PROJECT TITLE: The emotional basis of behaviour

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Project details: Emotions and mood states are notoriously difficult to study in non-human animals, but recent years have seen important progress in inferring these states and their links to behaviour and welfare. For example, the use of judgment-bias tasks has shown that differences in housing conditions for captive animals can generate 'optimistic' or 'pessimistic' attitudes towards ambiguous stimuli. The fundamental question that has not yet been addressed, however, is why evolution would favour a decision-making system guided by emotions, rather than a 'cold', unemotional, rational mapping directly from stimuli to behaviour. One important idea is that emotions act as a physiological memory of past experiences, and thus provide a valuable information source for making adaptive decisions in real-world environments. In previous theoretical work (Higginson et al. 2018, https://doi.org/10.1098/rspb.2017.2411), we have shown that in an environment characterised by temporal autocorrelation, a simple rule for foraging behaviour based purely on current hunger performs almost as well as an optimal strategy that uses Bayesian learning to integrate information from all previous experiences. More generally, across a wide variety of contexts, past experiences might be efficiently summarised by internal state variables (like hunger) that can be used to guide future decisions, without the need for cognitively demanding Bayesian computations. This points to the intriguing possibility that such internal state variables are the physiological basis and evolutionary precursor of emotions and mood states. In this PhD project you will use evolutionary modelling and artificial neural networks to identify adaptive emotion-based systems for decision-making in specified real-world scenarios (e.g. finding food in a dangerous environment; finding mates in a competitive environment). You will then compare the performance (in terms of biological fitness) of the emotional decision-making system to that of an unemotional, Bayesian system that explicitly computes the optimal decision based on current information. This comparison will reveal the conditions under which emotions are favoured by evolutionary pressures. This is an innovative, interdisciplinary project that will shed light on the fundamental evolutionary basis of emotions, and potentially explain some empirically observed cases of irrational or maladaptive behaviour.

Project specific entry requirements: A good BSc or MSc degree in Biology, Zoology, Psychology, Mathematics, Computer Science, Data Science or another subject with a strong quantitative focus.

Potential PhD programme of study: PhD in Psychology

Department: Psychology

Location: Washington Singer Laboratories, Streatham Campus

Please direct project specific enquiries to: Tim Fawcett

Please ensure you read the entry requirements for the potential programme you are applying for.

To Apply for this project please click on the following link - **APPLY HERE**