



Equine welfare assessment

Assessing equine welfare using positive parameters

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Degree project/Independent project • 15 credits
Swedish University of Agricultural Sciences, SLU
Department of Biosystems and Technology
Alnarp 2023



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Credits: 15 credits

Level: G2E

Course title: Independent Project in Biology, G2E

Course code: EX0855

Course coordinating dept: Department of Biosystems and Technology

Place of publication: Alnarp

Year of publication: 2023

Cover picture: Horses grazing in grass field. Helena Lopes.

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Keywords: human-horse relation, natural living conditions, social bond-analysis, time budget

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Abstract

This thesis examines positive parameters for assessing horse welfare. The purpose of the study was to examine what positive welfare parameters there are, and if they are valid or not. Data has been collected through a literature review. Findings suggest that behavioural indicators like yawning, vacuum chewing and play are not valid. In addition, physiological parameters also lack validation.

The thesis also examined valid positive welfare parameters. Horses living under natural conditions display behaviour related to good welfare. Relationships are also important, i.e. the social bonds with conspecifics but also the human-animal bond. Further, cognition and learning are closely related to emotions. Time budget studies and social bond analyses are suitable methods for assessing horse welfare with positive parameters.

Keywords: human-horse relation, natural living conditions, social bond analysis, time budget

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1. Background

Hausberger, Lesimple and Henry (2021) state that horses were domesticated for more than 5000 years. The authors highlight the many concerns about the welfare state about the domestic horse. Emotional, ethical and societal concerns gave rise to the research on animal welfare (Broom, 2014).

1.1 Definition of welfare

Lesimple (2020) describes animals as sentient beings and therefore presence and absence of emotions should be taken into consideration regarding animal welfare. The author points out the importance of protecting animals from negative emotions and give them opportunities to express positive emotions. Lesimple (2020) and Rollin (1993) emphasize that animals should live accordingly to their nature and should also be able to perform all necessary behaviours.

Animal welfare refers to the persistent state of an individual over time and is considered a chronic state, not a temporary state (Broom, 2014).

The term “umwelt” refers to a perception an individual has of its environment and it is perceived by own senses and the nervous system (Merkies and Franzin, 2021). According to Hausberger, Lesimple and Henry (2020) the term was developed by von Uexkull as a part of characterizing the perceptual world of an individual or species. Umwelt therefore refers to horses and humans living in different subjective universes. Merkies and Franzin (2021) similarly also put the definition in relation to an animal experiencing the living conditions and environment in its own way, which may differ from another individual’s perception.

Arena et al. (2021) point out the importance of being aware of behavioural disorders originating from animals trying to cope with their environment. Lesimple (2020) describes sub-optimal conditions as an important factor on the animals’ behaviour. To conclude, animal welfare is a chronic state that reflects an animal’s subjective perception of its own situation and living conditions (Lesimple, 2020).

1.2 Assessment of welfare

Hausberger et al. (2020) state that since welfare is the animal's subjective experience, the welfare status needs to be evaluated by using objective assessment tools. Further, the measurement tools need to be validated and have a scientific basis and be used by observers that are well-trained (Hausberger et al., 2020).

1.2.1 Different methods for assessing welfare

Henry et al. (2017) hypothesized horse welfare indicators being influenced by the animals' living and working conditions. According to Hausberger, Lesimple and Henry (2021) the resource-based models in assessing welfare seem to be easier to access by untrained observers. Hausberger, Lesimple and Henry (2021) describe the problem with welfare assessment through resource-based indicators in a more specific way. The authors give an example of an observer knowing that a horse must have access to feeding all day and that this knowledge is learnt. On the other side, they state, the knowledge does not necessarily inform the observer about how the horse feels with an empty stomach since this is an unshared experience.

Lawrence, Vigors and Sandøe (2019) describe positive animal welfare based on four different key features. The key features of positive animal welfare are positive emotions, positive affective engagement, quality of life and happiness.

According to Hausberger, Lesimple and Henry (2021) animal-based indicators are more likely to develop empathy. Though the authors raise the concern that most learning strategies are not based on learning to identify them, and by that also relate to human emotions and feelings for a greater understanding. Hausberger et al. (2020) describe recent studies converge to promote the animal-based measurement. The authors reason that the animal-based indicators better reflect the state of the animal. In addition, the authors point out the relevance of considering horses' subjective welfare state rather than external indices which are reflected by resource-based criteria. To conclude, the resource-based criteria might be easier for untrained observers to assess, but do not add the animal's subjective perception to it (Hausberger et al., 2020).

