

REVIEW ARTICLE



A tale of two processes: On Joseph Henrich's *The Secret of Our Success*: How culture is driving human evolution, domesticating our species, and making us smarter

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The secret of our success: How culture is driving human evolution, domesticating our species, and making us smarter, by Joseph Henrich, Princeton, NJ: Princeton University Press, 2015, 464 pp., \$65.00 (hardback), ISBN 0691166854

ABSTRACT

We situate Henrich's book in the larger research tradition of which it is a part and show how he presents a wide array of recent psychological, physiological, and neurological data as supporting the view that two related but distinct processes have shaped human nature and made us unique: cumulative cultural evolution and culture-driven genetic evolution. We briefly sketch out several ways philosophers might fruitfully engage with this view and note some implications it may have for current philosophic debates in moral and political theory and over the nature of extended cognition. We end by noting how Henrich's view of the source of cultural design and innovation, and the prominence of place he gives to the extended process of cultural evolution, cuts against a cluster of broad but common views about human minds, recasting putative bugs as features and indicating that many of the distinctive features of our individual minds evolved to allow them to be effective cogs in the larger, more productive cultural machine.

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Obviously a name like *The Secret of Our Success* (*TSoOS* hereafter) invites some immediate questions. The book's subtitle answers the "who" question: "our" success is that of the entire species, *Homo sapiens*. The term "success" might raise not just questions but objections from those who see in the positive valence of the term some kind of moral commendation. Thankfully such misunderstandings are headed off early on, when the scope of "success" is limited to characterize our species' "vast ecological dominance" (p. 15), a particular kind of evolutionary

achievement.¹ But of course the first and main question that leaps to mind is almost certainly “what’s the secret?”. Happily, the pillars of Henrich’s answer are simple enough fit on a T-shirt: culture and cooperation. Better still, his careful elaboration and skillful defense of this answer, along with his articulation of a vision of human nature and the processes that produced it, make for a superbly thought provoking book, one that is far-ranging, frequently persuasive, and sneakily radical.

Or so we will argue. To get into a position to appreciate the radical strand in the book, which turns on a subtle inversion of the usual way of understanding the relation between the minds of individual people and the collective activities they enable, we need to lay out the basics first. And so: a more orthodox reading of *TSoOS* would start with the fact that it is the latest book in a fairly continuous line of research that uses evolutionary tools to study human behavior, cognition, and culture. Henrich adopts an approach based in dual inheritance theory, which holds that humans are the products and beneficiaries not just of a genetic system of information transmission and accumulation but also of a cultural system whose contents also evolve in the face of selective pressures, sharing many properties with the genetic system but bearing some of its own unique features as well. Henrich holds that these inheritance systems operate in parallel but not in isolation from one other, with each exerting complicated forms of influence on the other in a “coevolutionary duet” (p. 61). He describes the most important type of interaction between the two as culture-driven genetic evolution. Indeed, he states: “The central argument in this book is that relatively early in our species’ evolutionary history ... cultural evolution became the *primary driver of our species’ genetic evolution*” (p. 57). Henrich marshals new evidence in support of this claim, adding interesting innovations to the framework that he inherits from his intellectual forebears.²

On this orthodox reading, *TSoOS* is “merely” an outstanding addition to this tradition, an important step forward in a thriving research program. Its immediate predecessor is Richerson and Boyd (2005) book *Not by Genes Alone*, which would make an excellent companion piece. Like *Not by Genes Alone*, *TSoOS* succeeds in handling the delicate tradeoffs involved in writing for both the novice and the specialist. It will function well as a comprehensible entry point for the interested layperson, introducing her to current work on human evolution and cognition while serving up an opinionated but plausible big picture take on where we come from and what makes us unique, without getting bogged down in jargon or contentious minutia. On the other hand, *TSoOS* will also be useful to students and practitioners, not only for the encyclopedic bibliography it draws upon, which runs over 50 pages of small print, but for providing an overview of the state-of-the-art, organizing and synthesizing research that spills across the traditional boundaries between subjects, often employing the methods of and finding significance in the data gathered by a wide range of disciplines. While *Not by Genes Alone* was similarly accessible and interdisciplinary, it made its case mainly by explaining results derived from mathematical models – one of the

foundational technical innovations of the approach was to take models initially developed for population genetics and apply them to the phenomena of culture – and conceptual arguments, especially those that brought population thinking to bear on human behavior. What rigorous empirical work was then available served mainly to punctuate discussions anchored by the conceptual and mathematical arguments. *TSoOS* does not abandon this but rather builds on it, and Henrich is at his best when he is integrating huge amounts of empirical evidence, showing the reader how results concerning the chemistry of food preferences (chapter 10) or the cultural variation of behavior in economic games (chapter 11) fits into the same framework as data about the anatomy of long distance running (a particularly fascinating discussion in chapter 5) or about the evolutionary importance of in-laws (chapter 9). Henrich’s overall discussion foregrounds the wealth of data gathered in the last decade, especially showcasing the results of new laboratory and field studies.

