMETERS AND UNDER SADDLE BEHAVIOUR IN RIDING LESSON HORSES DURING WORK

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Riding lesson horses experience unique stressors including handlers with unpredictable skill levels and extensive working hours identified as risk factors for conflict behaviours. Facility operators believe beginner lessons are less stressful for lesson horses than advanced lessons. However, little is known about what quantifies appropriate lesson workloads. This study investigated the impact of rider level on horse (n=35) behaviour (evasive head movements, general evasion, ear pinning and oral behaviours) and heart rate variability parameters (RMSSD) during beginner (walt/trot/canter) and advanced (walk/trot/canter/jump) hunter/jumper lessons. Horses were observed twice, once at each level with different riders. Heart rate monitors were applied for habituation 5mins before baseline measurements. Heart rate data were collected continuously and separated into four time periods: 5min baseline at rest (BL), grooming and tacking up (TACK), the first 5min of the ride including mounting (5MINS) and the full duration of the ride (RIDE). Behavioural data were collected live using one-zero sampling during 10s observation windows taken at 20s intervals for 3min during six periods of the ride: mount, walk, trot, canter, jumping exercises and resting after exertion. Data were analyzed using Generalized Mixed Models with repeated measures. Tukey-Kramer multiple comparisons identified differences in main factors. Rider level did not affect RMSSD values ($F_{1,42}$=0.00; p=0.9495) or behavioural frequencies (all p≥0.1474). Behavioural stress responses increased during canter with more evasive head movements than trot ($F_{5,64}$=4.65; p=0.0011), more general evasion than rest/walk/trot ($F_{5,275}$=3.77; p=0.0025), more ear pinning than mount/rest/walk ($F_{5,275}$=3.48; p=0.0045) and more oral behaviour than walk/trot ($F_{5,61}$=5.09; p=.0006). RMSSD was lower during 5MINS and RIDE than BL and TACK ($F_{4,42}$=8.83; p<0.0001). Horses with ≥7 years of experience exhibited higher RMSSD than those with <7 years ($F_{2,42}$=5.81; p=0.0059). While grooming and tacking up had minimal effect on RMSSD values, sympathetic nervous system activation increased when riders were mounted, particularly during the first 5mins. This may indicate that lesson horses anticipate that mounting signals oncoming stressors. Behavioural data suggests lesson horses experienced stress when ridden, particularly at the canter, regardless of rider level. That rider level did not influence any physiological or behavioural responses indicates that contrary to industry belief, rider level may not meaningfully affect the horse's experience during work. Primarily using lesson horses in beginner lessons may not represent the welfare-friendly workload many think it to be. Long-term experience as a lesson horse appeared to reduce physiological stress, potentially highlighting the benefits a predictable environment can have on equine welfare.

Layperson message

Beginner lessons are believed to be less stressful for horses than advanced lessons. In 35 hunter/jumper lesson horses, rider level did not impact physiological or behavioural responses expressed by horses during work. However, lesson horses showed higher physiological stress responses during the first five minutes of the ride compared to baseline and tacking up and more behavioural stress indicators during canter work than other gaits. More experienced lesson horses were less stressed, suggesting predictable environments may help lesson horses cope better.

Although rider level may not affect the horse's experience, anticipation of impending stressors of a lesson may. *Back to Scientific day 2 schedule*

O16

NEWS FROM THE FIELD: HOW WILD EQUID RESEARCH CAN CONTRIBUTE TO DOMESTIC EQUID WELFARE

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Understanding behaviour and movements of equids in a wild state is important for informing welfare standards when in a captive setting. Feral horses and donkeys are domesticated species removed from the constraints of artificial selection by humans with free-range over vast areas. Differences in behaviour between feral and captive animals can therefore highlight the impacts of living in more confined spaces. The behaviour of two feral horse populations (in western Utah, USA), and two feral donkey populations (in central Utah and Arizona, USA) was studied between April and September over four years. In one horse population 42% of males were experimentally castrated. Significant differences in the behaviour and social networks of horses and donkeys were found consistent with their ancestral species. Specifically, donkeys had more social interactions (agonistic: $F_{1,16156}$=192.7, $p<0.001$; affiliative $F_{1,16156}$=14.33, p=0.0002) than horses, and a fission-fusion social system in contrast to the relatively stable harem groups of horses. Horses had a home range of 103-117 km^2, within which they spent 25% time feeding on grasses and forbs, and 5% and 48% time moving and standing respectively. Donkeys had a home range of 35-99 km^2, within which they spent 31% time feeding on grasses, forbs, and browse, with 6% and 39% time moving and standing respectively, and 6% of their time lying down. Agonistic interactions in horse populations were rare, and both reproductive success (r_s=0.52, $p<0.0001$) and time spent as a harem stallion (r_s=0.55, $p<0.0001$) was correlated with affiliative interactions between mares and stallions. Reproductive rates of females were high (on average foaling in 3 out of the 4 years of the study), and male behaviour was minimally affected by castration. These results show the difference between the two equid species and highlight the importance of “freedom, forage, and friends”: horses and donkeys cover wide areas in their daily lives, selecting their food from what is available in the habitat, and choosing their associates based on positive social interactions. Providing for these basic needs and as much as choice as possible are important ways to improve the welfare of captive horses and donkeys.

