Improving judgement bias tasks for measuring emotional state in pigs

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IMPROVING JUDGEMENT BIAS TASKS FOR MEASURING EMOTIONAL STATE IN PIGS

S Roelofs [1,2], RE Nordquist [1,2] and FJ van der Staay [1,2]

[1] Behavior & Welfare Group, Department of Farm Animal Health, Faculty of Veterinary Medicine, Utrecht University, Utrecht, The Netherlands
[2] Brain Center Rudolf Magnus, Utrecht University, Utrecht, The Netherlands
s.roelofs@uu.nl

Measuring judgment bias in animals has been recommended as a potential indicator of emotional state. Judgment bias refers to the influence of emotion on the interpretation of ambiguous information, i.e. a negative affective state will result in a pessimistic judgment, whereas a positive affective state will result in an optimist judgment of an ambiguous stimulus. Judgment bias tasks have been applied to numerous different species. However, several potential limitations have to be taken into account before their results provide an accurate measure of emotional state.

We have explored these limitations using an active choice judgment bias task for pigs. Twenty pigs were trained to discriminate between two tone-cues. A 'positive' tone predicted a large food reward, available in a designated goal-box. A 'negative' tone predicted a smaller food reward in another goal-box. After completing discrimination training, pigs were presented with ambiguous tone-cues of intermediate frequencies between the tones used during training. Approaches to the designated 'positive' or 'negative' goal-boxes in response to ambiguous tones were scored as optimistic or pessimistic responses, respectively.

Successful judgment bias testing relies on animals' successful discrimination training. A lengthy training period prior to testing is undesirable, as it could act as cognitive enrichment. This could mask any detrimental effects on animal welfare induced by experimental treatment. Our pigs required 22 ± 5.9 daily training sessions (mean $\pm$ SD) to complete discrimination training. Two pigs failed to complete discrimination training within 30 sessions and were excluded from judgment bias testing. Results from training sessions show that pigs were initially unwilling to approach the 'negative' goal-box, opting instead to always inspect the 'positive' goal-box for a possible large food reward. Punishment for incorrect responding during discrimination training could shorten the required training period for judgment bias testing.

An effect of repeated testing on optimistic choice percentage was found ($F_{1,153}=6.59$, $P<0.0112$). Pigs became less likely to choose optimistically as testing progressed. This indicates that the pigs learned that ambiguous trials were unrewarded. For judgment bias tasks to provide an indication of emotional state, ambiguous stimuli used during testing must be truly ambiguous. Loss of ambiguity with repeated testing could influence results of judgment bias tasks and lead to incorrect conclusions about animals' emotional state. Possible solutions are the use of secondary reinforcers and/or a partial reinforcement schedule during training and testing.