Climate, Creativity, and the Evolution of Human Intelligence

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Abstract: The present essay compares two books dealing with the evolution of human mental abilities. Agustín Fuentes' *The Creative Spark* focuses on *creativity*. Fuentes argues that creativity is the central element that makes human uniqueness, and highlights continuity between modern examples of creativity and early forms of human creative behaviour. Mark Maslin's *The Cradle of Humanity* discusses the role of East Africa's climate in increasing the intelligence of humans. To understand this role, Maslin combines geological and climatic data with the latest discoveries in human evolution and palaeontology. The essay compares the books' content as well as their tone, and concludes on whether they might inspire future research on human evolution.

Keywords: human evolution, creativity, climate, human intelligence, palaeontology

Introduction

Many scientists have reflected on the faculties that distinguish humans from other living beings. Evolutionary biology, palaeontology, intelligence research, and other disciplines have progressively contributed to a better understanding of human mental abilities, and the evolution of these abilities. Nonetheless, much work remains to be done in this area.

In this essay, I would like to present two recent contributions to the field: Agustín Fuentes' *The Creative Spark: How Imagination Made Humans Exceptional* (Fuentes 2017) and Mark Maslin's *The Cradle of Humanity: How the changing landscape of Africa made us so smart* (Maslin 2017). The authors have different scopes and methods, but both works are relevant for researchers interested in early human evolution. Here, I intend to assess their merits and their insights, which may help future researchers, and the shortcomings they may have, so that other researchers can avoid them.

Fuentes is a biological anthropologist and a primatologist; his book deals with human *creativity* in a wide variety of domains. For his part, Maslin is a geographer and a geologist; his aim is to show that Africa's climate may have substantially contributed to the rise of human intelligence in the last million years.

The uniqueness of our species

In Fuentes' view, the defining trait of humans is not aggressiveness, altruism, adaptation to traditional lives, or intelligence, but *creativity*. The author's goal appears ambitious, as he claims to tell "the epic tell of all epic tales" (Fuentes 2017: 4) and writes:

"The goal of this book is a far more nuanced, complete, and judicious account of our evolution than has previously been possible. This new story is based on a synthesis of the full range of relevant research, old and new, across evolutionary biology, genetics, primate behavior, anthropology, archeology, psychology, neuroscience, ecology, and even philosophy." (Fuentes 2017: 5)

The four parts of this book corresponds, respectively, to four steps of the evolution of creativity: part one (Fuentes 2017: 15–48) tackles the creativity of very early hominins, e.g. with the usage of stones and sticks. Part two (Fuentes 2017: 49–123) deals with the strategies

hominins deployed to ensure food security, e.g. making better tools, coordinating with each other so as to hunt more efficiently, or using fire to cook aliments. Fuentes also describes the emergence of compassion and the common care of infants, which resulted in delayed growth and bigger brains. Part three (Fuentes 2017: 125–189) focuses on two aspects of the ever-increasing creativity/complexity of human societies: the codification of war and peace, and the traditional roles of men and women. Finally, part four (Fuentes 2017: 191–269) is about three domains in which humans were (and still are) remarkably creative: religion, art, and science. The final chapter, “The Beat of Your Creative Light” (Fuentes 2017: 271–292), summarizes the author’s views and provides conclusions on what the author regards as humans’ distinctiveness.

What is creativity?

Since Fuentes gives great weight to what he calls *creativity*, one would expect him to explain what *creativity* is and why it is important. Unfortunately, there is not much detail about that. While Fuentes (2017: 1–2) does refer to three definitions given, respectively, by Maria Popova, Ian Hodder, and Ashley Montagu, he does not outline how *he as a scientist* would define it.

What Fuentes explains is that there is continuity between the achievements of earliest hominin species and those of modern humans:

“In 2015 a space probe NASA launched in 2007 made it to Pluto and sent back amazing images from 3 billion miles away. That probe was a human-constructed tool, and the creative innovation behind it is a direct descendant of modifying rocks to have sharp edges a couple of million years ago.” (Fuentes 2017: 56).

He may be right, but the nature of *creativity* — and its relationship with another important human trait, intelligence (see e.g. Guildford & Christensen 1973; Karwowski *et al.* 2016) — remains to be defined. In absence of any clear answer, the author’s “news synthesis” appears compromised from the very beginning.

Besides, as one reads the book, it becomes evident that Fuentes addresses many issues that are only loosely connected to creativity — hence, perhaps, the author’s constant use terms such as “creative” or “creatively”, as if wanted to insist that these issues relate to his main subject. In the end, the “main dish” is still missing. Thus, the book is far from achieving what is in the author’s not-so-humble opinion “a far more nuanced, complete, and judicious account of our evolution than has previously been possible” (Fuentes 2017: 5).

Africa’s climate and the evolution of human intelligence

The main subject of Maslin’s book is not *creativity* but *intelligence*. While Maslin regrettably does not define *intelligence*, this is less problematic than with Fuentes’ *creativity*, insofar as there is already a widely accepted definition of *intelligence* among scientists (see Gottfredson 1997: 13; Deary 2013: R674). It is reasonable to assume that there is some overlap between this definition and Maslin’s own understanding of *intelligence*.

The Cradle of Humanity combines latest research in palaeontology and evolutionary biology with the author’s knowledge in geology, geography, and climatology. Maslin’s aim is to show that fossils and theories of human evolution can be much better understood when one takes into account the role of climate change in the last million years.