Layperson message

To inform welfare of captive horses and donkeys we need to understand how they behave and interact when free-roaming without constraints. Two populations of feral horses and two populations of feral donkeys in the western United States were studied over 4 years. It was found that the two species had different social systems, and donkeys spent more time feeding, moving, and lying down than horses and had more interactions. Agonistic interactions were rare among horses, with social groupings dependent on positive social interactions between individuals. These results highlight how important “freedom, forage, and friends” are for the welfare of all equids.

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O17

EFFECTS OF STRENGTH AND ENDURANCE TRAINING ON THE PHYSICAL FITNESS AND RIDING PERFORMANCE OF NATIONAL AND INTERNATIONAL LEVEL FEMALE EQUESTRIANS

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The physical performance of riders significantly affects equestrian outcomes and directly impacts horse welfare. Balanced and effective use of the rider's body influences rider stability, horse balance, the application of aids and equipment, and the overall load on the horse. This study examined the physical fitness characteristics of Finnish national and international level female show jumping (n=19) and eventing (n=33) riders, and the effects of a 12-week strength (S), endurance (E), and combined strength and endurance (SE) training intervention. It was hypothesized that (1) performance differences exist between disciplines, and (2) targeted fitness programs would improve riders' physical and riding performance. Fifty-two female riders (29.4±8.9 years) completed laboratory tests and practical riding assessments (obstacle test track, OTT). No significant differences were found between disciplines in strength, endurance, or OTT performance. Riders' middle- and lower-body maximal strength was lower than that of untrained Finnish women, while hand grip strength was above average. No asymmetries between left and right sides were detected. Baseline maximal oxygen uptake (VO_2max) during cycle ergometer testing averaged 32.1±4.5 ml/kg/min, indicating suboptimal aerobic fitness. Additionally, 82% of riders reported occasional lower back problems, emphasizing the need for targeted core training. Participants were randomized into S (n=11), E (n=11), SE (n=12), or control (C, n=9) groups and trained three times weekly alongside regular riding. Approximately 77% of the planned training volume was completed. After the intervention, the S group achieved a significant 9.0% increase ($t(10)=3.41$, $p<0.01$) in maximal bilateral leg press and trunk extensor strength, with no significant changes observed in the other groups. Rapid force production (0–500 ms) remained unchanged. VO_2max improved significantly by 6.5% in the E ($t(9)=2.57$, $p< 0.05$) and by 7.5% in the SE ($t(11)=3.26$, $p<0.01$) groups. These aerobic improvements translated into enhanced OTT performance: E and SE riders completed the course faster and demonstrated lower oxygen uptake and blood lactate levels. However, riders still used ~100% of HRmax and over 90% of VO_2max during OTT, indicating a high cardio-respiratory load. Riding performance should remain predominantly aerobic. The findings show that riders' physical fitness was in many respects lower than that of non-athletic women. The results emphasize that riders require additional off-horse training, which must be sufficiently demanding. This underscores the importance of evidence-based rider development to enhance horse welfare, rider–horse communication, and overall performance.

Layperson message

Rider training programs should be carefully planned and supervised, considering that regular riding may inhibit maximal strength development. Maximal strength training should preferably occur during the off-season, with a primary focus on enhancing maximal strength, promoting muscle strength balance, and improving core stability to help prevent lower back injuries. This highlights how structured, well-designed rider training contributes to better horse welfare and more effective, harmonious riding. *Back to Scientific day 2 schedule*

O18

WORKING TOWARD CONSENSUS ON NASAL-BASED ACOUSTIC SOUNDS (NBAS) IN HORSES: INSIGHTS FROM PILOT DATA

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The study of equine bioacoustics is advancing, yet classification inconsistencies of equine nasal-based acoustic sounds (NBAS) create challenges for assessing equine affective states and interpreting their communicative significance. While NBAS such as snorts, blows, snores, and sneezes are commonly referenced in equine literature, their precise English language definitions and functional contexts remain debated. Standardized terminology is critical to improving our understanding of horse welfare and refining horse-human interactions. At the 2024 ISES New Zealand conference, twelve NBAS recordings were presented to an international audience of conference attendees (n=121), first as audio-only and then with visual context, to assess agreement in classification. Eleven native languages were represented; 77% with English as their native language; there were not enough responses of any other single language to test for differences; when collapsed to English vs non-English, there was no significant difference. Drawing on their equine experience, participants categorized NBAS based on their perceived arousal state and function. High-arousal NBAS, typically associated with fear, caution, or playful behaviour, achieved significantly higher agreement in terminology (80–95% consensus; paired proportion *z*-test statistics ranged from 3.57-10.98, $p < 0.001$), predominantly labelled as "blow" or "snort". In contrast, low-arousal NBAS, often observed during food anticipation or deep foraging, showed greater variability in classification, with terms such as "whuffle," "snortle," and "sneeze" applied inconsistently (one recording leaned significantly towards "sneeze"; $z=-2.02$, $p=0.04$). These preliminary findings suggest that while some NBAS classifications are well-established, others require further refinement. Regional language differences and inconsistencies in existing literature may contribute to the challenge of defining NBAS with precision. More detailed spectrographic analyses and the development of a shared bioacoustics database would facilitate greater clarity and standardization. Future interdisciplinary collaboration will be essential to achieving a global consensus on equine NBAS terminology, ultimately enhancing the application of equine bioacoustics in both academic research and practical welfare assessments.

