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RESEARCH

Can equine communication via audible exhales improve the welfare of therapy horses? – A pilot practice project

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Abstract

Background: Human-animal interactions in human services are on the rise, with an increased focus on the welfare of animals involved as well as on client safety. Based on scientifically based training methods, it has been proposed that horses involved in therapy settings could benefit from learning proactive strategies to reduce stress. One possible strategy is audible exhale communication (AEC). Inviting horses to actively use this strategy with humans could enhance the welfare of horses in equine-assisted therapy (EAT), thereby increasing client safety.

Methods: A pilot project was conducted to test the feasibility of training 20 therapy horses to use AEC as a veto signal for an activity, while therapists responded to the signals. The number of audible exhales from the horses was compared between the initial and final training sessions. Furthermore, we tested whether age, years of training experience, and therapy experience served as moderating variables for the outcome. Additionally, qualitative observations were made by therapists working with the horses.

Results: It has become apparent that training the horses to use AEC was successful. After 6 months of training, the horses showed a significantly higher number of audible exhales than in the initial training session, with a large effect size. Neither age nor years of training or therapy experience was found to be a moderating variable. The horses were eagerly engaged with newly acquired tools. These showed fewer indications of stress, greater sense of relaxation, and more positive emotions.

Conclusion: Based on the findings of this pilot study, training horses to use AEC might be a feasible approach to reduce stress in horses working in therapeutic settings, increase client safety, enhance human-animal relationships, and open up new possibilities for improving the therapeutic process. This method is applicable to all horses, regardless of their age, training level, or experience in therapy. For future research, it would be interesting to replicate and extend the approach by addressing the aforementioned limitations and using a randomized controlled design to investigate the introduction and impact of AEC in a therapeutic setting and to gain more comprehensive insights.

Keywords: equine-assisted therapy, equine welfare, audible exhale communication, therapy horses, stress, breathing, horse training, positive reinforcement, therapy training, animal consent, client safety

Introduction

From a One Health perspective, integrating horses into human services should not only lead to increased well-being for humans, but should at the same time also lead to an increase in the welfare of the horses, or at least avoid suffering in the horses (Zamir, 2006; Hediger *et al*., 2019; Hediger *et al*., 2021).

In the German-speaking world alone, more than 1600 horses participate in therapeutic settings, which require a strong commitment to their protection and welfare. While previous studies on equine-assisted therapy (EAT) have mostly focused on the positive outcomes of clients, only a handful of studies have examined the impact of these activities on horses themselves (Gehrke *et al*., 2011; Fazio *et al*., 2013; McKinney *et al*., 2015; De Santis *et al*., 2017; Johnson *et al*., 2017; Malinowski *et al*., 2018; Mendonça *et al*., 2019; Arrazola and Merkies, 2020). Nonetheless, much is known about species-appropriate and needs-oriented horse husbandry, including the importance of muscle and balance training, recreational activities,

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best practices, stable design, and management practices for horses to ensure optimal welfare (Fraser, 2008; Ohl and van der Staay, 2012; Hediger and Zink, 2017). However, additional factors must be considered when integrating horses into human health services.

In therapy, horses are not just passive participants but are actively encouraged and reinforced to engage in the therapeutic process and actively respond to their environment, including the emotions and behavior of clients (Hanggi, 2005; Ohl and van der Staay, 2012). Regular training with a primary caregiver is necessary to train and reinforce this feedback. The caregiver responds to and reacts to the animal's behavior (Hediger and Zink, 2017). However, the openness of horses to clients' emotions and behavior can also cause stress in animals. Recognizing and preventing stress in therapeutic animals is a crucial responsibility for human caregivers. Knowledge of stress responses is imperative to fulfilling this responsibility.

