Influence of psychological and physiological arousal in humans on horse heart rate and behaviour

K Merkies•, A Isensee▪, H MacGregor•, U Koenig von Borstel▪, A Tucker•, J Carson•, R Bergeron•,
•University of Guelph, Guelph
▪University of Göttingen, Göttingen

The interaction of horses with humans is a dynamic state, but it is not clearly understood how horses perceive humans. Nervousness is transmissible from humans to horses indicated by increased horse heart rate (HR), however no studies have investigated whether horses can differentiate between humans who are physiologically-stressed (eg. after exercising) as opposed to psychologically-stressed (eg. feeling nervous/afraid). Horses (N=10) were randomly subjected to each of four treatments: 1) no human [control], 2) a calm human comfortable around horses [CALM; N=2 humans], 3) a physically-stressed human [PHYS; human exercised to reach 70% of maximum HR; N=2 humans], and 4) a psychologically-stressed human [PSYCH; human who was nervous around horses; N=14 humans]. Humans ranked themselves on a scale of 1-10 for their nervousness around horses. Both humans and horses were equipped with a HR monitor. Behavioural observations of the horses [gait, head position relative to the wit hers, distance from human, orientation toward human] were recorded live. Horses were allowed to wander loose in a round pen for 5 minutes of baseline recordings, at which time the human subject entered the round pen, stood in the centre and placed a blindfold over his/her eyes. The human remained in the centre of the round pen for an additional 5 minutes. Horse HR during control did not differ from when the human was present in the CALM and PSYCH treatment, and was lower during the PHYS treatment (51^a vs 54^a vs 55^a vs 45^b bpm for control, CALM, PSYCH and PHYS respectively; a,b differ $p<0.0001$). Over the 5 minute test period, horse HR decreased in PHYS and PSYCH ($p<0.01$) whereas it increased in CALM ($p<0.0001$). Horse HR decreased withincreasing human rank of nervousness around horses ($p=0.0156$), and horses stood nearer to the human when they faced the human ($p<0.0001$) regardless of treatment. Horses moved at a faster gait in the control treatment, and their gait was slowest in the PSYCH treatment ($p<0.0001$), and the horse's head position was lower in the PHY Sand PSYCH treatments compared to CALM or baseline ($p< 0.0001$). A lower horse head position was positively correlated to a lower horse HR ($p<0.0001$) and negatively correlated to horse age ($p<0.0001$). Human HR was affected by treatment, with PHYS having the highest HR ($p<0.0001$). Human HR increased when the horse was facing away from the human, even though the human was blindfolded ($p=0.0395$). Overall, horses appear to be influenced by the physiological and psychological state of a human without any direct contact. Horses' posture does reflect their physiological state. Understanding how horses react to human physiological and psychological states is especially important in equine-assisted activities, where the response of the horse has specific implications for the human participant.

Key words: horse-human interaction, heart rate, behaviour, human nervousness

Corresponding author:
K Merkies
Tel: +1 613 258-8336
Fax: +1 613 258-8285
E-mail: kmerkies@uoguelph.ca