Layperson message

Horses make a variety of nasal-based sounds like snorts, blows, and sneezes, but experts don't always agree on what to call them or what they mean. In an earlier study, researchers played recordings of these sounds to an audience, with and without video context, to see how well people could classify them. High-arousal sounds linked to fear or play were labelled relatively consistently, while low-arousal sounds varied considerably more. Standardizing these terms and being attentive to them could enhance communication between humans and horses.

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O19

RETROSPECTIVE ANALYSIS OF COMPLIANCE WITH REG. EC 1/2005: EXAMINATION OF TRADE CONTROL AND EXPERT SYSTEM (TRACES) FOR THE TRANSPORT OF HORSES TO AND FROM SOUTHERN ITALY

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Information about horse movement across European Member State is scant, and ineffective traceability can lead to poor welfare. This study aimed to analyse retrospectively horse movements reported in the European Trade Control and Expert System (TRACEs) arriving, departing from, and crossing an Italian region in 2022 and 2023. The most common inaccuracies and non-compliance with the current European regulation (e.g., mistakes in completing the TRACEs, minimum space allowance and maximum journey duration) were identified, and the difference in journey conditions of horses which arrived or not at a slaughterhouse were documented. The dataset included 3254 horses recorded in the 290 TRACEs, of which 2946 arrived at a slaughterhouse. The most common routes for slaughter were from Poland and France to Apulia, and the most common routes for other purposes were from Apulia and France to Germany and Apulia, respectively. Almost all TRACEs, regardless of destination, lacked key information required by the regulation, such as total weight and space. This makes it impossible for competent authorities and the authors to double-check whether the required minimal space allowance had been provided. When reported, the quantity of horses (mean 22 vs 2) and the space allowance (1.57 vs 3.25 m^2) differ significantly ($P<0.001$) if the horses arrived or not at a slaughterhouse, respectively. Moreover, most of these TRACEs were not compliant with the minimal space allowance, particularly when transporting a large group of horses (all Chi^2, $p<0.001$). In 75 TRACEs, the certification of the horses was incorrect, as the horses were certified as registered, but in reality, they were being transported to a slaughterhouse. Many of the inaccuracies (e.g., lack of data) and non-compliance (e.g., wrong certification) documented were associated with a specific transporter (all Chi^2, $p<0.001$). Overall, the study highlights that many horses are still shipped to a slaughterhouse, but that the journey durations (1598 vs 2027 Km), and the occurrence of the most common inaccuracies (lack of age 88% vs 85%, sex 89% vs 100%,) are similar ($P>0.05$) regardless of destination. This paper highlights the need to change the European policy protecting horse welfare during transport and the Trade Control and Expert System. The latter is not fit for purpose, probably because it is complicated and the policy is unclear. A simplification could be to treat all horses, registered or not, travelling to a slaughterhouse or not, in the same way, protecting welfare during transport in the same manner.

Layperson message

Protection of horse welfare during transport should be prioritised. Many codes and guidelines have been written, but often horses are treated differently, whether a journey is commercial or private and depending on the destination. This creates confusion and inadequate horse movement tracing systems. The European system for tracing horse movement needs improvements, as almost all paperwork had some inaccuracy or noncompliance in them despite being accepted by Competent authorities. In particular, 75 consignments declared to be shipped for other purposes ended up to at a slaughterhouse posing a risk for horse welfare and public health. *Back to Scientific day 2 schedule*

P11

COULD EQUINE PENILE TUMESCENCE ('DROPPING') BE A USEFUL INDICATOR OF EQUINE AFFECTIVE STATE?

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Equine welfare and human safety are reliant on an accurate interpretation of the horse's behaviour. Often, judgements are based on anecdotal reports or individual biases. Consequently there is a need for objective, animal-based indicators of equine affective state, and therefore welfare, that are applicable within industry settings, particularly those which may be challenging to horses such as training. Penile tumescence, known as 'dropping', is a behaviour where the penis extends from within the prepuce. Dropping is commonly observed in both stallions and geldings, but its importance outside of a sexual context is ambiguous. It has been suggested that dropping behaviour may help reveal the affective state of the horse. The aim of this study was to investigate the significance of equine penile tumescence in relation to affective state. Videos (n=112) of 10 Thoroughbred geldings (11.38±4.15 years) undertaking an operant training process with food reinforcement incorporating a prediction error paradigm, were observed. Using continuous sampling frequency, latency, duration and type of dropping was recorded for each horse in each training session. The training involved three phases: Familiarisation, Learning (horses had to press one of two panels) and Reversal (where the target panel changed) and went up to 7 consecutive days. A negative affective state was induced at the start of the Reversal phase, due to the large negative prediction error. All but one of the horses (90%) exhibited penile dropping behaviour during the training process, which accounted for 30.1% of total training time. The total number of dropping occurrences across all training days was 130; with partial tumescence occurring 97 times and full tumescence 33 times. Nine out of 10 horses displayed dropping behaviour at least once during the training process. A significant association between phase of training and occurrences of dropping was found (^{2}=95.23, df=7, p<0.001) with most individual dropping counts (n=45) occurring during the familiarisation phase and (n=33) during the Reversal phase. There was no relationship between training phase and the extent of tumescence (Chi^2=6.58, df=7, p=0.47), nor reversal (Chi^2=0.097, df=1, p=0.756). No significant relationships between training phase and dropping duration or latency were found. Given dropping occurred most often during phases which had distinctly different characteristics, it can be suggested that penile tumescence may be a candidate horse-based indicator of a change in affective state particularly in challenging circumstances such as training where the welfare and safety of both the horse and the trainer should be optimized.