In all animals, the autonomic nervous system is activated in response to stressors (Brown, 1994; Glenk, 2011; De Santis *et al*., 2017). This system regulates variations in the respiratory (De Santis *et al*., 2017) and cardiovascular (Giggins *et al*., 2013) responses. Heart rate variability, which refers to the variation between heartbeats, adapts to environmental and psychological influences and can be used as a measure of an organism's regulatory and adaptive capacity (McCraty *et al*., 2009). Conscious breathing in synchronization with heart rate refers to respiratory sinus arrhythmia, which can be trained (Yasuma and Hayano, 2004). Innovative behavioral interventions for humans, such as heart rate variability biofeedback, empower individuals with self-regulatory strategies to modify their breathing patterns, intentionally calm their breathing, promote relaxation, influence heart rate, and improve overall health (Bernardi *et al*., 2000; Yasuma and Hayano, 2004; Vaschillo *et al*., 2006; Siepmann *et al*., 2008; McCraty *et al*., 2009; Hallman *et al*., 2011; Giggins *et al*., 2013; De Santis *et al*., 2017). Breathing exercises, such as audible exhalation or using the "pursed lip breathing" can be trained to further support these efforts (van Dixhoorn, 2011).

Horses are highly attuned to environmental influences and emotions, and exhibit subtle changes in heart rate (Hediger and Zink, 2017) and distinct behavioral patterns that can provide insight into their emotional states. For instance, certain emotional states can be associated with specific noises that horses produce, such as squeals, screams, groans, blows (audible exhales), snores, and snorts (Yeon, 2012). Audible exhalation can serve as an indicator of a horse's general state of welfare, with more frequent audible exhales indicating a more positive emotional state (Stomp *et al*., 2018). Interestingly, the exercise "pursed lip breathing" and audible exhaling, commonly used in human relaxation programs (van Dixhoorn, 2011) is also a tool relied upon by horses, which produce a deep exhaling sound. In contrast, stressed horses often hold their breath, making deep breath by audibly exhaling a stress-reducing technique for them as well.

It can be highlighted that horses require well-directed methods to alleviate tension (Hediger and Zink, 2017). Although few studies have evaluated stress levels in horses in therapeutic settings, recent studies have emerged (Gehrke *et al*., 2011; Fazio *et al*., 2013; McKinney *et al*., 2015; Johnson *et al*., 2017; Malinowski *et al*., 2018; Mendonça *et al*., 2019; Arrazola and Merkies, 2020). These studies have primarily investigated the extent to which horses react to certain activities under stress. However, there is a lack of research on specific strategies through which horses can actively regulate their stress levels. We propose that exploring such strategies, to which horses can apply, might have immense potential and should be investigated further. It is worth mentioning that animals and humans share structural similarities in the brains, suggesting common mechanisms (Julius *et al*., 2014). Therefore, therapy horses may be able to learn relaxation behaviors that provide opportunities for relaxation, coping strategies, and stress reduction during therapy sessions. Drawing from the fundamentals of human trainable respiratory sinus arrhythmia, we hypothesized that such strategies could have significant potential for therapy horses, their well-being, and thereby for client safety. Thus, we propose a training concept in which horses learn to use audible exhales when their stress levels are high, contributing to a more frequent and faster stress reduction. This concept is called audible exhale communication (AEC).

Furthermore, we propose that horses learn to influence their environment and increase their self-efficacy when humans closely observe and pay attention to subtle reactions and respond accordingly. Self-efficacy and self-expression are fundamental needs for both humans and animals and are crucial concepts in reducing stress. By utilizing audible exhales as a learned means of communication, we hypothesized that horses may experience relief and reduced tension while providing humans with valuable feedback on their experiences. We suggest that the AEC can serve as an essential tool for facilitating communication and exchange between humans and therapy horses. We hypothesize that AEC can serve as a veto signal as well as a signal for positive emotions, so when it is combined with other nonverbal cues, AEC can be utilized as a form of supported communication to convey horses' nonverbal impulses in signal language. Based on these hypotheses, we conducted a pilot project to test the feasibility of training therapy horses to use AEC in stressful work situations using AEC as a coping strategy and releasement behavior. AEC fits in the efforts to use less pressure release methods and more positive reinforcement in the training of therapy horses.

