Foreword

In 2008, rather to our surprise, my family acquired a dog. Baldwin is a golden retriever, and before he was ours he belonged to Guide Dogs, a charity that trains dogs to guide blind and partially sighted people. We did not choose his name: an organisation called the Society of British Gas Industries paid for his training, and they chose to name him after the man who was their President at the time, Mr John Baldwin.

Until they are old enough for training, guide dogs live in family homes. Baldwin had lived with us when he was a puppy, and it had been our job to expose him to all sorts of different environments, so that he became used to unexpected and unfamiliar things, and would always remain calm when he became a working dog. We took him to meet children at a school, Alzheimer's patients in a nursing home and worshippers in an ancient stone church. He travelled in cars, trains and buses. We took him into shops in busy town centres, and we walked along public footpaths through farmers' fields where he saw horses, cows and sheep. After about a year, he went off to be trained as a guide dog, but then health problems prevented his becoming a working dog, and the charity offered him back to us as a family pet. Our elder son, who had prayed daily for Baldwin's return throughout the nine months of his training, nodded happily: "I knew he'd come back."

Baldwin's life has been touched by many aspects of human culture. Indeed, Baldwin is of a species that is the product of human culture, having been domesticated and artificially selected by humans over many thousands of years. And even in the brief snapshot of his life that I have provided, we can see some of the breadth and depth, the diversity and complexity that are so characteristic of human culture: domesticated animals and charitable organisations, industries and hierarchical management structures, trade associations and domestic living arrangements, family conventions and educational patterns, healthcare and religion, transportation methods and retail stores, electrical devices and public buildings … the list is endless.

But Baldwin' life has not been impacted by human culture in the same way that each human life is. Although Baldwin grew up in the same house as our two sons, for example, he did not learn to speak, as they did when they were young. He is capable of learning, of course, and even of learning to respond consistently to particular words, such as "sit", "wait" and "come". What he cannot do is learn a compositional language, the meaning of which is derived from the meanings of its constituent parts and the way in which they are put together. Compositional phrases like "the bees are buzzing" or "the dog is brown", for instance, can be understood by anyone who knows what their constituent words mean and how English puts words together. Modern natural languages are

on the whole distinguished by their compositionality, and their acquisition is simply beyond the mental capacity of a dog or indeed any other non-human species. There are dogs (border collies in particular) that can learn to respond appropriately to a relatively extensive vocabulary; some chimpanzees in captivity have been taught a relatively large number of signs; but compositional natural languages (whether spoken or signed) are, so far as we can tell, unique to humans. This book's thesis is that it is human language that has provided the mechanism for the evolution of human culture.

Key Ideas in Cultural Evolution

Evolution is a gradual, inter-generational process of change in a population's characteristics. It cannot happen unless variations in that population's characteristics are inherited across many generations. In fact, variations in a population's characteristics are not directly inherited, but are rather the expression of variations in inherited *information*. In biology, cellular mechanisms ensure that variations in genetic information are transmitted from one generation to the next. This book argues that in human culture, it is language that enables humans to receive and transmit variations in cultural information and resources. One of the key ideas that this book introduces is the distinction between *natural languages*, which are spoken or signed, and what I call *artefactual languages*, such as writing and mathematical notation, which use media that are made by humans. Natural languages evolved primarily to allow humans to communicate more effectively with one another, within local social groups. Artefactual languages evolved primarily to allow humans to preserve, transmit and manipulate information more accurately, permanently and effectively, between different social groups.

But language is not just a conduit for information: it also shapes the ways in which we think about the information that it enables us to acquire. Each language limits us to interpreting information in the way that its vocabulary and structures make possible, and it cannot help us to interpret information that is represented in a different system. That is why it has been so crucial for cultural evolution that we are able to acquire more than one language. We learn our native natural language in a critical period of childhood, but we can go on learning new natural languages, as well as many new artefactual languages, throughout our lives: the written language, mathematical notation, musical notation, cartographical conventions, computer programming codes, and so on. Specialist languages of this sort coevolve with the information that they represent, so that they are particularly well-suited to the manipulation and preservation of information in their particular cultural area. In this way, they provide an evolutionary mechanism for specialist cultural information and enable human culture to expand in both breadth and depth.

Humans were able to develop and learn all these different sorts of languages because of our unique mental capacity for *metarepresentation* - reflecting on the connections between symbols and their meaning; thinking about our thoughts - a process that has the potential to free cultural information from the cognitive and psychological restrictions of any one medium or language. The metarepresentational ability to transfer information between languages and media - to acquire new languages and then, when you have opened the doors to the information that they bring with them, to lift it out of that original context into one with different scope, different limitations - is the driving power behind cultural evolution. It enables us not only to acquire information but also to think about the information we have acquired; to recognise and to escape the impact of the information currently underlying our behaviour.

The Explanatory Power of Cultural Evolution

This book touches on the application of cultural evolution to our understanding of money, but in recent years the theory has also been applied fruitfully to an understanding of organisational evolution (with particular reference to business and management research), as well as to cartography, language diversity, social norms and technology. There is an emerging consensus that cultural evolution could provide a theory that helpfully integrates our understanding of the human and social sciences, just as biological evolution has done for our understanding of the biological sciences, and there is an increasing tendency for interdisciplinary research in this area.