Early on, he tells some tales of lost European explorers, individuals or small bands of putatively sophisticated pioneers who are rendered helpless when they become lost for too long in some unfamiliar terrain, where their lack of useful local cultural knowledge often proves fatal. These stories help him introduce another of his main take home messages, that one way we differ from other animals is that much of our survival wherewithal does not reside in any “specialized mental abilities” or the “raw, innate, intelligence” of a single human mind. While there is a sense in which human intelligence is greater than that found in other animals, contrary to a dominant and perhaps intuitive view, that intelligence does not lie in “our individual brainpower” (p. 2). In place of high-powered problem solving capacities of individual people or the innate, domain specific mental modules that populate their minds, Henrich puts forward a view that sees strength in numbers:

The secret of our species’ success resides not in the power of our individual minds, but in the *collective brains* of our communities. Our collective brains arise from the synthesis of our cultural and social natures – from the fact that we readily learn from others (are *cultural*) and can, with the right norms, live in large and widely interconnected groups (are *social*). (p. 5)

The book’s main line of argumentation for this view is a nested set of inferences to the best explanation. The global explanatory target is of necessity sprawling and fuzzy around the edges, but as mentioned above it centers on us: why and how have we become so smart, so ecologically dominant, so technologically advanced, and why has this happened to us but not any other species? But Henrich also demonstrates precision and command of detail when focusing on more specific aspects of our success. He turns up the resolution on different facets of human nature in different chapters of the book, where he explains, for instance, how our hands and their precision grip evolved to allow more dexterous construction and use of tools (p. 71 and 292), how, having slowly become more proficient at and reliant on cooking, we have reached the point where “our bodies have been shaped by fire and cooking” and “we are now, essentially, addicted to cooked food”

(pp. 67–69), and how our increased reliance on language has “shaped both our anatomy and psychology” (p. 232).

Fascinating as each of these explanations is on its own terms, a further layer of plausibility accrues to each, and to the theoretic framework that unites them, as Henrich fits each successive case into his larger picture, thus gradually but forcefully demonstrating the power and scope of the approach. It is pleasingly “meta” that a book so committed to the idea that processes that slowly accumulate small, local results can bring about substantial, even extreme, global effects operates via essentially the same principle; *TSoOS* shows even as it tells. It is also fitting, because the real stars to emerge as the book proceeds are a pair of distinct but related processes at the heart of its explanatory apparatus.

One of these is the process of cultural evolution. Roughly, humans are natural born imitators, which allows them to easily learn from each other, and as cultural variants – words, beliefs, preferences, norms, skills, rituals, procedures, or any other kind of behavior affecting information that is acquired socially – are transmitted between people, some of those variants are more successful than others, replicating more, spreading faster, and surviving longer. As humans grew more psychologically sophisticated, cultural variants began to accumulate over time, which generated a familiar survival-of-the-fittest type competition among them; thus, changes in the distribution of cultural variant frequencies throughout a population can be understood and modeled as a form of evolution. While theorists who adopt this picture explore different aspects of it, the angle that Henrich takes is particularly suggestive. He very deliberately conceptualizes cultural evolution as a process, which allows him to emphasize that it is one that does not take place entirely in the head of any individual person, but is rather extended, smeared out across populations and between generations. Moreover, it is that extended process, and not merely any of the individuals that support it, that pieces together cultural variants into more complicated composites. He makes the analogy to natural selection explicit:

At least since the rise of cumulative cultural evolution, natural selection has lost its status as the *only* ‘dumb’ process capable of creating complex adaptations well fit to local circumstances. ... cultural evolution, through the selective attention and learning processes ... is fully capable of generating these complex adaptive products, which no one designed or had a causal mental model of *before* they emerged. (p. 114)

The prowess of individual people and their own personal brains pales in comparison to the “collective brain” of interconnected, cooperating groups and the cultural evolutionary process they support, and it is the process that often does the designing, gradually assembling packages of complex cultural adaptations. We will return to this below.