Layperson message

Objective, reliable indicators of equine mental state which can used in challenging situations such as training to ensure the safety and welfare of horses and humans are needed. Practitioners use 'dropping' (when the penis extends from the sheath) to describe how a horse may be experiencing a situation. Ten adult geldings underwent training during which a negative affective state was induced by not providing them with a reward when expected. Given dropping occurred most at the start of training and when expected rewards did not occur, it may be a useful indicator of equine mental state during interactions with humans. *Back to Scientific day 2 schedule*

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THE INFLUENCE OF LANDSCAPE FEATURES ON EQUINE BEHAVIOUR: A GPS-BASED ANALYSIS OF SEMI-NATURAL ENVIRONMENTS

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Understanding how horses interact with landscapes is key to designing environments that support welfare and biodiversity. Yet, little is known about how domestic horses use specific landscape elements. This study examined behaviour patterns of warmblood horses in a semi-natural setting using GPS tracking. Seven mares (1–3 years) were introduced to the Kumlan Nature Reserve, Sweden, wearing Hoofstep® GPS trackers that continuously recorded their activity. Behavioural data were grouped into four categories: highly active, active, resting, and eating. Manly Selection Ratios (MSR) were used to assess landscape feature selection (LFS) relative to availability. A Generalized Linear Model (Gamma distribution, log link) tested the effects of Horse, Behaviour, Landscape Feature, Time of Day, Temperature, Rainfall, and Month on LFS. Significant main effects included Horse (Wald χ^2=16.35, df=6, p<.05), Landscape Feature (Wald χ^2(11)=119.5, p<.001), Month (Wald χ^2(1)=13.3, p<.001), Rainfall (Wald χ^2(1)=14.4, p<.001), and Temperature (Wald χ^2(1)=7.5, p<.01). Two-way interactions showed that behaviour was linked to LFS, and that selection was influenced by weather. For instance, tree rows and hedges were preferred during rainfall (Exp(B)=1.17, p=0.01), but avoided as temperatures rose (Exp(B)=-0.51, p<0.001). Three-way interactions highlighted individual preferences, i.e. Horse A preferred resting on a sandbank (Exp(B)=42.48, p<0.05), and Horse B in a blackberry patch (Exp(B)=25.22, p<0.05). Horse C was active on a sandbank with vegetation (Exp(B)=22.57, p=0.01), while Horse D preferred the pool (Exp(B)=90.44, p<0.001). These results show that both landscape and weather influence behaviour, with meaningful differences between individuals. Sensor-based technology allows us to develop a deeper understanding of equine behaviour at the individual and the collective level. Drawing on this information, equine living spaces can be designed that align with equine preferences and enhance equine welfare and biodiversity.

Layperson message

Horses don't all behave the same way. GPS data from seven young mares in a Swedish nature reserve showed that they chose different landscape features depending on availability, weather, and individual preference. Tree rows and hedges were used for shelter in rain, but avoided in warmer weather. Some horses rested on sandbanks or in blackberry patches; others were more active near pools. Using sensor data like this can help us design living spaces for horses that support individual choice, welfare, and biodiversity. *Back to Scientific day 2 schedule*

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HIPPOTHERAPY CONCEPUTAL FRAMEWORK

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Hippotherapy, the use of medical quality equine movement in occupational therapy (OT), physical therapy (PT) and speech-language therapy (SLP), has been incorporated into treatment for 47 years in the US. The American Hippotherapy Association, Inc. developed a Hippotherapy Conceptual Framework (HCF) based on established treatment theories in 1997 to support research, treatment paradigms, and quality horse training/handling in therapy. The framework was updated in 2024. OTs, PTs, and SLPs use hippotherapy to provide sensorimotor experiences for patients with cognitive, neurologic, sensory, or orthopaedic impairments. This Conceptual Framework aligns with other frameworks within these therapy disciplines, focusing on the effects of equine movement on human neurophysiology. The Conceptual Framework supports the need for high quality equine movement. The nine identified tenets are a mixture of theoretical and observable phenomena, all of which help describe how quality equine movement can be used effectively to improve function for patients in their preferred environment. The basis of the Hippotherapy Conceptual Framework is Neuroplasticity, recognizing that modification of impairments does not happen without changes within the central nervous system. Other tenets result from theoretical models of Motor Learning, Dynamic Systems and Sensory Integration®. The tenets are not hierarchical but do influence each other. Rhythmicity, often elusive for patients with sensorimotor impairments, can be provided with well executed equine movement, leading to integrated rhythmic responses. Motivation and Arousal are inextricably linked and may be influenced by the equine environment. Therapists can modify equine movement to affect a patient's arousal levels through collaboration with skilled horse handlers and engaged horses. In using hippotherapy, the therapist may rely on Entrainment of the patient within the dynamic system made up of therapist facilitation, equine movement, and specific horse handling to shift patient behaviour. The goal is to identify Control Parameters that facilitate replication of functional shifts observed during treatment. Treatment objectives encompass aspects of Postural Control resulting from manipulating quality equine movement input through skilled handling of the well-trained horse. Use of equine movement facilitates the patient experiencing varied sensorimotor challenges, which promotes Adaptability in their behavioural responses. This encourages Generalization within the patient's own environment. With the ability to generalize comes the opportunity for Self-Organization. The Hippotherapy Conceptual Framework offers therapists a structured perspective applicable towards facilitation of improved function, and an explanation of the immense impact medical quality equine movement may have in a broader context.

