In 2002, the three of us were working together at McGill University, brought together by our shared interest in animal innovation. We had begun to discuss writing a review on the different aspects of our work on behavioral flexibility, which we felt strengthened and supported one another. An ideal opportunity arose when then editor Walt Wilczynski devoted a special issue of BBE to a symposium on 'Ecology and the Central Nervous System', organized by Luc-Alain Giraldeau at the 2002 International Society for Behavioral Ecology congress in Montréal. In the paper we were able to discuss and review a new operational measure of cognition, innovation rate. Using innovation rate and related measures of behavioral flexibility, we provided evidence for convergent cognitive evolution in birds and primates, and for behavioral flexibility having important ecological and evolutionary consequences. Broadly, our contributions can be separated into three themes, and we discuss the genesis of each in turn.

(1) Encephalization and Innovation in Birds (Louis Lefebvre)

In 1985, Kummer and Goodall [1985] suggested that the study of behavioral innovations might be useful in understanding the ecology of intelligence, while Wyles et al. [1983] had proposed that innovations, especially when they were socially transmitted, might serve as behavioral drivers of evolution, using the famous example of tits opening milk bottles. Around 1994, I started wondering whether there could be many more cases of innovations besides milk bottle opening hidden in the ornithology literature, and whether these cases could provide a valid quantitative estimate of cognition. The publication of McGill Biology colleague Rob Peters’ influential book *The Ecological Implications of Body Size* [Peters, 1983] (currently 3,920 citations on Google Scholar) gave me a kind of ‘quantification envy’ that animal cognition could be as ‘operationalizable’ as body size and used in a similar manner in comparative analyses. Initially, the innovation project targeted taxonomic differences in socially acquired versus individually acquired innovations, predicting that, if the taxonomic distribution of the two modes of acquisition did not differ, this would be further support for the argument that social and individual learning evolve together, feeling that resolution of this issue was important for theoretical models of the evolution of social learning. We had begun experimental work on the causes of individual variation in innovation rate and its relationship with brains, ecology and general intelligence.

(2) Innovation and General Intelligence in Primates (Simon M. Reader)

During my PhD, Kevin Laland and I had become increasingly interested in the issue of whether social and individual learning evolve together, feeling that resolution of this issue was important for theoretical models of the evolution of social learning. We had begun experimental work on the causes of individual variation in innovation rate and its relationship with brains, ecology and general intelligence.
novation rates in fish and, with the publication of Lefebvre et al. [1997], wondered if Lefebvre’s comparative approach could be applied to primate innovation and to other potential indicators of behavioral flexibility, specifically social learning and tool use. The final push to begin the project resulted from an unusual chain of events. In late 1997, Indonesian forest fires had impacted air quality across Southeast Asia, where our fish supplier bred our experimental subjects, guppies *Poecilia reticulata*, in large outdoor pools. Soon, guppies were in poor health when they arrived in Cambridge, apparently due to the effects of the polluted air on rainwater, and experimental work was impossible. I thus turned to a project I could conduct in the library, and began to gather published data on primate innovation, social learning and tool use.

It rapidly became clear that the primate literature was a rich data source, and could be used, with appropriate caution, to examine the independence of social learning from individual learning processes, as well as links between cognition and brain enlargement. Our first major publication from the dataset [Reader and Laland, 2002] documented a link between executive brain volume and behavioral flexibility. Furthermore, the observed correlation between social learning and innovation suggested that these capacities had evolved together. The debate over the relative importance of social versus ecological drivers of brain evolution is not settled, nor is the debate over the independence of social learning from individual learning processes, as well as links between cognition and brain enlargement. Our first major publication from the dataset [Reader and Laland, 2002] documented a link between executive brain volume and behavioral flexibility. 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