The second process is culture-driven genetic evolution. As culture increased in both volume and importance, it produced pressures selecting for features of humans that allowed them to more effectively exploit culture. Henrich holds that “the *central force* driving human genetic evolution for hundreds of thousands of

years, or longer, has been cultural evolution” (p. 316), and this view shapes how he structures the book, as he makes explicit in his closing argument:

Rather than picking a particular product, like language, cooperation, or toolmaking, and then backing out an evolutionary story, I began this book by focusing on a type of *evolutionary process* – culture-gene coevolution – and then sought to track down its implications for our species. The answer to why humans are different is that we crossed the Rubicon. ... we seem so unique because no other living animal has gone down this road ... thus *the key to understanding our uniqueness lies in understanding the process*, not in highlighting particular products of that process, like languages, cooperation, or tools. (p. 317, emphasis added)

Henrich uses the apt metaphor of crossing the Rubicon to capture the initial sparking of this autocatalytic process, the setting into motion of a positive feedback loop, where improvements in cultural wherewithal boost the reliance on and thus importance of culture, which selects for further improvements in cultural wherewithal, and so on.

Some of the genetically controlled features selected for by this process were anatomical: the precision grip mentioned above, the reshaping of our larynx and throat to allow for better verbal communication, and the installation of a “suite of adaptations that make us stunning endurance runners” (p. 75). This last example makes a particularly vivid illustration of the sorts of complex, boundary straddling adaptations the “coevolutionary duet” can produce. Human sweating is the output of a unique and sophisticated biological thermoregulatory system that evolved to keep brains cool as early humans jogged after prey until it collapsed of exhaustion, or at least became weary enough to let down its guard. But as much of an engineering marvel as this thermoregulatory system is, it seems to suffer from a glaring defect, namely the lack of a storage container. Unlike other animals like horses or camels, human bodies are unable to consume or store the large amounts of water needed to complete those long chases. What gives? “How can this crucial element be missing ... is our otherwise elegant running design fatally flawed?” (p. 74). According to Henrich, the solution to this puzzle is that early humans, much like joggers in contemporary cities, were able to carry their water in external containers, or knew where to find sources of it in the environments they moved through. He points out that this “reasoning suggests that the evolution of our fancy sweat-based thermoregulatory systems could take off only *after* cultural evolution generated the know-how for making water containers and locating water sources in diverse environments,” and that our broader distance running abilities are “actually part of a coevolutionary package into which culture delivered a critical ingredient, water.” (pp. 74–75). In cases like this, human anatomy, chemistry, and biology have been shaped to “expect,” and seamlessly interlock with, human culture.

Even more striking, and perhaps more philosophically interesting, are the effects of this process on our psychology. Human capacities for social learning, grounded in our hypertrophied imitative tendencies, are unmatched in other animals, and Henrich describes the likely origin, character, and importance of

these tendencies throughout the book, also filling in detail about the crucial role of different attentional biases that influence them. We are also linguistic creatures, and while the provenance of our language capacities and the extent to which they are uniquely human remains controversial, Henrich's discussion of "grammaticalization" embeds the relevant issues in his framework, showing how "cultural evolution could gradually increase the complexity of a simple protolanguage by incrementally adding grammatical rules and tools to its stockpile of words" (p. 245 and the rest of chapter 13).

That discussion builds on earlier chapters that center on the importance of other kinds of rules, namely social norms, and the normative psychological capacities we have evolved to acquire, cognize, and behave according to them (see also Chudek & Henrich, 2011; Chudek, Zhao, & Henrich, 2013). These are crucial to our distinctively human forms of cooperation, our so-called ultrasociality, in at least three ways. First, they are ingredients of the self-domesticating cycle that has made individual humans docile and prone to conformity (and perhaps continues to – as Henrich notes at one point, autocatalytic processes like these "will continue until halted by an external constraint" [p. 57]). Some aspects of current human nature will be the products, unexpectedly, of "survival of the friendliest" (Hare, 2016). Second, the reliance on culturally acquired social norms allows for considerable variation in social organization from one group to the next, as different groups settle on different stable sets of traditions or arrange and regulate themselves in ways adjusted to the different habitats they occupy. This variation, in turn, opens the door to a unique form of group selection, one that operates not on genes but on cultural variants themselves, including the clusters of social norms and institutions that bind individuals to groups, knitting them together into coordinated, cooperating collectives rather than mere aggregates of individuals. Groups with more effective norms and cohesive institutions will usually outcompete, out survive, or simply absorb members of groups with less effective cultures, and those absorbed will assimilate by adopting the customs, habits, and normative sensibilities of their new group. We cannot help but wonder what sustained attention to the details of this account might reveal that could usefully inform philosophers' understanding of moral progress and moral decay. For example, some initial work that takes this tack raises questions about what the kind of cultural evolutionary perspective defended by Henrich implies for traditional conservatism and the feasibility of intentionally guided moral progress (see Buchanan & Powell, 2015, 2016; Kling, 2016.) Given how complicated, numerous, and intricately intertwined all of the different components are, attempts to initiate changes to the social order or the moral codes that govern it, the conservative argument goes, are more likely to go awry in unforeseen ways than produce improvement or genuine progress. Henrich's emphasis on the ability of the process of cultural evolution to design products, including complex social institutions, whose virtues and functions we individually and collectively often fail to completely understand appears to give

strength to the conservative view. Whether or not this is correct is an extremely interesting and as-of-yet unsettled question.³

