

with horses. Body language may also influence results of scientific studies. Research on preferences or cognitive abilities in horses often use choice experiments combined with operant conditioning. Recent studies have thus demonstrated that horses prefer bigger quantities of food than smaller quantities, that they have prospective memory, and that they can communicate with people using symbols. These results may be true but because the experimental horses are handled by people right before they make their choice it is not possible to tell whether their choice is their own or whether it has been influenced by the body language of the handler. To be valid this kind of experiment must eliminate any possibility of human influence.

Keywords: body language; communication; safety; handling

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Developing a descriptive reference ethogram for Equitation Science

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There is currently no gold standard for nomenclature and definitions of equine behavior units. The ultimate goal of an ethogram for a particular species is to provide a list of behaviors and their function. However, agreement on function, causation or ontogeny is difficult to reach without accurate descriptive definitions of the various behavior units. A descriptive reference ethogram would increase the validity, reliability and compatibility of studies, without compromising the flexibility needed. A test of the reliability of a descriptive reference ethogram for horses was conducted using a test panel comprising 13 Equitation Science researchers and 10 high-level practitioners. Panellists scored behaviors in 30 short video clips, using a partial ethogram containing 21 behaviors, including locomotor behaviors, lying down, getting up, rolling, striking and kicking. Statistical analysis using logistic mixed models indicated that the variability between observers was very low (covariance parameter estimate <0.0001) and much lower than the variability between video clips (covariance parameter estimate = 0.15, standard error = 0.05), indicating a high reliability. Scoring by researchers and practitioners showed no significant difference. Training of panelists was limited to 5 demonstration video clips with explanations and instructions on how to score the clips. It would be useful to investigate the influence of more specific training on the reliability of an ethogram. Feedback from panel members will be included in the development of the descriptive reference ethogram. Ethograms and their behavioral definitions represent measuring units for behavior. This study showed that agreement on descriptive definitions is possible.

Keywords: reference ethogram; behavior unit; descriptive definition; reliability

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Decreased eye-blink rate as a non-invasive measure of stress in the domestic horse

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Eye blink rate (EBR) has been successfully used as a non-invasive measure of stress in cattle and humans, and this study sought to validate this measure in horses. Each of 15 horses were randomly subjected to the known stressors of (1) separation (SEP) – horse removed from visual contact with its paddock mates; (2) feed restriction (FR) – feed withheld at regular feeding time; and (3)

startle test (ST) – a ball suddenly thrown on the ground in front of the horse while alone in the arena, and compared to control (CON) – horse in its normal paddock environment. Full eye blinks, half eye blinks and eyelid flutters of the right eye were retrospectively determined from video recordings. A one-tailed mixed-model procedure with Sidak's multiple comparisons of least square means demonstrated that both full blinks (3.0 ± 0.43^b vs 4.3 ± 0.66^{ab} vs 3.8 ± 0.61^b vs 6.2 ± 1.16^a full blinks/min $\pm$ SEM in, SEP, FR, ST and CON respectively where a,b differ, $F_{3,39}=4.83$, $P=0.006$) and half blinks (8.7 ± 0.97^{bc} vs 11.5 ± 1.22^{ab} vs 7.1 ± 0.95^c vs 12.9 ± 1.31^a half blinks/min $\pm$ SEM in, SEP, FR, ST and CON respectively where a,b,c differ, $F_{3,39}=8.99$, $P<0.0001$) decreased during potentially stressful situations. Eyelid flutters were more frequent in FR than any other treatment (1.3 ± 0.36^b vs 4.2 ± 0.69^a vs 1.3 ± 0.44^b vs 1.3 ± 0.22^b flutters/min $\pm$ SEM in SEP, FR, ST and CON respectively where a,b, differ, $F_{3,39}=8.76$, $P<0.0001$). These preliminary results suggest that a decrease in full and half blinks concomitant with an increase in eyelid flutters can be used as a non-invasive measure of stress in horses, allowing insight into a horse's affective state.

Keywords: eye blink rate; stress; behavior; heart rate

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Clicker training in horses; the importance of the time between click and reward

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Timing of reward is very important when training horses. Incorrect timing can lead to confusion and deleterious behaviors and learning will be impaired. Clicker training can be used as an important tool in training. However, the optimal timing between the secondary and primary reinforcer remains unclear in the scientific literature. Fifteen horses were divided into three treatment groups; all were trained to touch a target through clicker training. Group 1 (n=5) was immediately rewarded after the click, group 2 (n=5) was rewarded 10 seconds after the click and group 3 (n=5) was rewarded 20 seconds after the click. All horses received a maximum of 20 training trials, with a maximum duration of 60 seconds per trial. When the horse touched the target 10 consecutive times with its nose, achieving the training criterion, training trials were stopped. A Kruskal-Wallis pairwise test showed a significant difference in learning a simple behavioral task between groups 1 and 2 ($H_2=-31.955$, $P<0.05$) and between groups 1 and 3 ($H_2=-44.819$, $P<0.05$). There was no difference found between group 2 and 3. Most horses from group 1 (n=4, 80%) reached the training criterion, two from the five (40%) in group 2 reached criterion and only one from group 3 (20%). The results of this small study suggest that immediate delivery of primary reinforcement is most effective and that as the time increases between the secondary and primary reinforcers, learning efficiency declines. These results confirm that timing is important for the efficacy of secondary reinforcement.

