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Different methods for assessing cognitive affective biases in rats using the judgement bias task

Haris Organtzidis*, Claire Hales, Justyna Hinchcliffe, Emma Robinson, Conor Houghton

* School of Physiology, Pharmacology and Neuroscience, University of Bristol, Bristol, UK

The judgement bias task (JBT) or ambiguous cue interpretation task (ACI) describes a group of decision-making task where animals learn two different cue-outcome associations, one positive and one less positive or negative. An ambiguous cue, intermediate between the two reference cues, is then used to probe decision-making behaviour. The judgement bias task first described by Harding et al., 2004 aimed to capture similar cognitive affective biases in animals to those reported in people with affective disorders such as anxiety or depression. Since the first publications, several different types of the task have been described with methods using auditory or spatial cues and outcomes including reward versus punishment avoidance and high vs low or no reward. Some tasks are designed using a go/no-go format whilst others use a go-go presentation. In our laboratory we have used an operant box-based task and tested methods involving different tone frequencies and go-go formats with reward versus punishment avoidance and high reward vs low reward. We also tested a task where animals were trained using a light and tone for the reference cues and a compound cue used to probe responses to ambiguity. Each of the protocols tested adds to our knowledge about the underlying neuropsychological processes which contribute to the task and animals decision-making behaviour during ambiguous cue presentation. We will provide a summary of the different outcomes we have shown in terms of training time and sensitivity to different pharmacological manipulations of affective state pharmacological manipulations. We will also describe the computational modelling approaches we have been using delineate the decision process. Drift-diffusion and Bayesian models, previously shown to be equivalent, offer valuable insight into how subjects accumulate sensory evidence and how the evidence interact with the subjects' prior beliefs in order to result in a decision. These models are easily interpretable, as they are mainly built with intuitive parameters. This fact in conjunction with optimised data fitting techniques from the literature, which accurately capture experimental data with a minimal required data set size, add further support for their use in understanding alterations in the decision-making process under different affective state manipulations.