1.2.2 Challenges

Anthropomorphism is described in Hausberger, Lesimple and Henry (2021) as a cognitive bias because it involves different beliefs about the extent that animals have feelings, thoughts and awareness like humans. The anthropomorphism may lead to, for example, keeping horses in stalls for protection from weather and to lower the risk of injuries (Hausberger, Lesimple & Henry, 2021). Further, the authors explain that these effects rarely are mentioned to challenge the system. In

addition, the animal rights organizations often see horses in pastures abandoned and would rather see them in stalls for their security (Hausberger, Lesimple & Henry, 2021).

Arena et al. (2021) highlight the importance of improving management practices and knowledge. By doing that there should be an improvement in the horses' welfare, the authors claim. Hockenull (2010) also describes welfare of animals based on good practices. The good practices described by the author are then measured by resource-based criteria.

Hausberger, Lesimple and Henry (2021) describe the discrepancy between housing and keeping and put that in relation to the knowledge of the animals' owners. According to the authors there is a gap between the conceptual and procedural practices.

Furthermore, Hausberger, Lesimple and Henry (2021) discuss "yard culture" which is described as a social process of inclusion and exclusion in a place where different people keep their horses. Since horses are non-verbal, practices rely on what people think are good for them. The authors explain one's own subjective experiences and also cultural and social norms as interpretations for horse welfare. Influences, traditions and beliefs are also an important factor to consider (Hausberger, Lesimple and Henry, 2021).

In Lesimple (2020) a chronic state reflecting an animal's subjective perception of its situations is indicated by behavioural, postural and physiological parameters. The author describes the physiological parameters as approaches based on the concept of homeostatis and alleostatis. Broom (1993) defines homeostatis as a constant state only varying within certain tolerable limits. Alleostatis refers to stability through changes (Sterling, 1988).

Behavioral problems may originate from the animal's attempt to cope with an environment not optimal (Arena et al., 2021). Stereotypies can be described as periodic and regular behaviours that are predictable and always repeated in the same manner (Mason, 2006). Arena et al. (2021) further explain the stereotypies as behaviours that may not be dependent on current husbandry and living conditions. The authors further state that the circumstances that have given rise to the stereotypies, can be based on previous experiences of poor welfare.

Hausberger, Lesimple and Henry (2021) mention performance as an indicator that horses have a good welfare. According to the authors, performance is used as an indicator by horse owners. In addition, the authors state that riding and gear used can also relate to behavioural problems. According to Hausberger, Lesimple and Henry (2021) it is possible that pain have become the norm.

To have positive effects on horse welfare there are different enrichment methods (Hausberger, Lesimple and Henry, 2021). In the article the authors point out that it is worth considering replacing the term *enrichment* with *compensation*. There is no

evidence that enrichment objects have a positive effect on horse welfare. According to the authors, enrichment is providing appropriate care in impoverished conditions. Hauberger, Lesimple and Henry (2021) discuss that most studies assessing the welfare of horses are resource-based. Henry et al. (2017) stress the lack of validated methods measuring animal welfare with a focus on the animals' positive emotions. The study points out that common methods evaluate behaviour and physiological indicators of stress and welfare. These methods, are according to the authors, not necessarily sufficient because they can be related to arousal level.

Lesimple (2020) points out that multiple scientifically validated indicators are lacking. The study further describes the importance of the welfare indicators being valid, reliable and feasible. Validity means that the indicator must be meaningful for animal welfare and measure what it is supposed to measure. Reliability is when the results are consistent regardless of different observers. The indicators must also be easy to use in field and that is what defines feasibility (Lesimple, 2020).

To sum up, the measurement must yield information about an individual's subjective perception of its own situation. Further, it must reflect only the animal's perception and therefore include no anthropomorphism (Lesimple, 2020).