Finally, this view suggests a two-tiered picture of human moral psychology interestingly different from the by now familiar family of dual process models.⁴ On this picture, the first, more ancient tier contains mechanisms and “social instincts” we share with a host of other animals, mechanisms that are shaped by and operate according to the dynamics of kin and reciprocal altruism. Distinct from but existing sometimes uncomfortably alongside these are more modern, uniquely human tribal social instincts; as Henrich puts it, “culture made us the only tribal primate” (p. 163). These are shaped by and operate according to the dynamics of living in larger cooperative groups that include many non-kin and many who do not share any history of personal interaction with or reputational information about each other. Humans are able to navigate such situations in virtue of our tribal psychology, the components of which include an ethnic system that sensitizes us to cues that provide information about group membership and social position, on the one hand, and a normative system that helps us acquire norms and guide our behaviors, calibrating them to suit the specifics of the particular interaction and its participants, on the other. The utility of this kind of behavioral flexibility, and of being susceptible to social influence in ways that can fashion and fine-tune behavior, is not limited to any particular domain, and so it is not surprising that humans can also learn norms and rules that go beyond cooperation and social interaction, including those that govern how to prepare food, how to assemble complex artifacts, or how to form communicatively efficient, grammatical sentences.

This also seems like a rich vein to mine, especially for moral, social, and political philosophers. Particularly worth investigation is the suggestion that these ancient and tribal “instincts” not only coexist in modern human nature, but, in operating by different principles, can and do find themselves in conflict with each other, and in ways that might be reflected not just in the breast of the individual, as it were, but also in the dynamics of the group, and in the kinds of social regularities that the different sets of psychological mechanisms support and resist. For instance, the two-tiered account might be useful for those examining how social norms and collective behaviors are susceptible to change. A better understanding of the different kinds of motivations and attitudes the different types of “instincts” are likely to produce, along with a better understanding of the different types of physical situations, social arrangements, interpersonal interactions, and visual and linguistic cues that are likely to activate each, might lead to a better sense of when the two families of mechanisms are likely to come into conflict with each other, and of what kinds of targeted interventions are likely to make more or less effective nudges.⁵ The two-tiered account may also be relevant to the literature on evolutionary debunking arguments of morality. At the very least, the existence of an evolutionarily deep division between the ancient and more recent tribal mechanisms driving social behavior raises a *prima facie* obstacle to philosophical work that uses an overly broad conception of “the” evolution of morality, understood

as a single, cleanly delineable, and relatively uniform phenomenon. The division militates against such global approaches and instead seems to favor more piecemeal and selective attempts to use empirical and evolution-based work on human moral psychology to inform debates in ethics and metaethics.⁶

TSoOS itself is not a book of philosophy in the standard sense, but we have been highlighting claims that seem to be brimming with implications for issues dear to the more traditional philosopher's heart. Judging from both the discussion and its location in the overall layout, to the extent that Henrich takes his book to have a grand upshot, it seems to be his more detailed (and so more speculative) answer to how and when humans crossed the Rubicon. We leave those details, produced in chapters 15 and 16, for readers of the book to pore over, and will instead point out that on one recent and agreeably inclusive conception of what it is, "Doing philosophy is largely a matter of trying to *put things together*, trying to get pieces of very large puzzles to make some sense" (Godfrey Smith, 2016, p. 12). By this yardstick, *TSoOS* is not just a science book, but also a resoundingly philosophical work. Perhaps most emblematic of this is the 12 box, 21 arrow chart that takes up most of page 300, juxtaposing the sociality-care pathway – which maps out the causes and benefits of expanded kinship networks – next to the know-how pathway – which maps out the causes and benefits of improved capacities for social learning.⁷ The puzzle is grand and Henrich is working with lots of pieces.