To take just one example: at a 2014 symposium in London, convened jointly by the English peer and author Matt Ridley, and the American Gruter Institute for Law and Behavioral Research, the question "Is Innovation Evolutionary?" was posed to a group of experts from a wide variety of disciplines and backgrounds. The organisers' concern was to gain a better understanding of innovation, which they understand to be a key driver of advances in human well-being: a primary cause of economic growth and societal progress. To that end, they invited contributions from fields as diverse as policy and law, economics and business, primatology and anthropology, philosophy and psychology, history and biology, politics and journalism. I was invited to outline the theory of cultural evolution. What does it have to contribute to our understanding of innovation?

As I have explained above, under evolutionary pressure to represent more efficiently, each artefactual language coevolves with a specialist area of culture. As we acquire these specialist languages, so they prepare us to receive the cultural information that they carry, giving us access to specialist information and conceptual tools - knowledge and concepts that we could not access without the languages that support them.

Yet, as we have seen, each language restricts us to a particular way of thinking about the information that it represents, and does not help us to access information beyond what it can represent. So as subject areas evolve, and specialists become more immersed in their own field, a prevailing orthodoxy can emerge, which it is difficult to challenge. People who are educated and heavily invested in an existing paradigm will not necessarily welcome or find it easy to accept an innovative alternative. In effect, there can be a selective bias against ideas that challenge the orthodoxy, especially as academics find themselves under pressure to publish in highly ranked journals, and find it easier to have papers accepted if they are working within the current paradigm than if they are challenging it.

Now, a bias towards tried and tested knowledge, methods and technology is not always a bad thing. In any evolutionary sphere it is possible to have too much innovation. In biology, species barriers between sexually reproducing species limit the amount of genetic variation in each population and protect a pool of genes, which have successfully evolved to survive in a particular ecological niche, from the risks of too much disadvantageous variation. And in culture, too, we want to be able to build on existing knowledge and protect what has been found to work. Having put our intellectual money on one theory, it makes good psychological and epistemological sense to accept new ideas only if they are either compatible with it or have obvious enough advantages over it to compensate for our wasted investment.

The problem arises when present structures protect successful past innovation so effectively that they also discourage future innovation. Cultural and disciplinary isolation can cause beliefs and attitudes to become so deeply embedded that we are no longer able to see them, because we are seeing the world through them. And the more widely shared a view is, the more invisible it becomes, because everyone is viewing the world through the same lens.

If a prevailing paradigm or technology becomes sufficiently dominant, then innovations may need to be nurtured in isolated populations before they can challenge the mainstream. We know from biology that isolation can be significant for the evolution of new species. In culture, similarly, technologies may first come into existence as playthings of the rich: expensive prototypes or demonstrators, made in small numbers. Conceptual innovation may be nurtured in discussion groups and small specialist journals. Existing cultural information has found an ecological niche to exploit, and if novelties are to succeed then they may need to emerge in the safety of a different niche.

So cultural barriers are not always bad things: they can nurture novelty and protect success. But they can also be used to defend the outdated or mistaken against competition and correction. How is a

balance to be struck? The solution lies in the human capacities for metarepresentation and cooperation.

Humans are fundamentally cooperative beings, who are not only instinctively motivated to learn the local natural language in order to access the culture and social relationships within the local group, but are also capable of learning artefactual languages in order to access information and functional relationships across social and disciplinary boundaries. And crosscultural or interdisciplinary *cooperation* between diverse cultural *agents* can lead to productive *competition* between cultural *information*.

We do need people to specialise: to acquire the language and concepts that have coevolved in a particular cultural area; to mine each area for deeper knowledge and understanding; to exploit its resources for their implications and applications.

We also need people to take risks: to go prospecting as well as mining. We need to provide the structures and resources that will enable people to explore new areas - innovative ideas and technologies - in isolation from too much competition.

And we need to encourage people to share what they have found - to cooperate across cultural and disciplinary boundaries - to combine and recombine what has been found in each area, creating not only a new and more varied range of information, but also a greater range of skills and metarepresentational tendencies, which together can create the conditions under which successful innovation can emerge. It is when we encounter alternatives that we begin to make comparisons and choices: to metarepresent and consequently to innovate.

Our instinct for cooperation makes possible our use of shared languages, which prepare us to receive the information that they transmit. Our capacity for metarepresentation enables us to keep on acquiring and developing new languages; to free information from one code and re-represent it in another; to compare and recombine information across boundaries of culture and discipline, time and space. Artefactual languages, in particular, provide the evolutionary mechanism for a vast depth and diversity of specialist cultural knowledge - and they also facilitate and sustain functional relationships, through which people who have no social connections with one another can nonetheless cooperate across social, geographical and temporal boundaries - creating a conduit through which a greater number and diversity of ideas can flow into one cultural pool.

To repeat: cultural evolutionary theory teaches us that crosscultural or interdisciplinary *cooperation* between diverse cultural *agents* can encourage innovation by creating productive *competition* between cultural *information*.

The very fact that experts from such a wide variety of disciplines were attracted to a symposium convened to address the question, “Is Innovation Evolutionary?” is enough to tell us that the application of evolutionary theory to human culture is gaining momentum. The theory is being taken increasingly seriously by a growing number of academics and practitioners. As I noted in my Foreword to Chinese translation of *The Selfish Meme*, cultural evolution’s explanatory power is already being demonstrated in a way that crosses international and cultural borders.

It is a great privilege to have my work made available in China, and I am immensely grateful to Professor Li Dongmei for her untiring enthusiasm and hard work in translating both this book and The Selfish Meme, and to Professor He Ziran for his support for both projects, who also joined her in translating parts of the two books and did the reading and revising of the final translated versions. The ideas in this book have, so far at least, stood the test of application to every cultural area that I have encountered, and I have no doubt that cultural evolutionary theory will continue to contribute much to our understanding of the origin and development of the unique phenomenon that is human culture.