1.3 Purpose and problem statements

The purpose of this thesis work is to yield information about positive parameters for assessing horse welfare. Since most studies are resource-based the purpose is to describe the existing animal-based assessment methods which are departing from positive welfare parameters. The problem statements will therefore be as follows:

1. *Which positive horse welfare parameters are not validated in research?*
2. *Which positive horse welfare parameters are validated in research?*

2. Method

This thesis is a literature review and different sources have been used. Some of the articles are recommended by the supervisor and also a starting point for further searching of relevant literature. The search engine used is Primo, which is accessible through SLU. Words and phrases used in searches are: *horse welfare*, *equine welfare*, *animal welfare assessment*, *measuring animal welfare* and *welfare parameters*. Articles used are peer-reviewed and in English language. Some of the articles' references were also helpful for further reading and research.

3. Results

3.1 Non-validated positive welfare parameters

Different behavioural indicators, including play, and physiological factors will be described.

3.1.1 Play

Held and Spinka (2011) describe play as a behaviour highly flexible and variable within and between species. In addition, play has been viewed as a welfare indicator because it often disappears when animals are under fitness challenges. Also, the behaviour of play has been thought to be closely connected to positive emotions (Held & Spinka, 2011). Hausberger et al. (2012) describe play as a mystical phenomenon since it occurs in young individuals that are healthy but almost never in adult individuals. On the other hand, the authors emphasize, it may occur in captive or domestic animals. The study points out that it is related to spatial, social and/or feeding deprivations or restrictions. Further, their study revealed that animals suffering from more chronic stress were more likely to play than others. Blos-Heulin et al. (2015) describe play as a behaviour related to inappropriate living conditions. Hausberger et al. (2012) discuss play as a way of coping with the environment. Also, play can favor the animal's emotional resilience. The study also states adult horse play as a welfare indicator not reliable.

3.1.2 Other behavioural indicators

There are several behavioural indicators that have been related to welfare. Lesimple (2020) refers to yawning and vacuum chewing. According to the findings Lesimple's study refers to, yawning has been considered a relaxation signal and then also an indicator for welfare. As described in Lesimple (2020) yawning may also be triggered by stress and negative circumstances. Yawning can be considered as an ambiguous behaviour and may also reflect changes in the animal's inner state, stress and frustration (Kubota et al., 2014; Beerda et al., 1998). Górecka-Bruzda et al. (2016) discuss yawning in Prewalski horses occurring more often in social groups where aggressiveness was higher.

Vacuum chewing is considered a displacement behaviour in other species. Tinbergen (1952) describes vacuum chewing in horses as a relaxation signal. On the contrary, Cooper and Mason (2010) consider vacuum chewing as a behaviour occurring under frustrating circumstances.

Lesimple (2020) also points out that there are several behavioural indicators not valid as welfare parameters. The author describes vague evaluations not based on the animal's subjective perception of its conditions. The evaluation is completely based on the human subjective perception and likely leads to incorrect solutions (Lesimple, 2020).

3.1.3 Physiological parameters

There are several factors connected to physiological parameters and animal welfare. Cortisol is considered a stress hormone (Lesimple, 2020). Lansade et al. (2018) focused on tactile contacts in their study. The tactile contacts were grooming sessions. Rises in oxytocin levels have been observed in other positive situations but the results of the study showed that regarding oxytocin levels and blood cortisol there were non-significant differences between before and after the groomings. Neither did heart rate and heart rate variability differ significantly between groups. Lesimple (2020) also suggests that cortisol is not a reliable indicator for horse welfare since it reflects temporary unpleasant states and not an animal's chronic subjective perception of its living conditions.

3.2 Validated positive welfare parameters

Findings suggest that valid welfare parameters are related to time budget in natural living conditions, human-horse relationship, cognition and social bond analysis. These will be examined in the following part of the thesis.

3.2.1 Time budget

Hausberger, Lesimple and Henry (2021) describe the all day slow walks of feral horses. In addition, feral horses feed all day, according to the authors. Henry et al. (2017) thoroughly describe the importance of horses being able to live in stable groups and have access to large home ranges. The study also points out natural forage and roughage availability as important factors for welfare. Naturalistic conditions leads to good welfare and optimistic bias. Merkis and Franzin (2021) support this by stating that horses living in pastures with others display fewer undesirable behaviours and they also learn quicker. In addition, the authors

emphasize, the group housing leads to social interaction under natural living conditions.