In fact, in a different, less aphoristic metaphilosophical discussion, Godfrey Smith articulates another useful way to think about the philosophical significance of this book. He makes a tri-partite distinction between science (whose focus is on the world), the philosophy of science (whose focus is not on the world but on science itself), and the philosophy of nature, whose focus is back on the world again, but as viewed through the lens of science. This last division amounts to

the project of taking science as developed by scientists, and working out what its real message is, especially for larger questions about our place in nature. ... So we aim to use scientific work to inform our view of the world, but we do not determine this view using science in its 'raw' form. Instead we take the raw science on a given topic and work out, philosophically, what exactly the work is saying. ... So philosophy of nature refines, clarifies, and makes explicit the picture that science is giving us of the natural world and our place in it. (Godfrey Smith, 2011, p. 3)

Philosophy of science that takes the newly emerging special science of cultural evolution as its subject matter is already its own nascent subdiscipline, and as it continues to grow, Henrich's book will be a must read, almost certainly occupying a central place in the discussions to come.⁸ We suspect it will be just as critical to future work in the philosophy of nature vein as well (e.g. Downes & Machery, 2013).

None of this is to say that the book is beyond reproach. Given the sheer volume of studies it covers, some are bound to be overturned when the scientific process course-corrects, as it tends to do when it is working properly, and inevitably details of Henrich's interpretation of those that hold firm will be contested by others. Even some of the more global framing devices can be challenged. For instance,

some might take issue with Henrich's choice of "collective brain" to characterize the larger, group level networks and patterns of interpersonal connectivity that allow humans, when working together, to reach such great heights. Brains, the complaint might begin, are concrete particulars, if not paradigmatic examples of medium-sized dry goods (wet goods?), at least clear instances. Brains are uniquely complicated kinds of biochemical machines to be sure, but they are easily identifiable physical organs with fairly clear boundaries, at least from the point of view of our intuitive ontology. More to the point, whatever their collective cognitive powers, societies and firms and tribes and traditions of course do not have literal group brains, but talking as such could invite confused analogies exactly where clarity is needed most, and thus obscure the interesting and important differences between the "intelligent" processes realized in actual brains and those enacted by collectives that are spread out over relatively large chunks of both space and time. Even by Henrich's own lights, while individual brains are important contributors to humans' collective smarts, to the process of cultural evolution and the dynamics that stabilize social organization, they are far from the *only* important components. Failure to introduce some memorable terminology to highlight and keep attention trained on the supporting scaffolding and other, less tangible or at least less obvious components feels like a missed opportunity. But it is an opportunity that others might seize; indeed, philosophers working on distributed cognition, group agency, and collective intentionality and responsibility will have much to offer here, and will find much to engage with in return.⁹

Or on another front, one could challenge the claim that humans have in fact established a "vast ecological dominance," noting that it is only true relative to some comparison classes, and its plausibility might derive from an unwarranted animal-centric chauvinism. Plants, on the other hand, not only do all of the work of generating atmospheric oxygen and converting the energy of the sun into a form usable by us animals, but they also, for all of our agricultural, industrial, and technological revolutions and their resulting disruptive effects on the environment, still make up an estimated 99.7% of the biomass on the planet.¹⁰ Adopting this perspective suggests the idea that we are the most important or dominant form of life on earth is, at the very least, an expression of narcissism. Determining whether or not that perspective would also show the idea to be misleading enough to damage Henrich's claims about cooperation, culture, and human nature closer to the heart of the book would require more sustained philosophical scrutiny.

TSoOS deserves the attention. Indeed, we have registered some complaints, but perhaps they are so shallow as to border on being churlish; obviously we do not intend them as devastating criticisms. Rather, we offer them as a few more conversation starters – enticements to encourage philosophers of all sorts to read the book itself. It is almost indescribably rich, and we have only been able to scratch its surface here.¹¹ We have tried to give a sense of its architecture and some of its most intriguing claims, and we will end by making one more point in that spirit, elaborating on what we have come to think of as the radical reading.

As Henrich develops the framework he inherits, he returns to one specific thread again and again, working it out a little more each time, and as he does so the reader catches glimpses of an upshot of the theory that was not clearly visible in earlier presentations. The book portrays many of the unique aspects of human cognition as serving, essentially, interdependence and interface functionality, that is, having evolved in the face of pressures selecting for the ability to sync up with others in ways appropriate for different collective activities. These have a somewhat different flavor than the usual suspects, the types of capacities typically advanced as representing the pinnacle of human cognition, for example, the hallmarks of individual genius like problem-solving prowess and creative firepower, or whatever virtues are distinctive of moral exemplars and those possessed of the most incisive understanding and soundest judgment. Indeed, on the radical reading, many of our unique psychological capacities may even work against common ideals associated with self-reliance, such as establishing a distinct identity or achieving basic personal autonomy, because the main purpose of those capacities is to allow us to fluidly mesh with others, making us effective nodes in larger networks.¹²

Worse, those larger entities in which we individuals are designed to be but small cogs include not only groups whose members live together and cooperate with each other on a relatively short span of time, but also a cultural evolutionary process that spans generations. As we have seen, Henrich holds that it is primarily this process, rather than solitary creative inventors, that deserves credit for the creation of complex cultural adaptations such as complicated physical artifacts like kayaks, but also languages and hunting strategies and family structures and social institutions: for the most part, individual people don't design things; the *process* of cultural evolution designs things. It is the goose that lays the golden eggs.