Layperson message

The Hippotherapy Conceptual Framework (HCF) developed by the American Hippotherapy Association, Inc. has guided practice in the US since 1997 bringing the sciences of therapy services, neurophysiology and equine movement together. The nine tenets offer a structured perspective applicable towards the profound impact medical quality equine movement has on human neurophysiology, the facilitation of Occupational, Physical or Speech-Language Therapy services for

individuals with sensorimotor impairment, and guidance for research in the area of hippo-therapy. This poster focuses on the extensive update released by the American Hippotherapy Association, Inc. in 2024. *Back to Scientific day 2 schedule*

P14

Bridging Theory and Practice: How a Community of Practice Can Drive Cultural Change in Equitation Science and Welfare Education

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The equestrian industry faces increasing pressure to align with scientific advancements in equine welfare and ethical horse training (application of ISES' First Principles of Horse Training). However, resistance to change remains a significant barrier, often due to deeply ingrained cultural norms, particularly in riding schools, equestrian centres and freelance coaches.

A Community of Practice (CoP) was created to bridge this gap, providing structured, peer-led learning where equine professionals collaboratively challenged traditional training methods and implemented science-based welfare strategies. Units of study included video demonstrations of applying ISES' First Principles in practice, weekly member-led discussions, and a Q&A forum to enhance participants' engagement and knowledge sharing.

To evaluate the impact of CoP participation, an independent researcher conducted anonymous, structured, and standardised interviews with four coaches, one veterinarian, and one horse owner. Six questions explored participants' motivation to join the CoP, as well as their expectations, the support provided, and their reflections on the efficacy of the CoP.

Preliminary findings from a thematic analysis of interview transcripts indicate that CoP engagement accelerated the adoption of ISES First Principles and reshaped professionals' perspectives on horse welfare. Thematic coding identified key factors contributing to this impact, including a supportive environment, shared experiences, psychological safety, validation, solving challenges, overcoming professional isolation, and the integration of theory into practice. Participants also reported that the CoP enhanced their understanding of equitation science by making scientific concepts more accessible. Perceived challenges included navigating time zones and maintaining focus to themed, weekly discussions. Furthermore, participants self-reported professional and personal growth, perceived improvements in coaching, and confidence. Three themes emerged from thematic coding:

1. Application of ethical horse training (First Principles, ISES)
2. Knowledge of the Five Domains (2020)
3. Practice of ethical reasoning through challenging traditional norms through peer-led learning.

In summary, despite the small sample size of interviews, CoP accelerated growth in equitation science practices and can serve as catalysts for cultural and professional transformation in equestrian education. By providing structured peer learning, scientific literacy, and self-reported professional validation, CoPs facilitate grassroots-driven change with perceived improvements in equine welfare, application of evidence-based horse training principles, and industry best practices. Findings support the integration of CoPs as scalable models for welfare education. Future research should explore the long-term impact of CoP-driven learning on horse training practices and their role in earning public trust.

Lay Summary

Community of Practice (CoP) is a path for transforming equine education by helping professionals apply scientific evidence to horse training and welfare practices. This research examined how CoP engagement enables trainers, coaches, and educators to challenge outdated knowledge and implement welfare-focused strategies such as the Five Domains Model and First Principles of Horse Training (ISES). Findings show that CoPs are effective in driving cultural change, equipping professionals with the skills, confidence, and community support to apply evidence-based training and advocate for improved welfare education. CoPs offer a collaborative solution for integrating science into equestrian education.

GLOSSARY

Aid Any of the signals used to elicit responses in horses. Rein, leg, whip and spur aids are initially learned through negative reinforcement and then transformed to light aids (light rein, light leg, voice, seat) via classical conditioning. The difference between cues and aids is that aids may vary in intensity, whereas cues are typically of the same intensity. Traditionally, the aids are divided into two groups natural aids and artificial aids. This distinction is misleading as it refers to what is 'naturally' available to the rider, but it neither identifies nor correlates with the two learning modalities through which the horse acquires its responses to the aids.

Approach conditioning An operant conditioning technique that reduces flight behaviours using the natural tendency of horses to investigate and approach unknown objects, in combination with systematic desensitisation. The horse is encouraged to approach the object that it is fearful of, which then retreats as the horse approaches. The horse may then be signaled to stop before it reaches its fear threshold, so that the object retreats even further. The horse is then signaled to catch up. As soon as the horse slows its approach it is deliberately stopped, and this is repeated until the horse comes as close as possible to the object. The horse usually becomes increasingly motivated to investigate the object.

Blocking A form of interference with classical conditioning; once an animal has learned that a given stimulus predicts a certain event the animal may fail to learn new associations, i.e., a second stimulus may not become a conditional stimulus because learning has been blocked by the presence of the first conditional stimulus.

Classical conditioning The process whereby an animal learns to correlate external events, e.g., the animal is presented to a neutral stimulus (e.g., a sound) which is followed by a biologically important stimulus (e.g., a noxious stimulus such as a shock, or a positive stimulus such as food). In equitation, classical conditioning is the process where learned responses are elicited from more subtle versions of the same signal or to entirely new signals, e.g., when a horse learns to react to voice commands, visual cues, or rider seat cues.

Cognition The mechanisms by which animals acquire, process, store and act on information from the environment. The study of cognition covers many topics such as perception, learning, memory and communication.