Auer et al. (2021) highlight the horses behaviour as a good welfare indicator. The study shows that time budget can assist in horse welfare assessments. Further, their study revealed that domesticated horses with free access to food, increased space and decreased population density yielded time budgets that easily can be compared to time budgets of semi-feral horses. In addition, the authors state that healthy and stress-free horses have a daily routine with almost identical patterns of behaviour from day to day.

3.2.2 Human-horse relationship

Hausberger et al. (2012) describe the human-horse relationship as an important part of welfare. Boissy et al. (2007) highlight calmness and calm attention as an aspect that may reflect better positive emotions and a good welfare of the horse. A positive status also improve relations (Merkies & Franzin, 2021).

Merkies and Franzin (2021) also point out that positive emotions stimulate to seek more and a positive status improve relations. In humans' relations with horses it is of great importance to be aware of these positive aspects between human and animal. If horses can understand our emotions it may lead to influencing the horse's emotions and actions. In addition, gentle contact leads to an optimistic horse. Tactile stimulation by gentle grooming is described in Merkies and Franzin (2021) as a specific action for improvement of the relationship between human and horse. Lansade et al. (2018) emphasize repetition of gentle grooming since the repetition leads to a general state of well-being. Hausberger, Lesimple and Henry (2021) also highlight horses higher tactile sensitivity compared to humans as an aspect to consider in equine welfare.

3.2.3 Cognition

Emotions are short-lived affective responses (Hausberger et al., 2019). Furthermore, positive experiences lead to subsequent learning and a stronger bond between human and horse. According to Hausberger et al. (2019) welfare and cognition are closely related. Poor welfare is connected to poor cognition. Also, alternations of welfare affects cognitive abilities which clearly shows that cognition and welfare are related, and so are emotion and learning (Hausberger et al., 2019). Enhanced attention and cognitive activity are sources for more positive emotional states which is why the daily cognitive investment is of great importance (Hausberger et al., 2019). The relationship between emotions and cognition can be explored through cognitive bias test (Merkies & Franzin, 2021). According to

Henry et al. (2017) the horses in their study who lived under naturalistic conditions displayed indications of good welfare and an optimistic bias. Their study also adds evidence of the validity of a cognitive approach when assessing emotional states. Merckies and Franzin (2021) describe humans playing a large part in horse cognition. Also, if the human can affect the emotional state of the horse it is also important to have a positive attitude which is based on our knowledge of horses' affective states (Merckies & Franzin, 2021). Henry et al. (2017) conclude that judgement biases could be used for evaluating animal welfare in different systems.

3.2.4 Social bond analysis

According to Merckies and Franzin (2021) discrete positive emotions are scarcely researched. More and more horses are group housed which highlights the importance of taking the horse individuals' preferences into account to ensure their welfare (Wolter, Stefanski & Kruger, 2018).

Wolter, Stefanski and Krueger (2018) discuss social bonds in their study. According to the authors there are different aspects to consider when analysing social bonds: mutual grooming, affiliative approaches and spatial proximity. Mutually grooming horses are standing side by side and gently nip, nuzzle and rub each other. Affiliative approach is defined by horses approaching each other and staying within one body length. Spatial proximity, on the other hand, defines horses standing with body contact or within two horse-lengths (Wolter, Stefanski & Kruger, 2018). The authors suggest using a combination of the proactive behaviours (mutual grooming and affiliative approach) or using spatial proximity as an indicator when analysing the social bonds. According to the study, observations of these indicators are suitable within a time frame of 15 hours.

4. Discussion

4.1 Non-validated positive welfare parameters

Different behavioural parameters have been used as indicators for animal welfare. Most of them are not valid because of vague human evaluations of horses behaviour. Instead, evaluations must be based on animals' subjective perceptions of their own environment and living conditions (Lesimple, 2020). These requirements are not met using most behavioural factors as indicators for animal welfare.

Many behaviours that have been considered behaviours indicating good welfare are not displaying good welfare at all. Contrary, many behaviours may indicate impoverished housing conditions or great stress. Vacuum chewing, which is a displacement behaviour, can not be seen as a good welfare indicator since displacement behaviours may indicate a poor welfare status rather than good welfare status (Lesimple, 2020).

Yawning is well-known as a relaxation signal and perceived as an indicator of an individual being free from stress and having a good quality of life (Tinbergen, 1952). In fact, the yawning behaviour also can indicate changes in the inner state of the animal, and even stress or frustration (Cooper & Mason, 2010).

