

A whinny is not just a whinny. Horses convey complex information when they whinny. These expressions reflect their emotions, in the same way as human's voice. Each whinny is made up of two independent fundamental frequencies, according to researchers at the Ethology and Animal Welfare Unit at ETH Zurich's Institute of Agricultural Science. One frequency indicates whether the emotion is positive or negative, while the other frequency reveals the strength of the emotion.

This phenomenon had not been described in any scientific study on horse vocalizations but the fact is that listeners with normal hearing can easily perceive both fundamental frequencies if they are aware of them.

Such vocalizations with the two fundamental frequencies are actually rare among mammals, in contrast, for example, to songbirds. It is not yet known how horses simultaneously produce such complex sounds. Researchers suspect that the presence of these two fundamental frequencies is due to an asynchronous vibration pattern of the vocal cords. In order to learn more about the expression of emotion in horses, the researchers tested 20 groups of horses by exposing them to various positive and negative situations. This allowed researchers to study the individual horses reaction when members of the group were removed and later returned. Researchers used cameras and microphones to record the behavior and vocalizations of the horses and to also measure the animal's physiological response, such as heart rate, breathing and skin temperature.

The findings show that the intensity of emotions is best indicated by the heart and respiratory rates, the horses' movements, the characteristics of the lower of the two fundamental frequencies of the whinny and the amplitude of higher frequencies. Specifically, the more aroused the horse is, the more its heart rate and breathing increase. It moves more and produces whinnies in which the lower of the two fundamental frequencies is higher, regardless of whether the emotion is positive or negative.

The valence—that is, whether the emotion is positive or negative—is expressed most strongly through the characteristics of the duration of the whinny, the higher fundamental frequency and the position of the head. Positive emotions can be recognized by the fact that the horse emits whinnies of shorter duration

and in which the higher fundamental frequency is lower, and it lowers its head. Whinnies produced during negative emotions are longer and the higher fundamental frequency is higher.

This knowledge could be useful to horse owners allowing them to better interpret the animal's behavior and thus respond more effectively to its needs. This research is part of a larger research project that explores how the expression of emotions has evolved among various ungulates. The main aim of this project is to look at the effect of domestication. The researchers want to find out whether domestic animals and their wild counterparts express their emotions in a similar way, or if domestic species have adapted their means of expression to humans. Comparisons are planned between domestic and Przewalski horses (a species of wild horse), domestic pigs and wild boars, and cattle and bison.

References

Briefer EF, Maigrot AL, Roi Mandel R, Briefer Freymond S, Bachmann I, Hillmann E: Segregation of Information about Emotional Arousal and Valence in Horse Whinnies. *Scientific Reports*, 21. April 2015, DOI: 10.1038/srep09989