

The predicting individual: expectations and their influence on emotional state and welfare

Supervisory team:

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Project description:

Theory and experimental evidence emphasize the role of the brain in generating predictions about what will happen in the environment and learning from any errors of prediction to update an increasingly reliable model of the world. In both humans and animals, recent research also indicates that prediction errors themselves can influence an individual's emotional (affective) state and welfare. In the short-term, unexpected rewards and losses can generate states of 'elation' and 'disappointment' respectively. And recent computational analyses of human learning and decision-making suggest that decision outcomes that are better than predicted have a stronger influence on 'happiness' than the total experience of positive outcomes per se. In the longer-term, the loss of desired resources from an animal's environment appears to be a potent cause of negative states and poor welfare, whilst addition of such resources has the opposite effect.

An individual's ability to update predictions may also be an important determinant of wellbeing. Fast learners who readily update predictions when unexpected outcomes are encountered may be at an advantage when dealing with sustained changes to their environments than when changes are erratic and transient, compared to those who update more slowly. This project will investigate the influence of short- and longer-term change on affective state and welfare in humans (short-term) and rodents (short- and long-term). Subjects will be studied in short-term (e.g. learning and decision-making tasks) and long-term (e.g. housing) environments characterised by high or low rates of change, matched for absolute levels of reward and loss. Measures of affective state and wellbeing will be recorded, including subjective report (humans), preference for environments, and behavioural and physiological markers of affect and welfare. The interplay between cumulative experience of reward and whether things are going better or worse than predicted will thus be dissected. The influence of individual differences in how subjects update behaviour when faced with change (e.g. in learning tasks) on their responses to the different environments will also be investigated. There will also be opportunities to design environments that generate positive prediction errors to see if these can enhance affective state and welfare. Findings will have theoretical impact and also practical implications for the design and management of animal housing.

The student will receive training in animal behaviour and welfare science, decision-making psychology, and computational analyses of response to change. They will learn experimental design, behaviour and welfare research methods, and statistical / computational analysis approaches.