Methods

In 2019, a pilot project was conducted at the association *e.motion Lichtblickhof*. Since 2003, this nonprofit organization has been providing EAT to children and adolescents at *Hospital Penzing* in Vienna, Austria. It is one of the largest equine-assisted service projects in Austria, with an annual attendance of 400 children and adolescents (Zink, 2008; Zink and Deimel, 2019), e*.motion Lichtblickhof* is one of the largest equine-assisted service projects in Austria. The *Equotherapy* used in this program emphasizes nonverbal communication as a key component.

Our aim was to determine whether it is possible to train horses to utilize AEC when experiencing stressful situations and whether this might enhance the welfare of therapy horses by reducing stress.

SAMPLE: PARTICIPATING HORSES

The regular training sessions at *e.motion Lichtblickhof* included all 14 therapy horses and 6 young horses in training. The 20 horses comprised a diverse range of breeds, including 12 Criollos, 1 Icelandic horse, 2 Shetland Ponies, 2 Tinkers, a Camargue horse, a Warmblood horse, and a Haflinger-Arabian Mix. Among them, 15 were mares and 5 were geldings (Table 1). At *e.motion Lichtblickhof* therapists fulfill the roles of the animal trainer, handler, and session leader of the therapy concurrently. For the purpose of this study, the term "therapist" was used to encompass all three roles.

RESEARCH QUESTIONS AND HYPOTHESES

This study aimed to determine whether a specially designed AEC training program for therapy horses and therapists working with them could increase the number of audible exhales used by horses to reduce stress and communicate with their human counterparts. Furthermore, the study aimed to investigate whether age, experience in training, or experience in therapy among horses served as moderating variables in the observed increase in audible exhale in the event that such an increase was detected.

We hypothesized that audible exhales would significantly increase after AEC training. Given that horses of all ages possess the ability to acquire new abilities and can be trained to work in therapeutic settings, we did not anticipate that age would act as a moderating variable. Nevertheless, we expected that the number of years

Table 1. Characteristics of the participating horses.

				Years of experience at Lichtblickhof	
Horse	**Gender**	**Age (years)**	**Breed**	**In training**	**In therapy**
1	♀	26	Shetland Pony	21	15
2	♀	22	Criollo	11	8
3	♀	7	Criollo	5	0
4	♀	30	Shetland Pony	15	12
5	♀	19	Tinker	8	5
6	♀	27	Criollo	20	17
7	♂	14	Criollo	12	6
8	♂	10	Criollo	8	1
9	♀	5	Criollo	1	0
10	♀	8	Criollo	3	0
11	♀	12	Criollo	6	10
12	♀	31	Icelandic Horse	16	1
13	♂	10	Warmblood	5	5
14	♀	13	Criollo	8	7
15	♀	23	Criollo	17	9
16	♀	6	Criollo	4	8
17	♂	20	Criollo	14	13
18	♀	19	Haflinger Mix	1	12
19	♀	12	Camargue	3	2
20	♂	10	Tinker	8	8

of experience in training and therapy could potentially serve as moderating variables, as therapy horses with extensive experience had to assimilate numerous novel concepts throughout their involvement in training and therapy sessions. Therefore, horses with more years of experience may be more receptive to new concepts and may have a greater capacity for adaptation.

PROCEDURE

Starting in January 2019 and ending in June 2019, each horse participated in a training session once a week for 6 months. Five weekly training sessions were conducted in total. The training was conducted in small groups consisting of four horses, four therapists, and a supervisor to facilitate a more personalized approach for each horse-human team. Each horse was paired with a person who typically worked with the horse during the therapeutic sessions. Thus, every horse had one reference person who was responsible for weekly training over the course of these 6 months. The association's founder, a certified horse trainer, biologist, psychologist, and professional in animal-assisted interventions who was also responsible for the horse training concepts of the association, served as a supervisor for every training session.