Conflict behaviour Stress-induced behavioural changes that arise from conflicting motivations, especially when avoidance reactions are prevented. Conflict behaviour may be agonistic behaviours, redirected aggression or displacement activities. If the stressor is recurrent, conflict behaviour may manifest as repetition and ritualisation of original conflict behaviours. Stereotypies and self-mutilation may develop from severe, chronic, or frequent stressors. In equitation, conflict behaviours may be caused by application of simultaneous opposing signals (such as go and stop/slow) such that the horse is unable to offer any learned responses sufficiently and is forced to endure discomfort from relentless rein and leg pressures. Similarly, conflict behaviour may result from incorrect negative reinforcement, such as the reinforcement of inconsistent responses or lack of removal of pressure.

Contact The connection of the rider's hands to the horse's mouth, of the legs to the horse's sides and of the seat to the horse's back via the saddle. The topic of contact with both hand and leg generates considerable controversy relating to the pressure that the horse should endure. In classical equitation, contact with the rein and rider's leg involves a light pressure (approximately 200g) to the horse's lips/tongue and body, respectively. A heavy contact may cause progressive habituation leading to diminished reactions to rein and leg signals as a result of incorrect negative reinforcement and/or simultaneous application of the aids.

Counter-conditioning A type of training based on the principles of classical conditioning that attempts to replace fear responses to a stimulus with more desirable responses. The term means training an animal to show a behaviour which is opposite or different to the one the trainer wishes to eliminate. The technique is widely used in combination with systematic desensitisation. By ensuring that the preferred behaviour is more rewarding, the animal learns to perform the new behaviour when exposed to the problematic stimulus.

Cue An event that elicits a learned response.

Ethogram A list of the type of behaviours performed by a species in a particular environment. The list includes precise descriptions of each behaviour. It is fundamental to any study of animal behaviour to define which behaviour types are being observed and recorded.

Ethology The scientific and objective study of animal behaviour, usually with a focus on behaviour under natural conditions, and viewing behaviour as an evolutionarily adaptive trait.

Extinction The disappearance of a previously learned behaviour when the behaviour is no longer reinforced. Extinction can occur in all types of behavioural conditioning, but it is most often associated with operant conditioning. When implemented consistently over time, extinction results in the eventual decrease of the undesired behaviour, but in the short-term the animal may exhibit an extinction burst.

Extinction burst A sudden and temporary increase in the frequency or magnitude of a behaviour, followed by the eventual decline and extinction of the behaviour targeted for elimination. Extinction bursts are more likely to occur when the extinction procedure is in the early stages.

FEI Fédération Equestre Internationale The world governing body for Jumping, Dressage & Para Dressage, Eventing, Driving & Para Driving, Endurance and Vaulting.

Flooding (response prevention) A behaviour modification technique where the animal is exposed to an overwhelming amount of the fear-eliciting stimulus for a prolonged period of time while avoidance responses are prevented, until the animal's apparent resistance ceases. The method is generally not recommended because there are severe risks associated with the method, e.g., injuries due to exaggerated fear reactions.

Foundation training The basic training of a young horse to respond to aids and cues that control its gait, tempo, direction and posture for whatever purpose may be required. Foundation training may also include habituation to saddle and rider.

Freeze The sudden alert motionless stance associated with a highly attentive reaction to an external stimulus.

Habituation The waning of a response to a repeated stimulus that is not caused by fatigue or sensory adaptation. Habituation techniques include systematic desensitisation, counter-conditioning, over-shadowing, stimulus blending and approach conditioning.

Hard/tough-mouthed Describes horses that have habituated to rein pressure. This is generally a result of incorrect negative reinforcement and can result in learned helplessness and conflict behaviours.

HPA axis (Hypothalamic–Pituitary–Adrenal axis) An organ system comprising the hypothalamus, the pituitary gland and the adrenal gland. The activation of the HPA axis is heightened when an animal is challenged with a stressor, and HPA axis products, such as cortisol, can serve as a physiological indicator of stress in animals.

Hyper-reactive behaviour Behaviours characteristic of an activated HPA axis and associated with various levels of arousal. Such behaviours typically involve the horse having a hollow posture and leg movements with increased activity and tempo, yet shorter strides. Hyper-reactive behaviours are quickly learned and resistant to extinction because of their adaptiveness in the equid ethogram. Behavioural evidence of hyper-reactivity ranges from postural tonus to responses such as shying, bolting, bucking and rearing.

Learned helplessness A state in which an animal has learned not to respond to pressure or pain. It arises from prolonged exposure to aversive situations or insufficient environments without the possibility of avoidance or control. It may occur from inappropriate application of negative reinforcement or positive punishment, which results in the horse being unable to obtain release from or avoid the aversive stimuli. If this continues over a period of time the horse will no longer make responses that were once appropriate, even if they would be appropriate under the present conditions.

Negative punishment (subtraction punishment) The removal of something pleasant (such as food) to punish an undesired response and thus decrease the probability of that response.

Negative reinforcement (subtraction reinforcement) The removal of something aversive (such as pressure) to reward a desired response and thus increase the probability of that response.

Operant conditioning (instrumental conditioning) The process whereby an animal learns from the consequences of its responses, i.e., through positive or negative reinforcement (which will increase the likelihood of a behaviour), or through positive or negative punishment (which will decrease the likelihood of a behaviour).