Play has been considered an indicator of good welfare based on an interpretation of the good emotions connected to play behaviour (Held and Spinka, 2015). Young animals do play and display positive emotions, but adult horses rarely play if they live in optimal conditions. Play behaviour in adult horses indicate a lack of welfare in some aspect Blos-Heulin et al. (2015).

Physiological factors were also examined in the literature review. Animals' emotions and wellbeing can be reflected by for example oxytocin, blood cortisol and heart rate. On the contrary, the results do not necessarily reflect an individuals chronic state and well-being. It rather reflects a temporary state, which is not valid when measuring animal welfare. An individuals welfare do not need to be impoverished if the animal is experiencing stress at a certain point. Contrary, it is not considered poor welfare unless it is the animal individual's subjective perception of its chronic situation.

Factors discussed above can not be considered positive welfare indicators. Firstly, they do not necessarily indicate welfare. Secondly, even when considered as welfare parameters they are not positive indicators since they are connected to behaviours displaying negative inner states.

4.2 Validated positive welfare parameters

In the literature review different parameters indicating good welfare were found. This thesis shows that studying animals' time budgets, lead us to important information about the animals' inner states and their well-being. This is true for studying horses in natural living conditions. Horses living in conditions that meet their behavioural needs can, in research, be compared to semi-feral horses in behaviour and time spent during different activities. Horses feed almost all day, need social contact with conspecifics and enough space for locomotion (Hausberger, Lesimple & Henry (2021).

Further findings is the importance of human-horse bond. By engaging in activities based on tactile communication a strong bond can develop. Horses are much more sensitive for tactile signals than us humans, and by practicing gentle grooming their welfare may improve (Merkies & Franzin, 2021).

Learning and cognition are closely related to welfare (Hausberger et al. 2019). When welfare is poor, cognition is also poor. When assessing emotional states, cognitive parameters can therefore be very useful. Humans are important for horses and the positive emotional state is especially important. Since learning and emotions are closely related one can assume that horses with a positive inner state and good emotions also are quicker and better learners. In addition, it may also lead to a stronger human-animal bond.

Horses also bond with conspecifics. Social bond analyses are examined in the thesis and the findings suggest that analysing social bonds gives a good indication of the welfare conditions. There are several ways to perform the analyses but the suggestions in literature are to either combine the proactive behaviours in the analysis or use spatial proximity as a factor (Wolter, Stefanski and Krueger (2018). To sum up, time budget studies in combination with social bond analyses give us a good indication of an individual horse's welfare. In addition, the human-horse bond is also of great importance and a valid welfare indicator. A good relation also promotes learning in the highly cognitive horse.

5. Conclusion

There are different methods for assessing horse welfare. Most of them focus on negative factors where the absence of certain behaviours indicates good welfare. Also, there are several resource-based factors that are valid indicators but not for assessing positive welfare. Examining those has not been the purpose of this study. This thesis' focus has been on the positive welfare parameters. Results show that there are several valid positive welfare indicators for assessment of horse welfare. The core point and main findings are that horses thrive under natural living conditions where they can express normal behaviour, a behaviour similar to feral horses. In addition, relations are of great importance for horses, i.e. relations with both humans and conspecifics. Animals' cognition is also connected to their inner state and welfare. A strong human-horse bond based on positive togetherness also leads to higher cognition and enhanced learning.

Horses are social animals and their social bonds to other horses are important. Assessing welfare by social bond analysis can be done in different ways. One way is to consider proactive behaviour where mutual grooming is one of the aspects.

All in all, several aspects of horse welfare cooperate and are closely related to each other. Natural living conditions and strong and healthy bonds with humans and conspecifics are important for the horse's welfare. Welfare is a chronic state, not a temporary.

Time budget studies departing from aspects concerning natural living conditions is one possibility for further research. For a deeper understanding of equine welfare based on positive parameters, the time budget studies could be combined with social bond analyses.

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Acknowledgements

I want to give a special thanks to my supervisor Maria Vilain Rørvang. She has been very helpful during this thesis work. I also want to thank course leader Lotta Nordmark for her rapid responses when questions arose during the thesis work.

Last, but definitely not least, I want to thank friends and family who all believed in me and supported me all the way.

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