AEC training for participating horses

For this pilot project, a training concept that was individually adapted to the current needs of horses and therapists was developed. This included addressing challenging situations that had arisen in the previous therapy sessions. The training was mainly based on positive reinforcement, where the horses get reward or break after AEC. Since the focus was strongly on the relationship level with the horse and the attention was not only on the audible exhale but also on the body language dialogue as well as mutual affect adjustment and the connection between human and horse, this training method, which is reminiscent of classical conditioning, goes beyond that. Another focus was on achieving mutual relaxation, physiological coordination, and synchronization of movements between the horse and the therapist. Horses are motivated to use their body language to signal their condition clearly, enabling their human counterparts to respond to stress factors. The training was aimed at increasing the horses' self-efficacy, and these were encouraged to apply stress-reduction strategies using AEC. The AEC was introduced as a stress-reducing strategy in the sense of a veto signal. This means that when a horse used the AEC, the activity was stopped for a short period of time. To teach horses AEC as a stress-reducing strategy, these were challenged with different tasks set at various levels of difficulty. For example, horses were asked to trot next to the therapist (exertion) while also being asked to hold their head low and maintain the same pace as humans (relaxation). Therapists avoided projecting a strained, demanding demeanor during the interaction and instead modeled the relaxed concentration. For example, by breathing deeply and not merely focusing on the task, their body language supported the horse and modeled calmness. If the horses reacted to this relaxation signal in their emotional tuning and exhibited relaxation signals, such as a deep audible exhale, the task would be interrupted and the horses would be rewarded for their efforts to engage with the therapist through treatment, scratching, or another positive experience. The training always aimed for a relaxed and considerate interaction between the horse and the therapist. In this manner, horses gradually learned to use the AEC to express their state, indicating that these have a say in and can co-determine the situation and that these are heard by humans.

AEC training for participating therapists

In addition to the horses being trained, therapists were educated in the EAC. They were instructed on how to perceive the body language and feedback of the horses that they were working with more clarity. They were also trained to positively reinforce horses to use AEC, resulting in a more frequent and faster stress reduction. The sound of exhaling was used as an important feedback system by therapists to identify stressful situations for the horse and make necessary changes. Thus, the AEC was assumed to provide horses with a tool to influence and control situations, potentially counteracting the phenomenon of 'learned helplessness' (Seligman, 1972) by providing a means for the horse to be understood. Therapists were educated on how to provide horses with opportunities to act proactively regarding their motivation, exert influence, and communicate their stress. This provides humans with more opportunities to respond to the emotions of horses, reduce stress, and aid in relaxation. In addition, regular discussions between the training supervisor and therapists facilitated the exchange of different strategies and experiences. In addition, therapists were trained on how to incorporate the horse's AEC into the therapy sessions once the horse started using the technique.

Discussion units for exchange

At the end of each training session, a discussion was held between the supervisor and four therapists. During these discussions, the supervisor and therapists exchanged and compared their subjective observations of horse behavior. The number of times each horse used the AEC was recorded on a sheet by the training supervisor and possible contributing or preventing factors were discussed. The overall training process for each horse was assessed. Exercises for subsequent training and therapy sessions were discussed and determined.

ENVIRONMENTAL CONDITIONS

The training was conducted in the covered and weather-protected riding hall of *e.motion Lichtblickhof*. Austria's climate is classified as humid-cool-temperate, with a Pannonian-continental, low-precipitation climate characterized by hot summers and cold winters. The annual mean air temperature in Austria ranges around 12°C, with January being the coldest month and July being the warmest month on average.

The training often took place concurrently with the usual therapy activities, with barn workers, clients, other therapists, and therapy animals also present on the premises.