Henrich makes this point nicely with the example of manioc, a kind of tuber that contains small but dangerous levels of toxins, enough to cause chronic cyanide poisoning if untreated manioc is a regular staple of one's diet (p. 97). The Tukanos of the Columbian Amazon have developed a long processing technique to prepare their manioc, a technique, holds Henrich, that no individual developed on his or her own, but that was assembled by cultural evolution operating over the years. Moreover, the technique serves to neutralize the toxins in the manioc, rendering it edible and harmless – and it does so even if no individual Tukanos realizes that it is performing this crucial function. Describing this example and others, he states:

As a product of this long-running duet between cumulative cultural evolution and genes, our brains have genetically adapted to a world in which information crucial to our survival was *embedded implicitly* in a vast body of knowledge that we inherit culturally from previous generations. This information comes *buried in* daily cooking routines (manioc), taboos, divination rituals, local tastes (chili peppers), mental models, and tool-manufacturing scripts (arrow shafts). *These practices and beliefs are often (implicitly) MUCH smarter than we are*, as neither individual nor groups could figure them out in a lifetime. ... this is also true of some institutions, religious beliefs, rituals, and medical practices. ... Often, *people don't even know what their practices are actually doing, or that they are "doing" anything.* (p. 112, emphasis added)

Some of the effects on our psychology of this subtle inversion of primacy, the replacement of the individual mind with the collective process to which it is subservient, are also unsettling. What might first appear to be bugs, or design flaws in our minds, often turn out to be strengths, features that serve not necessarily the individual but the collective, specifically the process of cultural evolution. Henrich argues (p. 108) that what psychologists call “overimitation” is misnamed: individuals who err on the side of copying “too much” of a cultural parent’s behavior make for a more effective cultural evolutionary process. Indeed, on the radical reading, even ignorance is often functional. In a section called “Game Theory and Divination” that describes how use of bird auguries serves to randomize, and thus covertly optimize, hunting patterns, Henrich underlines the importance of the fact that many of the products of cultural evolution are “causally opaque” to us, claiming it as “a key point: not only do people often not understand what their cultural practices are doing, but *sometimes it may even be important that they don’t understand* what their practices are doing or how they work” (p. 106, emphasis added).¹³

Of course there will be tradeoffs involved, since total ignorance would be catastrophic. Henrich does not claim that individuals are completely oblivious or deny that people possess psychological abilities that are useful to the individuals that possess them. But he suggests that even in many of these cases the improvements in the cognitive sophistication of individual minds were selected for because they helped the *process* of cultural evolution operate more effectively and efficiently. For instance, he endorses “the cultural-intelligence hypothesis” (p. 51), an account of why human mentalizing capacities have evolved to be more sophisticated than those we find in other species: not so that people can protect themselves against exploitation in the move/countermove dynamics of a continually escalating Machiavellian game of deception and manipulation, but rather to improve social learning. Being able to infer what someone is thinking makes it easier to understand what they are doing, which makes it easier to copy them, which in turn facilitates cultural transmission and, over time, the accumulation of complex design; cultural evolution has thus become the driving force shaping our mindreading capacities. Henrich also argues (p. 71) that our intuitive artifactual cognition, so different from the folk biological cognition that guides our intuitive reasoning about living things, was selected for because it allows us to reverse engineer the products of the cultural evolutionary process. This allowed us to better discern the purpose of artifacts, and thus create causal models of them, which in turn allowed us to gradually improve upon them, with advances usually taking the form of small innovations. That said, causal models can be useful for understanding not just the operation of artifacts but of phenomena in the natural world as well, and the most insightful and sophisticated causal models are likely to be those that are themselves gradually assembled by the process of cultural evolution, with the most far-seeing contemporary innovators standing on the shoulders of the giants who came before them.¹⁴

