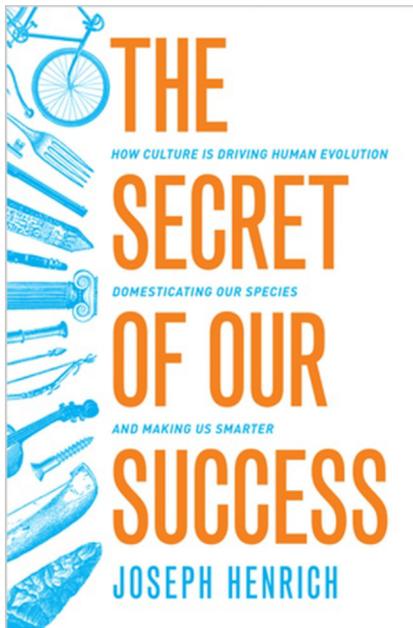


Book Review

Social Evolution and
the Collective BrainKevin N. Laland^{1,*} and
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Humans flourish in virtually all terrestrial environments, in unprecedented numbers for a primate. Yet our bodies are physically weak and digestively fragile, and without specific learned guidance we typically have no idea how to process foods to detoxify them, let alone keep ourselves warm, safe, and free from disease.

Historically, people have tended to assume that it is our ‘innate intelligence’ that explains our success – that we exemplify the superiority of brain over brawn. We read *Robinson Crusoe*, or watch Tom Hanks in *Cast Away*, and delude ourselves that, when challenged by nature, humanity’s raw ingenuity comes to the fore.

Harvard anthropologist Joseph Henrich’s book *The Secret of our Success* annihilates any such delusion. In reality, nature is brutal and unforgiving. Actual cases of

people lost in remote and inhospitable places almost always result in death. Survival arises not from self-reliant ingenuity but via rescue by indigenous people with the knowledge to acquire and provide food, shelter, clothing, and medicine. None of us are born with the natural intelligence to overcome anything but the most benign environmental challenges. As Henrich explains, the secret of our species’ success is not our intelligence, but our culture – the knowledge we learn, add to, and pass on as members of human societies. More so than any other animal, humans pool their knowledge to generate a collective brain infinitely wiser than the smartest individual. Through an iterative process of selective copying, refinement, and recombination operating over millennia, cumulative cultural evolution has steadily built the adaptive knowledge that has taken us from stone tools to space. In turn, natural selection favored genes for building brains tuned to exploit information provided by others, generating a culture–gene coevolutionary dynamic that favored puny bodies, shorter guts, larger brains, and docile personalities.

Vast domains of human physiology, anatomy, and psychology have been shaped by selective feedback from human culture. For instance, learned food processing, control of fire, and cooking skills externalized digestion, allowing humans to evolve smaller guts. The invention of water containers and animal-tracking knowledge allowed selection for an anatomy suited to endurance running. Blue eyes are a side effect of natural selection favoring genes for lighter skin among human populations living at high latitudes reliant on agriculture. Henrich provides plentiful examples of how our ancestors’ cultural activities were a major source of natural selection acting back on our species.

Particularly instructive are chapters on the origin of faith and the impact of kinship norms and taboos on social structure.

Henrich argues that adaptive cultural practices frequently entail multiple steps that are causally opaque. To prepare cassava (manioc) as a safe and nutritious food, for instance, requires an elaborate process involving protracted scraping, grating, washing, boiling, waiting for a period, and then baking. Failure to follow such guidelines results in chronic cyanide poisoning. Such procedures were not invented by a single individual but rather are cultural adaptations fashioned over long time periods through cultural evolution. Henrich argues that the adaptive value of this kind of cultural know-how has favored a predisposition to copy complex procedures, practices, and beliefs blindly, including components that might appear irrelevant. Henrich also shows how kinship norms, taboos, and rituals operate in small-scale societies to forge commitments amongst unrelated individuals and expand social networks, thereby giving rise to larger communities. Such alliances are critical to communities that must survive in the face of pressing and often violent intergroup competition. Evolutionary researchers that remain skeptical of group-selection arguments would be well advised to read the description of how group-level cultural practices determine patterns of evolutionary change. A final eye-opener is Henrich’s illustration of how a cultural evolution perspective offers new insights into one of the thorniest problems in human evolution: language [1].

Henrich’s writing is compelling in no small part because he himself has conducted seminal research on many of the topics surveyed, emerging as the leading light of the intellectual diaspora from Rob Boyd and Peter Richerson’s now dominant school of cultural evolution. He combines sophisticated mathematical modeling with innovative ethnographic fieldwork to the admiration of economists, anthropologists, psychologists, and biologists alike. Henrich’s breadth of coverage across multiple academic fields is truly impressive. Some sections are

speculative (notably the analysis of brain evolution, and of why humans alone exhibit spectacular cultural advances), as Henrich himself acknowledges. However, the readable and engaging text is backed up by detailed notes and references, and some level of speculation seems appropriate in what is an 'ideas' book.