INTEGRATION OF AEC INTO THERAPY

Once horses had incorporated the concept of AEC into their training, these were introduced to the therapy setting. The use of AEC in therapy was carefully observed and recorded in standard therapy documentation sheets under the headings "feedback horse" and "horse-human interaction." These findings were subsequently shared with the training supervisor, as well as with colleagues in both the training units and the regular team interventions.

At *e.motion Lichtblickhof* EAT with clients consists of both ground work and mounted activities. Joint activities vary greatly depending on the area of support and the objective and can include outdoor educational elements, vaulting tasks, talk therapy during walks or horseback rides in nature, mastering self-made obstacle courses, or riding tasks with the horse. Regardless of the planned program, the focus is always on the relationship, nonverbal body language dialogue, and reflection on feedback from the horses.

DATA ANALYSIS

All quantitative data were analyzed using *IBM SPSS Statistics 28* (IBM Corporation, 2020). Statistical significance was set at $p < 0.05$. To assess changes in the number of audible exhales over the course of the 6-month training, a paired *t*-test was conducted to compare the number of audible exhales in the first training session with those in the last training session. Cohen's *d* was used as a measure of effect size. Additionally, we qualitatively observed the horse's behavior during training and therapy sessions.

Results

PRE-POST COMPARISON

The dataset did not contain any outliers. Given the relatively small sample size, the Shapiro–Wilk test was used to assess the assumption of a normal distribution. The differences in AEC between the initial and final training sessions were assumed to be normally distributed ($p = 0.729$), therefore, a dependent *t*-test was conducted. The number of audible exhales was significantly greater during the final training session than the first training session ($t(19) = 9.99$, $p < 0.001$, $d = 2.73$).

From a qualitative perspective, therapists involved in the training thoroughly enjoyed the experience and expressed satisfaction with the results. They reported that the horses experienced reduced stress and displayed more pronounced signs of interaction. As soon as the horses grasped the concept of having the ability to set a veto, which occurred at different times for each horse, they eagerly engaged with the newly acquired tool, utilizing it not only in training settings but also in challenging situations. Therapists observed that horses showed fewer indications of stress, a greater sense of relaxation, and more positive emotions after each use of AEC.

MODERATION ANALYSES

The relationships between all the variables involved in the moderation analysis were approximately linear, as assessed by visual inspection of the scatterplots after LOESS smoothing. A moderation analysis was performed to determine whether the interaction between the number of audible exhales in the initial training session and age predicted the number of audible exhales in the final training session. The overall model was not significant, $F(3, 16) = 1.54$, $p = 0.242$. The analysis did not show that age moderated the effect of the number of audible exhales in the initial and final training sessions significantly $\Delta R^2 = 0.97\%$, $F(1, 16) = 0.09$, $p = 0.773$, 95% CI[−0.151, −0.207]. Another moderation analysis was performed to determine whether the interaction between the number of audible exhales in the initial training session and horses' years of training experience predicted the number of audible exhales in the final training session. The overall model was significant, $F(3, 16) = 4.42$, $p = 0.019$. The analysis did not show that years of training experience moderated the effect of the number of audible exhales in the initial and final training sessions significantly, $\Delta R^2 = 1.03\%$, $F(1, 16) = 0.232$, $p = 0.637$, 95% CI[−0.279, −0.122]. The last moderation analysis was conducted to determine whether the interaction between the number of audible exhales in the initial training session and horses' years of experience in therapy predicted the number of audible exhales in the final training session. The overall model was significant, $F(3, 16) = 6.30$, $p = 0.005$. The analysis did not show that years of experience in therapy moderated the effect of the number of audible exhales in the initial and final training sessions significantly, $\Delta R^2 = 0.08\%$, $F(1, 16) = 0.014$, $p = 0.906$, 95% CI[−0.266, 0.197].