But the overall picture is still disquieting. It certainly goes against the common, though overly-simplified-even-when-not-outright-apocryphal mythology surrounding invention – Edison invented the light bulb, Bell the phone, Carver peanut butter – and at least sits uneasily with the Cartesian notion that our minds are the one thing we know best. More than anything, it strikes us as weirdly alienating. On the radical reading, natural selection is no longer the only game in town, and the cultural assembly line that can also gradually produce design also spans generations. This process, though, is supported not just by some low level biochemical magic of double stranded helixes, but has built and continues to run straight through our own minds, even if we haven't realized it. That we often don't fully know what the process is doing, or in some cases how the packages of cultural adaptations that it pieces together really work, seems on target but disconcerting. The radical reading dispossesses us of a sense of familiarity with ourselves, suggesting that we have failed to fully grasp what is a primary function of our own minds, a function that reveals them as subordinate to what does the real work, namely the distributed, "collective brain" of cultural evolution. We persons are just ephemeral, replaceable parts in a process that pre-dates, outlasts, and uses but spans far beyond each of our individual heads.¹⁵

This would seem to situate Henrich's book in the genre of displacement narratives that have been slowly chipping away at a comforting Western self-conception, one that exalts the centrality of human consciousness in the cosmos. Copernicus and Darwin removed humans from the center of the physical and biological worlds; Freud made the initial case that consciousness contains but the tip of the behavior guiding iceberg; Dawkins¹⁶ painted individual organisms like us as lumbering robots, survival machines for more primary genes and memes; and a recent addition to the genre holds that our brains make decisions before we're aware of them, leaving us only with the cleanup job of spinning socially acceptable rationalizing stories after the fact.¹⁷ On the radical reading, *TSoOS* should take its place among these, all of which have in common that in one way or another they undermine our sense of ourselves as being central and in control, or of the importance of our individuality – each upsetting, in its own way, the Enlightenment story that makes the person and individual human mind the most significant thing.

Perhaps Henrich overplays his hand here (or more likely we are overplaying Henrich's), but even if so, we think the picture suggested by the radical reading we have sketched is worth exploring. After all, there is dialectical value in formulating the most extreme version of a view to see where it leads, how defensible it is, and where exactly it goes wrong if it does. In any event, if, as suggested above, one vital task of philosophy is to refine, clarify, and make explicit the picture that science gives us of ourselves and our place in the world, this radical reading and the book from which we extracted it together give us a mass of rich material to sift through, and the outlines of a picture that is alternatively compelling and jarring, and certainly demands to be reckoned with.

Notes

1. And it is certainly not the only kind. Humans' inordinate, alarming, and destabilizing success as measured by our facility at occupying and altering so many different types of habitat far outstrips our less impressive accomplishments as measured by, for instance, longevity and staying power. We are relative newbies, and have been around for only the briefest of evolutionary moments even compared to many of the species with which we currently share the planet.
2. See the first chapter of Paul (2015) for an accessible account of the history of this approach that traces it from Darwin through Cavalli-Sforza and Feldman, Dawkins, Campbell, E.O. and D.S. Wilson, to Boyd and Richerson).
3. We are thankful to Victor Kumar for pressing us on this point.
4. For more on the use of dual process models in moral psychology see, for example, many entries in Doris and The Moral Psychology Research Group (2010), especially Kushman and colleagues' "Multi-system Moral Psychology."
5. See Boyd and Richerson (2008) and Richerson and Henrich (2012) for more on the contrast between ancient and tribal social instincts, as well as its relevance to the functioning of social institutions. Sterelny (2014) and Paul (2015) also defend similarly two-tiered pictures, but each provides his own twist and emphasis. Thaler and Sunstein (2009) coined the term "nudge" and draw on behavioral economics for inspiration; Bicchieri (2016) focuses on ways to alter collective behavior by trying to change not official, explicit laws, but rather social norms, the less tractable, unwritten rules that organize much behavior.
6. See Kelly (in press) for an opinionated take on global versus selective approaches to debunking; compare Machery and Mallon (2010) and Joyce (2016).
7. The chapter "Why Us?" in which this chart occurs is in many ways the culmination of the entire book, and so is difficult to neatly summarize, but the illustration nicely depicts Henrich's currently best guess at how different, relatively local, and individually distinguishable factors, each represented by its own box, might have interacted with and influenced each other, with each important interaction represented by its own arrow, to produce the result that early humans were able to begin reaping the benefits of cumulative cultural evolution and thus head off down a unique evolutionary pathway dominated by culture-driven genetic evolution. The previous chapter 15, "When Did We Cross the Rubicon?" provides much of the set up for this chart while also staking out claims about the historical timeline and sequence of major events in human evolution; pages 284 and 285 present them in table form.
8. The Society for the Study of Cultural Evolution was formed last year <https://evolution-institute.org/project/society-for-the-study-of-cultural-evolution/>, and "Cultural Evolution" recently got its own entry in the Stanford Encyclopedia of Philosophy (Lewens, 2013). For influential early efforts that take up philosophy of science type issues surrounding cultural evolution, see Hull (1982), Sober (1991), and Sterelny (2006), and for more recent work see Ramsey (2013) for an explication of the notion of culture, Ramsey and De Block (2015) for an examination and defense of the idea of cultural fitness, and Lewens (2016) for a new book-length overview of a variety of foundational and conceptual topics. Sterelny (2012) manages to artfully balance both philosophy of science and philosophy of nature, though his main concerns seem to lie closer to the later.
9. It is of course also a common view that brains are not the only thing, biological or otherwise, that can realize genuine intelligence and mentality. But brains do already soak up extraordinary amounts of theoretical attention, and there seems no reason to