Overshadowing The effect of two signals of different intensity being applied simultaneously, such that only the most intense/relevant will result in a learned response. It can explain why animals sometimes fail to associate the intended cue with the desired behaviour in favour of a different stimulus that was happening unintentionally at the same time and which was more relevant to the animal. The term overshadowing also denotes a desensitisation technique where habituation to a stimulus is facilitated by the simultaneous presentation of two stimuli that elicit a withdrawal response (such as lead rein cues/pressure and clippers or a needle).

Positive punishment (addition punishment) The addition of something unpleasant to punish an undesired response and thus decrease the probability of that response. Incorrect use of positive punishment can lower an animal's motivation to trial new responses, desensitise the animal to the punishing stimulus and create fearful associations.

Positive reinforcement (addition reinforcement) The addition of something pleasant (such as food or a pleasant scratch) to reward a desired response and thus increase the probability of that response.

Punishment The process in which a punisher follows a particular behaviour so that the frequency (or probability) of that behaviour decreases. See also Positive punishment and Negative punishment.

Reinforcement The process in which a reinforcer follows a particular behaviour so that the frequency (or probability) of that behaviour increases. See also Positive reinforcement and Negative reinforcement.

Reinforcement schedule The frequency of the reinforcers used in training. The schedule may be continuous, intermittent or declining.

Reinforcer An environmental change that increases the likelihood that an animal will make a particular response, i.e., a reward (positive reinforcer) or removal of an aversive stimulus (negative reinforcer).

- *Primary reinforcer* A stimulus that is considered naturally rewarding (e.g., food).
- *Secondary reinforcer* A stimulus that has become associated with a rewarding stimulus and thus has been conditioned to be rewarding for the horse (e.g., the sound of a clicker which has been associated with a food reward).

Shaping The successive approximation of a behaviour toward a targeted desirable behaviour through the consecutive training of one single quality of a response followed by the next.

Social Licence to Operate The ongoing acceptance of an entity's practices.

Stereotypy A repeated, relatively invariant sequence of movements that has no function obvious to the observer. Stereotypies are abnormal behaviours and are generally considered as a sign of impaired welfare. Stereotypic behaviour arises from frequent or chronic stress and may help the animal to cope with adverse conditions. The behaviours may persist even if the triggering factors are eliminated. A number of stereotypic behaviours, such as box-wandering, pacing and crib-biting are seen in horses and are erroneously referred to as stable vices.

Stimulus blending A desensitisation technique that uses a closely resembling stimulus, to which the horse is already habituated, to systematically desensitise the horse to the fear-inducing stimulus. The fear-inducing stimulus is applied simultaneously with the known, non-fear-inducing stimulus, and then systematically increased in intensity. The aural and tactile characteristics of the two stimuli are gradually mixed, making identification of the new one difficult and different. The old benign stimulus can then be diminished and finally terminated after which the horse will show habituation also to the new stimulus.

Stimulus control The process by which a response becomes consistently elicited by a light aid or cue.

Stress Stress is a state which is characterised by the behavioural and physiological responses elicited when an individual perceives a threat to its homeostasis ('internal balance'). The threat is termed a stressor.

Stressor Anything that disrupts homeostasis, e.g., physical and psychological threats incl. lack of fulfilment of natural behavioural needs. Stressors appear to be stressful to the extent they contain elements of loss of control, loss of predictability, and absence of outlets for frustration.

Stress response The body's adaptations evolved to re-establish homeostasis. Stress responses are elicited when an animal anticipates or faces a stressor and involves a range of endocrine and neural systems. The responses are somewhat non-specific to the type of stressors that trigger them. Stress responses are in nature adaptive; however, when these responses are provoked for a long duration or repeatedly, they can cause negative effects such as increased susceptibility for diseases, gastric ulceration, abnormal behaviour, reproduction problems and reduced performance.

Systematic desensitisation Systematic desensitisation is a commonly used behaviour modification technique for the alleviation of behaviour problems caused by inappropriate arousal. In a controlled situation, the animal is exposed to low levels of the arousing stimulus according to an increasing gradient, until habituation occurs. An increase in the level of the stimulus is not made until the animal reliably fails to react to the previous level. In this way, the technique aims to raise the threshold for a response. The decrease in arousal can be reinforced by either negative or positive reinforcement.

A QUICK GUIDE TO SCIENTIFIC RIGOUR AND STATISTICS FOR NON-SCIENTISTS

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For those new to research, understanding the hallmarks of scientifically robust studies is invaluable. Publication in a peer-reviewed journal or presentation at a scientific conference, while important credentials, does not automatically guarantee adherence to principles of sound scientific practice. As consumers of scientific literature and conference attendees, we must critically evaluate methodologies and remain discerning about results from studies that fall short of these fundamental scientific principles.

ISES Research Principles

The application of statistics is a tool that enables reliable conclusions to be reached and the research objective to be answered. Statistical analysis is not that difficult and simply involves following a series of simple steps and rules. An example is used to demonstrate the steps required for a simple scenario where the researcher needs to apply the two sample t test to statistically assess any differences between two sets of data. (All text relating to the example given is highlighted with shading.)

EXAMPLE: A study is planned to investigate the behaviour of dressage horses trained using two different training methods (Method A and Method B). A specific behaviour, behaviour X is of particular interest and will be examined.

1. Generating a research question

A good project will have a simple title which clearly describes the objective of the study.

Is there a difference in the behaviour of dressage horses trained using Method A and Method B?

