

Crib-biting behaviour of horses: stress and learning capacity

S. Briefer Freymond¹, L. Piovesana¹, E. F. Briefer³, S. Beuret², K. Zuberbühler², R. Bshary², I. Bachmann¹

¹Agroscope—Swiss National Stud Farm

²Institute of Biology, University of Neuchâtel

³Institute of Agricultural Sciences, ETH Zurich

Crib-biting is a stereotypy in horses that is potentially linked to both chronic stress and genetic predisposition. Chronic stress can cause neurobiological changes such as alteration of the dopaminergic modulation of the basal ganglia [1]. These neurobiological changes could alter and modify the learning profile of the horses [2,3]. We tested 19 crib-biters and 18 non-crib-biting horses (controls) in five challenging spatial tasks, in order to test if differences in dopaminergic modulation impair learning capacities. The tests were performed in two time periods, in a small arena (8 x 10 m) that was familiar to the horses. For each trials, the horses were led to the start zone in front of a four-meter-long solid fence and were then left alone in the arena. Their task was then to find a bucket containing food, which was situated in different positions around the fence, depending on the tests. The time to reach the food bucket, the trajectory taken by the horse (left or right side of the fence) and the ECG trace were recorded continuously. Additionally, salivary cortisol was collected before the tests (baseline), after the first time period, and after the second time period. We found that crib-biters and controls behaved similarly during the learning tasks. However crib-biters that did crib-bite on the solid fence during the task (group A; 10 horses) behaved differently than crib-biters that did not crib-bite (group B; 9 horses) and controls (group C; 18 horses) for some tests, in their trajectory or time to reach the bucket. These differences are more likely explained by the time taken to crib-bite, than by differences in learning capacity. We did not find any difference between groups

in their heart-rate variability (RMSSD). Yet, we found a difference in salivary cortisol after the first time period between groups A, B and C. Indeed, the crib-biters that did not crib-bite had higher salivary cortisol values than all the other horses (mean±SE: A, 0.51±0.16ng/ml, B, 0.78±0.17ng/ml, C, 0.59±0.20ng/ml; Linear mixed model (LMM), $p<0.05$). Our results suggest that crib-biting horses that did not crib-bite during the learning tasks were more stressed than all other horses. This difference could be due to higher stress sensitivity in crib-biters, which could be reduced by the opportunity to crib-bite. These results replicate our previous findings testing differences in cortisol levels between crib-biters and control horses during an ACTH challenge test. Therefore, crib-biting behaviour might be a coping strategy helping stereotypic horses to reduce their stress during frustrating situations [4].

Keyword:
stereotypy, chronic stress, learning task

Corresponding author:

Sabrina Briefer Freymond

Email: sabrina.briefer@agroscope.admin.ch

Tel: +41 (0)58 484 61 01

Address: Swiss National Stud Farm SNSTF, Les Longs Prés, P.O. Box 191, CH-1580 Avenches. Switzerland