Discussion

RESULTS IN THE CONTEXT OF EXISTING LITERATURE

The results of this pilot study demonstrate the feasibility of actively training horses to use AEC. Furthermore, the study found that horses trained to use the concept exhibited fewer stress signals and displayed more positive emotions and signs of relaxation. After a period of 6 months, the horses started employing AEC as a veto signal, prompting therapists to respond accordingly by interrupting

the current tasks. The horses showed significantly more audible exhales than before training. These results are consistent with our expectations. Therapists working with horses reported that they enjoyed the process. The AEC signal was easily detectable, as observed through sight, hearing, and touch. Because of their perceptibility through various senses, therapists quickly became adept at identifying these signals. Consequently, a high level of communication between horses and therapists was achieved, leading to increased satisfaction among the therapists involved. Previous research has suggested that such a strong relationship between horses and therapists may facilitate faster learning (Covalesky *et al*., 1992; Martin, 2008). Our subjective observation that horses showed fewer indications of stress, a greater sense of relaxation, and more positive emotions after each use of AEC is consistent with previous research, suggesting that AEC can serve as a reliable indicator of positive emotions (Stomp *et al*., 2018).

As anticipated, age did not moderate the effect of the number of audible exhales during the initial and final training sessions. Contrary to our assumptions, neither years of experience in training nor in therapy had a moderating effect on the outcome. These results indicate that the concept of AEC can be incorporated into training and therapy for horses of any age and level of training or therapy experience.

THE POTENTIAL OF AEC USE IN THERAPEUTIC SETTINGS

Introducing this concept could potentially enhance the training and therapeutic processes at multiple levels. Therefore, it is possible to improve the relationship between therapists and horses. According to previous studies, the incorporation of AEC can have a positive impact on horses. Horses that are accustomed to communicating with peers through breathing have been observed to respond positively when humans acknowledge and reciprocate this form of communication (Stomp *et al*., 2018). It might also give the animals a sense of control, which is one of the most effective stress-reducing factors (Dickerson and Kemeny, 2004; Rietmann *et al*., 2004). Consequently, an increase in animal welfare is expected. On the other hand, AEC could also enhance safety by providing horses with a tool to self-regulate and influence the behavior of therapists when they feel stressed. Audible exhaling is a clear signal from a horse that is difficult to overlook, unlike subtle behavioral signals of the horse that the therapist usually keeps an eye on, such as facial expressions (e.g., tension and wrinkles around the mouth, lips, and chin), size and shape of the nostrils, shape of the eyes, eye blinking, and changes in body posture (e.g., tension or oscillation of the tail, posture of the neck and head, and movement of the feet). Therapists need to focus on clients, their interactions with the horse, and the horse itself, which can be challenging. The AEC can assist therapists in reliably identifying horse signals, even in demanding situations. This could potentially prevent stressful situations from building up, thereby avoiding worst-case scenarios of injuries or accidents that cannot be ruled out with certainty when working with living beings.

In the realm of equestrian sports, training concepts and methods often lean toward traditional approaches that rely on punishment or aversive negative reinforcement. However, there is a growing trend in the development of methods, such as classical conditioning, operant conditioning, generalization, learning on the model, and social learning for other animal species (Pilley and Reid, 2011; Martin, 2013; Pilley, 2013). Research suggests that horses are also capable of engaging in various forms of learning, including the methods mentioned above, as well as advanced cognitive challenges, such as categorization learning and concept formation (Hanggi, 2005). Therefore, it is indispensable to incorporate scientifically based animal training concepts that prioritize animal welfare into training with horses, along with the traditional "pressure release" approach (Riedl *et al*., 2008). In the context of therapy, it is crucial to prioritize effective communication among therapists, clients, and horses. Neglecting this aspect may result in training horses to become desensitized or trapped in a state of learned helplessness (Hediger and Zink, 2017).