Henrich undermines the traditional account of human evolution in which standard genetic evolution culminates in an explosion of innovation 10 000–50 000 years ago, and then essentially stops as culture takes over. Culture–gene coevolution has almost certainly dominated human evolution for hundreds of thousands, and perhaps millions, of years. He also illustrates the implausibility of evolutionary psychologists' claim that humans possess an 'improvisational intelligence' that allows them to solve adaptive challenges on the fly [2]. Culture is what makes us smart, and social learning is essential for human adaptation [3,4].

We particularly appreciated Henrich's discussion of genes and races. Some early instantiations of culture–gene coevolution contentiously suggested that genetic differences might underlie 'racial' variation in cognition [5]. In contrast, Henrich rejects any biological concept of race, and shows how culture–gene coevolution operates in nonconcordant ways within races to make local groups less similar (e.g., variation in lactose tolerance in physically sympatric African peoples with different pastoral histories) whilst at the same time making people in different continents more similar (e.g., amylase genes responding to high starch diets in Japanese and Americans). For Henrich, variation in the productivity of societies relates to differences in group size and connectivity, not differences in ability.

We find little with which to take issue in Henrich's thesis. Perhaps Henrich could have placed greater emphasis on the possibility that the learning strategies

deployed by humans (e.g., prestige bias, conformist transmission) might themselves be learned (i.e., that people learn when, from whom, and how best to learn). The rapidly accumulating data on animal cultures suggests that culture–gene coevolution may not be the unique preserve of humans [6,7]. The absence of Kristen Hawkes' work in the discussion of menopause will raise some eyebrows [8]. Finally, Henrich arguably overplays the 'it's not our intelligence' card. We do not dispute that 'culture makes us smart', but the evidence showing that humans sometimes perform worse than chimpanzees in cognitive tests is, as he readily admits, thin and contentious. One problem here is that our species is so culture-dependent that there can be no meaningful concept of 'innate intelligence' freed from cultural influence, which leaves fair comparative experimental tests challenging to conduct, and makes it difficult to parse evolved and socially learned cognitive differences between humans and other species. However, these are nit-picking points, which do not run counter to Henrich's general arguments. *The Secret of Our Success* is a marvellous book, destined to become a core text in human evolution studies and to establish its author as an important contemporary thinker.

The Secret of our Success: How Culture is Driving Human Evolution, Domesticating our Species, and Making us Smarter by Joseph Henrich, Princeton University Press, 2017. US\$29.95, £24.95 (hbk), 464 pp. ISBN 978-0-6911-6685-8

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References

1. Kirby, S. (2017) Culture and biology in the origins of linguistic structure. *Psychon. Bull. Rev.* 24, 118–137
2. Pinker, S. (2010) The cognitive niche: coevolution of intelligence, sociality, and language. *Proc. Natl. Acad. Sci. U. S. A.* 107, 8993–8999
3. Richerson, P.J. and Boyd, R. (2005) *Not by Genes Alone*, University of Chicago Press
4. Boyd, R. et al. (2011) The cultural niche: why social learning is essential for human adaptation. *Proc. Natl. Acad. Sci. U. S. A.* 108, 10918–10925

5. Wilson, E.O. (1978) *On Human Nature*, Harvard University Press

6. Whitehead, H. and Rendell, L. (2015) *The Cultural Lives of Whales and Dolphins*, University of Chicago Press

7. Laland, K.N. (2017) *Darwin's Unfinished Symphony: How Culture Made the Human Mind*, Princeton University Press

8. Hawkes, K. et al. (1998) Grandmothering, menopause, and the evolution of human life histories. *Proc. Natl. Acad. Sci. U. S. A.* 95, 1336–1339

Letter

Neglect of the Tropics Is Widespread in Ecology and Evolution: A Comment on Clarke *et al.*

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One Sentence Summary

Neglect of the tropics is a widespread problem across ecology and evolution, and not specific to the field of biodiversity and ecosystem function.

In a recent paper, Clarke *et al.* [1] present evidence for a bias against the tropics in studies of biodiversity–ecosystem function (BEF). Unfortunately, BEF is not the only field in ecology and evolution that suffers from gross geographical sampling biases; rather, this is just one example of a more widespread lack of studies from the tropics that needs to be recognized and accounted for – especially in the face of growing conservation challenges.

What Is Tropical?

Surprisingly, a clear definition of what constitutes tropical versus non-tropical ecosystems does not exist. This may seem illogical to many ecologists and evolutionary biologists given the existence of strict latitudinal boundaries relating to direct solar exposure (e.g., between 23.4° North and South of the equator; the