Keywords: clicker training; learning theory; horse; timing

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A code of welfare for horses and donkeys: establishing standards for the welfare of equids in New Zealand

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New Zealand's code of welfare for horses and donkeys was developed by the National Animal Welfare Advisory Committee (NAWAC), under provisions in the Animal Welfare Act 1999, and issued by the Minister for Primary Industries in 2016. This code applies to all horses, ponies, donkeys and hybrids of these in New Zealand. The code contains 15 minimum standards that owners and persons in charge of horses and donkeys in New Zealand must meet including standards relating to equine management, food and water, shelter, housing and facilities, restraint and containment, behavior, handling and training, equipment, breeding, foaling and weaning, identification, health and emergency humane destruction. When developing a code of welfare, NAWAC is required under the Act to take into account good practice and available scientific knowledge, as well as public opinion and any other matters it considers relevant. Minimum standards have legal effect in that failure to meet a minimum standard in a code can be used as evidence to support a prosecution for an offence under the Act. An amendment to the Act was made in 2015 and allows for the development of animal welfare regulations. Regulations around horses and donkeys are currently being developed. These are directly enforceable, are associated with fines and infringements, and are intended to further improve welfare. New Zealand's regulatory system relies heavily on scientific evidence in order to guide appropriate standard setting to ensure that people meet the physical, health and behavioral needs of their animals.

Keywords: horse; donkey; legislation; welfare; code

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A pilot study for the development of the equine behavior assessment and research questionnaire (E-BARQ)

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Numerous factors affect horse learning. In this study, data were obtained from horses (n=96) that were trained to step backwards through a corridor in response to bit pressure and tested for responsiveness with rein tension meters. A week before these tests, the horses' owners were questioned about each horse's management, behavior, training, behaviors indicative of conflict, and factors such as breed, age and sex. Factors from these three broad domains were studied using a multiple logistic regression (MLR) model to examine associations between horses' behavioral attributes and test results. The MLR included estimates of the rider's ability and experience and owner's perceptions of their horse's trainability and temperament. The influence of the various factors on the ability of horses to learn to step backwards, as measured by the relative latency to back through the corridor over the course of trials, were assessed. Preliminary results revealed several significantly correlated variables. They revealed explanatory variables that significantly influenced rate of learning. Horses were faster at backing when handled on the right ($t_{94}=3.65$, $P<0.001$) than the left side. Horses in regular work did not learn significantly more quickly than their unworked counterparts but showed a trend towards completing the task faster. Horses regularly ridden by beginners showed the slowest learning ($F_{6,81}=2.98$, $P<0.05$). These findings will help clarify how horse characteristics, training and management may influence learning and how their application may optimize learning outcomes. Items that assess these qualities will be integrated in anticipated equine behavior assessment and research questionnaires.

Keywords: learning; horse management; training; temperament

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Attitudes toward the application and use of biometric health data in equine training and care

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A survey was designed to identify a relationship between an individual's role in the equine community (owner, trainer, caretaker, casual rider and competitive rider) and their attitude about the use of technology in the collection and application of biometric health data. Survey questions sought to determine whether community members collected health data independently, and a community member's attitude about the use of technology, asking for an indication of if they would use technology to monitor health data or maintain health data records. Respondents (n=74) frequently identified with multiple roles, with some combinations such as competitive riders and owners being common. The results showed that there was a relationship between an individual's role in the equine community and their attitude of health data collection specifically, those identifying as either a competitive rider ($\chi^2=10.334$, d.f.=4, $P<0.05$) or a horse owner ($\chi^2=12.081$, d.f.=4, $P<0.05$). No other demographic groups showed such dependence. The results also showed a relationship between likelihood to collect biometric data for training and care and identifying as a competitive rider ($\chi^2=10.597$, d.f.=3, $P<0.05$). Overall, approximately two-thirds of respondents (50 out of 74, 67.6%) would be likely to use technology for care and training. The availability of accessible technology that allows easy recording of health and performance related information for individual horses will assist with communication between responsible personnel and contribute to the maintenance and improvement of horse welfare.

Keywords: owner attitude; health; record; biomedical; data

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Field test of an instrument to identify youth perceptions of equine welfare issues among common training practices

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Youth account for vast numbers of participants in equine activities and what they learn as youth will impact interactions with horses as adults. The aim of this study was to develop an instrument to gather data to increase understanding of youth perception and awareness of what constitutes a compromise to equine well-being. Survey items related to the importance of common care and management interactions and who taught youth those interactions derived from a previous instrument. Additional items used videos and a Likert scale measuring if the horse in the video was not distressed, slightly distressed, somewhat distressed, moderately distressed, or very distressed. Videos were selected based on consistency of evaluation of distress by panelists and demonstration of a range of levels of distress for all items. The survey was distributed to members of a youth (ages 8–18) horse club (n=23). Youth had no previous education on horse well-being or welfare. The welfare assessment scale was found to be highly reliable (34 items; Cronbach's alpha = .868). A one-way ANOVA compared means of youth responses to the videos against experts and found no significant differences ($P>0.05$) between the amounts of distress youth detected compared to the distress identified by the panel. This study demonstrated that this instrument has potential to analyse youth perceptions within equine welfare. This survey will be tested with larger populations to determine effectiveness as an assessment of youth perceptions of behaviors impacting horse welfare, and to determine if other factors correlate to perceptions of horse welfare.

Keywords: equine; welfare; fear; distress; youth; perception