In addition to the anticipated benefits to animal welfare and client safety, the use of AEC could greatly enhance the therapeutic process. This might be especially true for clients who rely on self-supported communication or augmentative and alternative communication tools (Finke *et al*., 2017; American Speech-Language-Hearing Association, 2020). These individuals may find it particularly appealing to interact with animals that face similar challenges in understanding and adapting to different perspectives. Additionally, the nonverbal and paraverbal levels of communication offered by horses and moved into focus even more strongly by using AEC add another dimension to the therapeutic experience. Overall, AEC can serve as a valuable tool for introducing stress-reducing techniques to clients and facilitating discussions on self-expression, sharing, boundaries, and other topics. Moreover, with the assistance of the AEC, clients would have the opportunity to receive direct and unequivocal feedback regarding the emotional state of the horse. This creates a conducive environment for learning, and developing emotional and social skills.

Although we saw that the horses very quickly understood the concept and used AEC, we also experienced that it requires consequent training, and therapists need to be dedicated to this approach. It is important to provide horses with predictability and security through consistent engagement. This can lead to frustration if horses engage in this type of communication, use AEC as a skill, or are not heard. Involved therapists must show sensitivity, mindful attention, and appreciation when interacting with horses and dealing with their feelings. Ignoring AEC or a lack of empathy and respect can lead to emotional hurt, frustration, or a resulting loss of trust, which can erase the learned behavior.

Thus, we want to highlight that applying AEC requires a great deal of experience and knowledge regarding the connections between human and animal interactions, equine communication, and audible exhales. It is important to be aware of the powerful access that the AEC offers and does not use to the detriment of animals. The AEC creates a deep level of trust between the horse and the therapist. This concept should be adapted to the needs of horses based on an understanding of equine behavior to ensure that an increase in welfare becomes possible.

LIMITATIONS AND OUTLOOK

This project was implemented in a practical setting within everyday therapeutic life, supporting its external validity. Consequently, the obtained results hold a significant value for other centers engaged in EAT. Our findings demonstrate that horses that have already been involved in a similar setting for extended periods can acquire new strategies and incorporate them seamlessly into their work. It is noteworthy that in the discussion, we attributed human concepts such as self-efficacy, self-empowerment, and conscious thinking to horses. However, this topic remains the subject of debate in some scientific communities.

As this study used a pre-post design rather than a randomized controlled trial, it is important to acknowledge that confounding variables and biases cannot be completely ruled out. Additionally, it is worth noting that the sample size was small, which may have resulted in underpowered testing. Therefore, it is important to consider this as a pilot study and as the first quantitative approach to this phenomenon. Furthermore, the observations were not standardized but only subjective and did not follow an observation protocol. For further research, it is crucial to ensure large sample sizes, and we recommend incorporating a diverse range of complementary parameters to effectively measure horse reactions to AEC usage. This can include standardized observations, physiological measurements (e.g., cortisol, heart rate, heart rate variability, and thermography), and behavior coding based on an ethogram. By utilizing these multiple parameters, a more comprehensive understanding of the AEC impact can be achieved. To enhance the internal validity and draw more specific conclusions, a randomized controlled study should be conducted. This involved comparing a group of horses receiving AEC training with a control group that did not incorporate AEC into their training

concept. This approach provides a more robust framework for evaluating the effectiveness of AEC and its impact on equine training.

CONCLUSION

This study demonstrated that teaching horses AEC and integrating it into their training and therapy settings is possible. All horses, regardless of age, training experience, or prior experience in therapeutic settings, could learn and apply the AEC concept. Incorporating AEC provides a simple means to enhance animal welfare by helping therapy horses to reduce stress and improve relaxation, thereby increasing client safety. Moreover, the AEC offers numerous possibilities to use the AEC in address important topics that contribute to the improvement of therapeutic processes.

In summary, it can be concluded that the utilization of AEC is possible and that both the client and horse, as well as the therapist, might benefit from it. Further research on this pilot project, to address these limitations, could yield more comprehensive insights.

CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

ETHICS STATEMENT

The authors confirm that the research meets any required ethical guidelines, including adherence to the legal requirements of the study country.

AUTHOR CONTRIBUTIONS

All author contributed equally to the development of this article.

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