

Using vocalisations and cognitive bias to assess emotions, temperament and welfare in domestic goats (*Capra hircus*)

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Key words

Animal welfare, cognitive bias, emotions, livestock, temperament, vocalisations

Aim of the study

This study was aimed at finding behavioural, vocal and physiological indicators of emotions, moods and temperament in goats. The study was carried out at a goat sanctuary in Kent, UK.

Material and methods

First, we recorded and analysed the behaviour, the physiology (heart-rate, respiration rate and skin temperature) and the vocal parameters of the goats in 4 situations of different emotional intensity and valence (positive/negative) to find indicators of emotions. We then carried out a judgement bias experiment to study the long-term effect of poor welfare on goat moods, by testing the reaction of goats, which had experienced poor or good (control) welfare before arriving at the sanctuary, to intermediate spatial locations situated between food rewarded and food unrewarded locations. Finally, we investigated consistent individual behavioural differences across situations (i.e. temperament) in exploration/avoidance, sociability and aggressiveness. Goats were tested with 2 situations per temperament trait in 2011 and the tests were repeated in 2012.

Results and significance

Our analyses revealed 4/4 physiological parameters, 6/8 behavioural parameters and 8/32 vocal parameters that differed according to the emotional intensity. We also found 2/8 behavioural parameters and 5/32 vocal parameters that differed according to the valence of the situation ($n=22$ goats). These parameters could be good non-invasive indicators of emotional intensity and valence. The judgement bias experiment revealed that, surprisingly, females from the poor welfare group displayed more optimistic bias than control females, suggesting that these females were experiencing long-term optimistic bias triggered by release from stress ($n=9$ females). By contrast, male judgement bias did not differ between the poor welfare and control groups ($n=9$ females). To assess temperament, 28 goats were tested in total. The analyses are ongoing. We will test the effect of the breed, sex, age and individuality on goat behaviour. This project has resulted in one review paper, one submitted paper and 5 talks. We are planning 3 more papers based on these results.

Publications, posters and presentations

Briefer, E.F., McElligott, A.G. (*Submitted*) Long-term effects of poor welfare on goat mood revealed by a judgement bias experiment.

Briefer, E.F. (2012) Vocal expression of emotions in mammals: mechanisms of production and evidence. *Journal of Zoology* 188, 1-20.

Briefer, E.F., McElligott, A.G. (2012) Goat calls differ according to emotional arousal and valence. *46th Congress of the International Society for Applied Ethology*, Vienna, Austria. *Talk*

Briefer, E.F. (2012) Deciphering goat vocalizations: cues to physical characteristics and emotional states. Roehampton University. *Invited talk* and Neurobiology, behaviour and cognition seminars, Queen Mary University of London. *Invited talk*

Briefer, E.F. (2012) Using vocalizations to measure emotions and assess animal welfare. Vetsuisse-Fakultät, Universität Bern, Bern. *Invited talk*

Briefer, E.F. (2011) Using vocalisations to measure emotions and assess animal welfare. Federal Veterinary Office, Agroscope Reckenholz-Taenikon Research Station ART, Taenikon, Switzerland. *Invited talk*

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