

introduction

The world changes. Animals, humans included, must adapt to such change. Behavioural flexibility provides one route to adaptive behaviour. Individuals faced with uncertainty have a choice: to innovate, to socially learn (learn from others), or to not change and maintain their established behaviour. Innovation and social learning are quintessential human characteristics, but are also important elements of animal behavioural flexibility, vital to survival in changing environments, fundamental to generalist and opportunistic lifestyles, and perhaps key to avian, primate and human brain evolution. Yet innovation and social learning also carry costs, and little is known about when individuals should employ a particular information-gathering strategy.

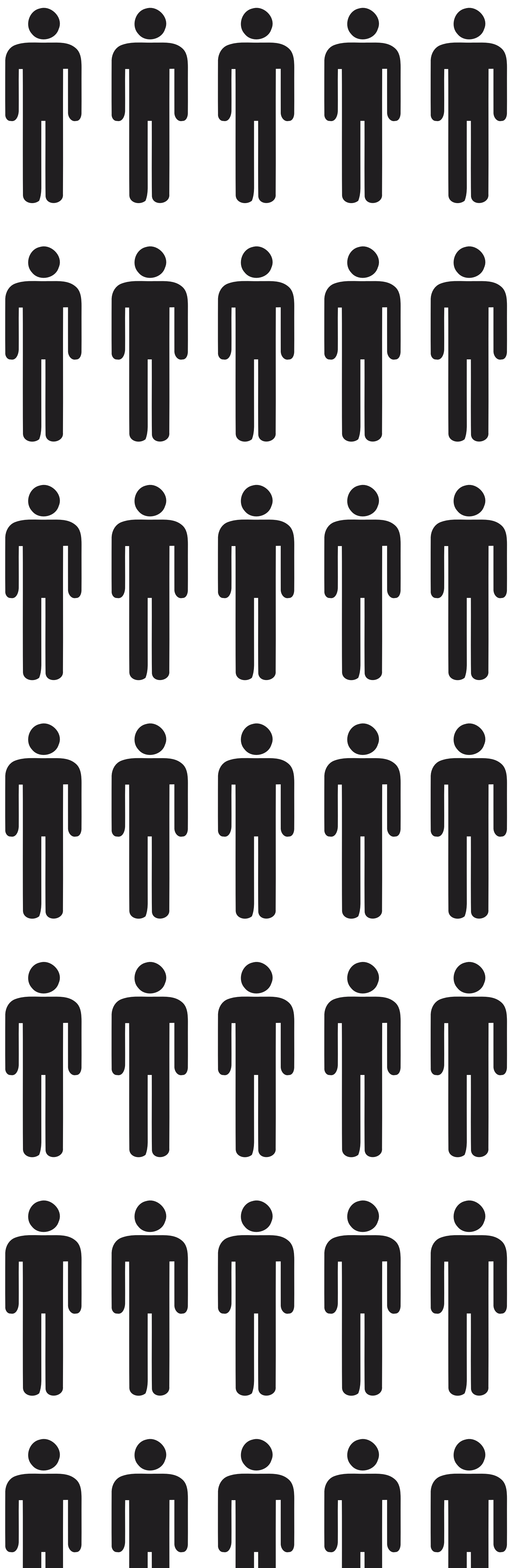
innovate or imitate?

S.M. Reader¹, M.J. Bruce¹, M.T.H. Meeus², U. Toelch^{1,3}

core question

Theoretical evolutionary models

predict when particular information gathering strategies should provide maximum payoffs, and from whom individuals would be expected to learn. Organisation theory makes predictions regarding why and when innovations should spread, and how past performance and resource availability influence innovation and learning. We test these influential models using a combination of human and animal (the guppy, *Poecilia reticulata*) models.



main findings

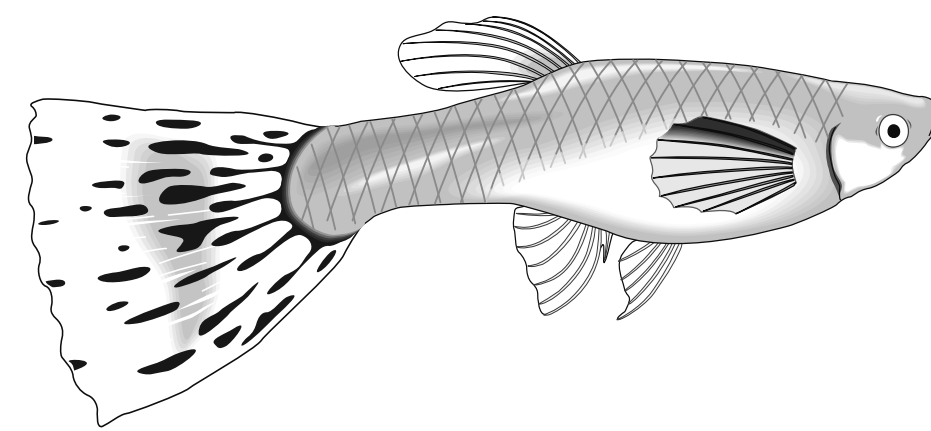
In both study

systems we find multiple levels of flexibility in information-gathering strategy. Strategies are partially a function of individual characteristics but are also plastic, reactive to environmental and social cues.

Strains show evolved differences in social learning tendencies

Guppies preferentially copy successful individuals. They remember a successful individual based on either shared success or purely observed success, and later copy her choices even if equally rewarding choices are available.

Copy-the-successful strategies are only employed by certain individuals: large individuals, probably a result of their superior competitive ability.

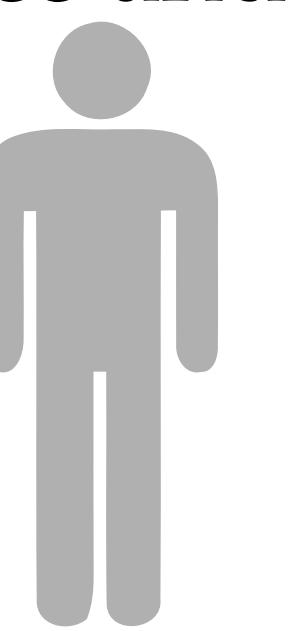


Individuals show consistent individual differences in their reliance on social information.

Increased environmental variability determines individuals' preferred information gathering strategy, decreasing reliance on social information and, when social learning is forced, leading to conformist transmission strategies.

Innovation and the adoption of innovations are driven by competitor performance and necessity, with slack resources playing a minor role.

Individuals copy traits that are rapidly increasing in frequency within the population, potentially driving cultural evolution.



interdisciplinary collaboration

Our project has joined human scientists from organisational science, cognitive science, and anthropology with behavioural and evolutionary biologists. This has resulted in animal and human studies inspired by a combination of evolutionary models and organisational innovation theory. We have co-authored research papers and presentations, co-supervised Masters theses, and collaboration continues with papers in preparation, a newly funded PhD project, and follow-up grant applications. International research visits to and from UC Davis and Indiana University have resulted in ongoing collaborative projects investigating cultural differences in information gathering strategies.

1: Behavioural Biology and Helmholtz Institute, Utrecht University
2: Organization Studies, Faculty of Social and Behavioural Sciences, Tilburg University
3: Dep. of Innovation and Environmental Sciences, Utrecht University