REFINEMENT OF A THREAT PERCEPTION TEST TO IDENTIFY ANXIOUS STATES IN MERINO SHEEP

Jessica Monk[1,2], Rebecca Doyle[3], Sue Belson[2], Greg Cronin[1], Caroline Lee[2]

[1]*University of Sydney, Faculty of Veterinary Science, JL Shute Building, Camden NSW 2570, Australia.*
[2]*CSIRO, Agriculture, FD McMaster Research Laboratory, Locked Bag 1, Armidale NSW 2350, Australia.*
[3]*University of Melbourne, Animal Welfare Science Centre, Alice Hoy Building, Parkville VIC 3010, Australia.*

ABSTRACT

Attention bias is the processing of certain types of information before others. Anxious individuals process threatening cues before neutral or positive ones. In the current study a threat perception test was refined and validated using pharmacological models to induce and reduce anxiety in Merino sheep. The isolation box test (IBT), a commonly used measure of anxious temperament, was also pharmacologically validated as a measure of anxiety. A total of 60 male sheep received one of the following treatments (*n*=20/treatment): 1. control (saline), 2. diazepam (0.1 mg/kg, i.v., anxiolytic), or 3. 1-(m-chlorophenyl)piperazine (m-CPP) (2 mg/kg, i.m., anxiogenic). Each sheep entered a threat perception arena 30 min after receiving their allocated treatment for the 3 min test. The arena contained hay in the centre and a dog was visible to the sheep through a window which was closed 3 s after the sheep made visual contact with the dog. Latency to eat the hay, time spent eating, vigilance behaviour and zones crossed in the arena were measured in the test period. Using the data, the test was shortened to 120 s, 60 s and 45 s with vigilance and latency to eat as indicators. There was a treatment difference in proportion of time spent vigilant during the test ($H=24.49$, $P<0.001$). Sheep receiving m-CPP spent more time displaying vigilance behaviour (mean rank 45.73) than diazepam and control groups (mean rank 19.30 and 26.48, respectively). Diazepam treated sheep displayed a tendency to spend less time vigilant ($P=0.085$). These findings were consistent at 120 s ($H=18.66$, $P<0.001$), 60 s ($H=20.56$, $P<0.001$) and 45 s ($H=20.83$, $P<0.001$). More m-CPP treated sheep failed to eat during the test than control and diazepam groups, which was consistent across all time periods ($P<0.001$). This test requires no prior training and can be reduced to 45 s duration, which makes application more practical in a range of situations including on-farm. After the arena test, sheep were moved to the IBT, a small enclosed box, for 1 min where agitation was recorded. We found no significant differences in agitation scores between treatment groups ($P=0.174$). We suggest the IBT should be further investigated and validated as a measure of anxiety.

Keywords: affective states; anxiety; attention bias; sheep; vigilance; welfare