- add to it, especially if some of the most interesting claims in the offing have to do with alternative ways intelligence *actually is* realized and counterintuitive ways that design and innovation *actually is* produced. On this last point, in addition to the material in the book, see Muthukrishna and Henrich (2016) and Sterelny (2016).
10. See Mancuso and Viola (2015, p. 123) for the statistics on biomass, and the entire book for a lucid case that, though it is difficult to see through our speciesist biases, plants qualify as mobile, sensing, and intelligent forms of life, and that they qualify despite not having brains or any other recognizable, functionally localized organs of the sort common to animals. Rather, Mancuso and Viola argue, plants have cognitive capacities that work on a somewhat slower time scale than our own, and are realized in networks distributed across their bodies, especially their root structures.
 11. One strand we do not have the space to give the attention it deserves is the case Henrich makes that the familiar opposition between biology and culture is untenable. For instance, he shows that culture affects anatomy, physiology, even chemistry, and that cultural influence can produce measurable *biological* differences – even in something as unsocial and deeply subjective seeming as the way wine tastes or the kinds of faces one finds attractive – that are nevertheless not *genetic* differences (see especially chapter 14).
 12. Or perhaps this radical reading only appears to be at odds with certain ways of *understanding* personal autonomy, namely those that derive from the tradition found in, for example, Kant and more recently Rawls. The radical reading that we are describing may be quite well suited to the kinds of relational and dialogical accounts of autonomy that have recently been explored from perspectives based in feminist thought (Stoljar, 2015) and empirical psychology (Doris, 2015). Alternatively, perhaps we are on a pathway that ends in us all slowly melding together into The Borg. Henrich does not discuss this possibility explicitly, though he does suggest that “humans are undergoing what biologists call a major transition,” which “occur when less complex forms of life combine in some way to give rise to more complex forms” (p. 314).
 13. Seabright (2010) argues for an idea that is at least similar in spirit, namely that part of what allows modern society, and particularly market economies, to function is that individuals operate with “tunnel vision,” concerning themselves with their own interests and agendas and little else. The operation of the Invisible Hand would be hindered if too many people paid too close attention, or tried to micromanage it (or macromanage it, for that matter).
 14. See Hyde (2011) for an interesting and compatible discussion focused on collective creativity, art, and intellectual property rights.
 15. The picture of humans as *serial hyperspecializers* recently defended in a series of papers by Elijah Millgram actually seems to be right at home next to this characterization. The kinds of views he cautiously advances about the nature and function of human practical reasoning, identities, and persons, for instance, are as far as we can tell comfortably compatible with Henrich’s picture of human nature, the type of adaptive problems it is designed to help solve, and the kinds of cultural and cognitive tools with which we are equipped to solve them. See Millgram (2014) and all of Millgram (2015), but especially chapters 3 and 10.
 16. Yes, we realize the irony of using the names of Great Men as emblematic of these intellectual achievements even as we are explicitly emphasizing gradual process and collective over individual. Old habits die hard; so it goes.
 17. See Libet (1985), Haidt (2001), Wegner (2003), and Gazzaniga (2011) on decisions and *post hoc* rationalization; Roskies (2006) and Shepherd (2015) provide good overviews of the putative philosophical implications, and Dennett (2004) and Mele

(2009) each give more wide-ranging book length treatments. For general comments on how the approach to cultural evolution used by Henrich and other dual inheritance theorists relates to the meme-based approach see Boyd and Richerson (2000) and Henrich, Boyd and Richerson (2008). A key difference lies in the relative importance assigned to replication and replicators, with meme theorists seeing the high fidelity replication of variants – memes being the replicators of culture – as crucial, while dual inheritance theorists argue instead that replicators are not necessary for cumulative evolution and that the notion of a meme obscures many important ways in which cultural evolution differs from the genetic analog.

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