

*Preface*

## The entangled (and constructed) human bank

All living organisms are active agents, altering through their activities the living conditions in which they and their descendants develop, act and are selected. The reciprocal feedback between organisms' activities and their selective environment is known as niche construction, and a large body of observations and many models point to its ubiquity and evolutionary significance.

Humans are probably the most creative niche constructors on the planet. Their constructions modify the abiotic environment that they inhabit and influence the evolution of the organisms with which they interact as well as their own evolution, including the evolution of traits that we identify as the hallmarks of humanness, such as language. The human niche has ecological, social and epistemic aspects, which make up what we call human culture. Human cultural evolution, the historical change in human culture, involves changes in the intergenerational transfer of ecological legacies, in the reconstruction of developmental conditions, in the transmission of behavioural and symbolic information and in the selective stabilization of practices and preferences. Human cultural evolution is therefore a special and extreme case of niche construction. It is different from other types of niche construction not just in scope but also because it involves deliberate and planned actions that are based on communally shared, virtual (imagined) realities that are stabilized by learning, pedagogy and social conventions. Because human niche construction is often future-oriented, and because it is stabilized by reasoning and by conventional beliefs, the potential range of constructed human niches is enormous. The actual diversification and sophistication of human-constructed environments is a testimony to the special properties of human niche construction.

As the papers in this issue show, there are several overlapping reasons for the usefulness of the niche construction approach to human history and evolution. Firstly, it does justice to the complexity inherent in the misleadingly simple term 'human environment', with its interacting ecological, social and symbolic components. Secondly, it stresses the active role of humans in the construction of their world and their own evolution, highlighting the intricate relations between different aspects of human

existence, for example between social practices and belief systems, which can change on different time scales, can influence and transform one another and can lead to the complex patterns of cultural change that have been documented by sociologists and anthropologists, but have not been captured by conventional evolutionary approaches. Thirdly, ongoing, systematic, niche construction can lead to genetic changes in the niche-constructing species (e.g. human) or the niche-constructed species (e.g. domesticates such as the dog or wheat). Such coevolution of genes and culture that affects the niche-constructing cultural capacities themselves can lead to an increase in the evolvability of culture, something that may explain human-specific cognitive and affective traits. Fourthly, the niche-construction approach provides a unifying theoretical framework for scientists from disciplines as different as ecology, population genetics, archaeology, anthropology, sociology and economics, and thus encourages collaboration among them. For example, ecologists and palaeontologists can document changes in landscapes and species distribution, and correlate them with the changes in human practices documented by archaeologists or anthropologists. Similarly, genetic data contributed by population geneticists can be put together with data gathered by archaeologists and ecologists. Comparative methods and formal models based on assumptions that incorporate niche construction can be used to analyse and evaluate different hypotheses about the reciprocal interactions between human activities and the selective environments. The authors who contribute to this issue show the productiveness and power of the niche-construction approach, and demonstrate how this framework can generate a real dialogue between the different disciplines studying the culture and evolution of our species.

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October 2010

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