2. Identifying variables and measures

There are two types of variables independent variables which are determined by the researcher and dependent variables which provide the measurements upon which statistical tests are conducted. It is important to carefully consider which variables to measure. If, for example, researchers aim to reach conclusions about the welfare consequences of different treatments/conditions, it would be necessary to include validated behavioural measures, ideally in combination with physiological measures.

The Independent Variable is 'Training method' and has two levels: Method A and Method B.
The Dependent Variable is 'frequency of pre-defined behaviour'.

A behaviour could be e.g., 'mouth opening' and must be clearly described in an ethogram so the study can be repeated based on the description. Ideally, the observer should be blind regarding the treatment (i.e., whether horses were trained according to Method A or B) and testing of agreement between different observers should also be included (inter-observer reliability).

3. Formulating hypotheses

All research projects rely on the examination of hypotheses. Each statistical analysis relies on the simultaneous examination of a pair of hypotheses which are opposites of each other and always follow the standard format

- The Null Hypothesis (Ho) states that *'There is no significant difference between Method A and Method B'*.
- The Alternative Hypothesis (Ha/H_1) states that '*There is a significant difference between Method A and Method B*'.

Ho: There is no significant difference in the amount of behaviour X shown by dressage horses trained using Method A and the frequency of behaviour X shown by horses trained using Method B.

Ha: There is significant difference in the frequency of behaviour X shown by dressage horses trained using Method A and the frequency of behaviour X shown by horses trained using Method B.

4. Designing the experiment and data collection

When designing an experiment, it is important to obtain an adequate sample size (n). As a rough guide anything less than 30 is considered to be a 'small' sample and the horses contributing to each sample should be matched as evenly as possible.

All of the horse and rider combinations in this study will be competing at the same level, and performing the same dressage test, under the same conditions at the same venue.

5. Data analysis

Two types of data analysis are applied first, exploratory, descriptive analysis that provides averages and an indication of the spread of the data; and second, confirmatory statistical analysis that yields 'test statistics' and probabilities and ultimately allows a statistical conclusion to be reached. The latter will then allow a conclusion to be reached in relation to the objective of the study.

Sample data (frequency of behaviour X during the test)

Method A (30 horses):
6, 6, 6, 4, 6, 7, 3, 8, 2, 8, 7, 1, 7, 6, 5, 2, 1, 4, 10, 6, 7, 1, 1, 3, 7, 12, 2, 8, 3, 7

Method B (30 horses):
14, 8, 12, 15, 9, 8, 3, 5, 3, 3, 19, 11, 9, 3, 12, 10, 15, 5, 14, 12, 4, 4, 9, 1, 7, 1, 9, 11, 2, 9

Exploratory, descriptive analysis - of the sample data shows that horses trained using Method A showed an average frequency behaviour X of 5.20 with a variability (standard deviation) of 2.85 typically presented as 5.20±2.85 occurrences. Horses trained using Method B showed a frequency of behaviour X of 8.23±4.73 occurrences.

At this point the general impression is gained that there is a difference in the frequency of behaviour X shown by horses trained using the two different training methods.

Confirmatory, statistical analysis ~ is necessary to reach a reliable conclusion. A standard process is now followed

- Conduct a statistical test (here the two sample t-test). This will produce a test statistic and a probability value, p.

6. Reach a conclusion

In statistics there is a one important number **P=0.05**.

A P-value of 0.05 means that if a study was repeated 100 times then, 95 times out of 100 the same result would be found, and 5 times out of 100 a different result would be gained. As far as interpretation of results goes, the P value should be less than 0.05 for the results to be considered to be statistically significant and therefore reliable (and reportable).

To reach a statistically sound conclusion, a simple procedure is followed to relate the P value to the hypotheses

- If the P value obtained is less than 0.05, the Ha is accepted and the Ho is rejected. The conclusion is then reached that there is a significant difference between the two samples. The averages found in exploratory data analysis show that training Method B caused horses to show more of behaviour X compared to horses trained using Method A.

Test statistic (Unpaired t test for unequal variances): **t=-2.95, p<0.05**

Here we would reject the Null hypothesis (Ho) and accept the alternative hypothesis (H_1) and conclude that Method B caused the studied horses to show a significantly higher frequency of behaviour X than those trained using Method A.

- If the P value obtained is equal to, or greater than, 0.05, the Ho is accepted and the Ha is rejected. The conclusion is then reached that there is not a significant difference between the two samples and the occurrence of behaviour X is similar with both methods. (Here scientists state that there is a non-significant difference.)

IMPORTANT NOTES

With non-significant findings, if the sample size is small (i.e., < 30 horses) one should be cautious with non-significant findings as they may simply reflect that too few horses were included in the study to show a difference. Conclusions cannot be drawn based on non-significant results from a small sample size.

Significant findings based on small samples sizes suggest that there is a large difference between treatments/conditions. However, as always with small samples sizes, the results may not generalise to other horses. The significant difference in the example above suggests that Method B leads to an increased frequency of behaviour X in the population studied. If this is based on warmblood dressage horses during a dressage test, the result may not generalise to for example Shetland ponies doing ground work.

Are you a journalist or a horse practitioner?

Does the study you are interested in adhere to the ISES Research Principles?

Does the study contain different treatment groups as in the example above, or a control (no treatment) and a treatment group?

Does the study include a sufficient number of horses?

Are data presented along with appropriate statistical tests?

Are limitations addressed?

Are conclusions appropriate?

! If not, do not communicate the results to others!