Maslin first presents elementary notions on the history of the universe (chapter 1), the latest state of knowledge on prehistoric human species (chapter 2), and notions in tectonics and climatology (chapter 3). Then, he describes the climate of the East African Rift Valley (chapter 4), some of the most important climatic events of the last 60 million years (chapter 5), and the celestial factors (p. 6). Importantly, Maslin notices that “periods of extreme climate variability seem to correlate with key periods of hominin evolution” (Maslin 2017: 127). The key part

of the book (chapter 7) is Maslin's discussion of competing hypotheses on human evolution, including the *savannah hypothesis*, later "refined as the *aridity hypothesis*, which suggested that the long-term trend towards increased aridity and the expansion of the savannah was a major driver of hominin evolution, particularly the evolution of *Homo* and encephalization" (Maslin 2017: 132). Another hypothesis, Elisabeth Vrba's *turnover pulse hypothesis*, implies that "environmentally induced extinctions hurt specialist species more than generalist species" (Maslin 2017: 133). This theory was later refined to become the *variability selection hypothesis*, which "splits species in terms of their differing ability to adapt and evolve in a more variable and unpredictable environment" (Maslin 2017: 134). A direct development of the *variability selection hypothesis* is the *pulsated climate variability framework*, which came out of the work of (among others) Maslin himself and "highlights the role of short periods of extreme climate variability in East Africa in driving hominin evolution" (Maslin 2017: 137).

The author also addresses other influences on the evolution of human intelligence, e.g. social factors (chapter 8). I do not understand why Maslin discusses these issues, since his topic is the influence of *climate* on the evolution of human intelligence, not the evolution of human intelligence in general. The latter topic would require a much longer book — if one intends to treat each issue deeply enough. Finally, the author discusses the Anthropocene (chapter 9). Maslin thinks culture accelerated biological evolution: "we have gone through profound changes, from hunter-gatherer to pastoralism to agriculture to urbanization, all of which would have driven evolutionary processes" (Maslin 2017: 193). Moreover, with genetic technologies, we could control "our evolutionary destiny" (Maslin 2017: 196).

To understand the evolution of human intelligence, one should combine various types of evidence. Ancient DNA is available for the last 40,000 years at least (Pääbo, 2014) and has cast light on many aspects of recent human evolution (see e.g. Reich 2018). With the ever-increasing accuracy of cognitive polygenic scores, ancient DNA may greatly improve our understanding of how intelligence evolved recently (e.g. for the Bronze Age, see Woodley of Menie *et al.* 2017). The further back in time one travels, the thinner the evidence; one may explain the same trends with very different hypotheses. Maslin's book enables researchers to see which hypotheses best fit geological and climatic data. Thus, while books on ancient DNA mainly shed light on recent evolution, *The Cradle of Humanity* constitutes a precious contribution to the study of our most ancient past.

As written above, the book does not provide a definition of *intelligence*. While I applaud Maslin's analysis, future research on the same topic must discuss the nature of the ability (or abilities?) whose selection was favoured by the East African climate. This is indispensable for being able to assess the credibility of hypotheses about the evolution of human intelligence. For instance, Maslin notes that Elisabeth Vrba "suggested that environmental changes would affect specialist and generalist species differently" (Maslin 2017: 142). In this case, the nature of human intelligence can clarify to what extent humans are generalists rather than specialists. If humans have a general factor of intelligence, *g* (as I think they do), and a very high one, this makes them one of the most generalist species one can think of, and one is strongly inclined to agree with the author that the changing landscape of Africa naturally favoured the rise of human (general) intelligence while penalizing the species that lived in a very specific adaptive niche.

Discussion

Before concluding, a few words about the formal aspects: while I am sceptical about Fuentes' ambition, I am equally sceptical about his tone, which is often bombastic. Many of his sentences are unnecessarily convoluted, as shown by these two passages:

"The nature of humans' creative collaboration is multilayered and varies widely. But our distinctively human capacity for shared intentionality coupled with our imagination is how we became who we are today." (Fuentes 2020: 2)

“In humans the ability to imagine responses to both material and perceived pressures, and to convert those imaginings into material items or actions, became a major tool in our success. This evolutionary benefit to having and deploying an imagination results in increasing use of the imaginative reaction to a diverse set of challenges, social and economical. One way in which the imagination is deployed in humans is in religious ritual, structures, and institutions.” (Fuentes 2020: 215)

Maslin’s tone is without pretension or artifice. His style makes the book very readable — an exploit given the technical notions he describes to the readers.

My final judgment on *The Creative Spark* may seem severe, but I believe it is justified. The book could have been a success had it been framed differently. Just as the author’s previous book was titled *Race, Monogamy, and Other Lies They Told You* (Fuentes 2012), his book on creativity could have been titled, say, *Cooking, Hunting, and Other Inventions*, and designed not as a “grand synthesis” but as a series of interesting stories about human creativity. Indeed, many of Fuentes’ stories are genuinely interesting. But the introduction promises far too much. One gets to the end of the book with a sense of disappointment, and with the impression that the author’s grandiloquence — aside from making the book harder to read — is a way to conceal his own doubts about the value of his work.

By contrast, *The Cradle of Humanity* delivers what is promised. It is a very stimulating book and will be of interest to a large educated public. Besides, I recommend that evolutionary biologists and intelligence researchers read it carefully and seek to collaborate with Maslin. A judicious combination of skills could result in significant progress toward understanding the nature and the origin of human intelligence as we know it today.

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