Recent advances in animal welfare science V
UFAW Animal Welfare Conference
York Merchant Adventurers' Hall UK, 23rd June 2016

SHEEP PERCEIVE BRUSHING AS A POSITIVE STIMULUS: STUDY OF BEHAVIOURAL RESPONSES AND NASAL TEMPERATURE

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Research on positive affective states in animals has increasingly contributed to their welfare. Events that may elicit positive emotions include play, feeding and, recently, positive judgment towards tactile interactions have been demonstrated in farm animals. We investigated whether sheep perceive brushing as positive, through behavioural and temperature responses. Twenty-seven Dorper and White Dorper sheep were brushed by a familiar observer in three body regions: ventral neck, lateral chest and withers. We performed 3 min focal assessments at pre, during and post-brushing phases. Vocalization, ear changes and postures, presence of half-closed eyes and tail wagging were assessed. We also recorded nasal temperature with an infrared thermometer, twice at each phase. Data were analyzed using descriptive and nonparametric methods, in addition to marginal and linear mixed models. The models considered sex, breed and phase as fixed effects, as well as the random effect of animal for linear mixed models and a correlation structure for marginal models. Vocalization was not frequent throughout the phases. Regarding ear changes, no significant effect was found ($p>0.05$). Sheep changed ear postures 10 (1/42), 6 (0/26) and 7 (0/39) times pre, during and after brushing, respectively. We identified three main ear postures frequently performed: horizontal (H), raised up (R) and backward (B) postures. In relation to the estimated probabilities for the occurrence of ear postures, we observed important breed and phase differences, when comparing B x H ($p<0.05$). During brushing, sheep tended to show a higher proportion of B posture in comparison with H postures. In this case, a frequent performance of B posture may be an indicator of an appeasing state. Comparing R x H postures, we noted a longer duration of R posture pre than during brushing ($p<0.05$). Sheep showed a higher proportion of half-closed eyes during and post-brushing, when both phases were compared to pre-brushing ($p<0.05$). Only four male sheep wagged their tails, mostly during brushing (median: 7.50s; minimum: 4.38s; maximum: 9.03s). Post-hoc pairwise comparisons indicated important differences for mean nasal temperatures pre (33.46±1.87) and post-brushing (34.12±1.58) ($p<0.05$) as well as during (33.25±2.02) and post-brushing ($p<0.05$). No significant differences were noted pre and during the stimulus ($p>0.05$). Our findings suggest that the animals perceived brushing as positive. Ear postures and half-closed eyes have shown to be useful tools for assessing emotional states in sheep. Furthermore, although there is a need for validation, nasal temperature may be a promising measure of emotions in sheep.