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Book Review

Why Genes Still Matter

A review of Gregory Cochran and Henry Harpending, *The 10,000 Year Explosion: How Civilization Accelerated Human Evolution*. Basic Books: New York, 2009, 288 pp., US\$27.00, ISBN 978-0-465-00221-4

Gregory Gorelik, Department of Psychology, Florida Atlantic University, Davie, FL 33314 USA. Email: ggorelik@fau.edu (corresponding author).

Todd K. Shackelford, Department of Psychology, Florida Atlantic University, Davie, FL 33314 USA. Email: tshackel@fau.edu.

Introduction

The 10,000 Year Explosion: How Civilization Accelerated Human Evolution, by Gregory Cochran and Henry Harpending, is an unapologetic analysis of some relatively recent trends in human biology. The authors, one a physicist, the other an anthropologist, are intrepid in laying out their hypotheses, no matter how politically incorrect or controversial they may be. Although many of their arguments need more fleshing out and some may not withstand the assault of further scientific analysis, the authors are stunningly creative when considering human history. If even a handful of their arguments survive the onslaught of rigorous scientific scrutiny, Cochran and Harpending will have offered a valuable and novel approach to addressing questions of recent human evolution. Many scholars, especially in the human social sciences, avoid addressing difficult and uncomfortable aspects of their disciplines. There seems to be a systemic ignorance of the implications that the biological sciences offer to our understanding of

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ourselves, whether intentional or not. This is most apparent in discussions of individual differences and group differences in traits such as intelligence and aggression, topics that are openly discussed in *The 10,000 Year Explosion*. Ironically, in their attempts to avoid racial or ethnic bias, researchers may inadvertently engage in scientific bias. This scientific bias is apparent whenever differences between individuals and groups are claimed to result solely from differences in culture, with little or no regard for genetics. An example of this, discussed by Cochran and Harpending, is the denial of the scientific evidence for the heritability of intelligence and the claim that the higher-than-average intelligence of groups such as the Ashkenazi Jews is explained entirely by differences in rearing practices. Therefore, despite the controversy that this book may arouse, it is an important vanguard in furthering the study of “genetic history” (p. x), and its relationship to cultural history.

The Neanderthal Within

As Cochran and Harpending contend, genetic evolution and cultural evolution are not exclusive. Each feeds off of the other in an “...endless dance of biological and cultural change” (p. 227). According to the authors, this symbiotic relationship between genes and culture gained momentum around the time of the Upper Paleolithic (about 40,000 years ago). Termed by archeologists and anthropologists as “the great leap forward,” this period heralded the emergence of more sophisticated forms of art and technology than that of earlier *Homo sapiens*, as evidenced by the archaeological record. Cochran and Harpending argue that this type of cultural innovation could not have been achieved without a parallel biological innovation. They

hypothesize that ancestral humans may have interbred with Neanderthals, thereby infusing Neanderthal genes into the ancestral human gene pool (pp. 25-64). This introgression of Neanderthal genes may have brought about the cultural revolution of the Upper Paleolithic, even if there were only a handful of borrowed Neanderthal genes that proved beneficial. Although a tantalizing possibility, this much debated hypothesis requires additional genetic and archeological research. Molecular genetic studies may be useful in isolating the relevant Neanderthal genes, if any, which reside in human genomes. These studies are also needed to verify the extent to which groups such as the Khoisan of Africa—who possess advanced hunter-gatherer technologies—have incorporated Neanderthal genes despite not living in close proximity to Neanderthals during prehistoric times, a point overlooked by the authors. Diverse fields of inquiry are needed to establish the causal relationships between any introgressed Neanderthal genes and the specific cultural innovations that they gave rise to in early humans. Although *The 10,000 Year Explosion* is intended as a work of theoretical speculation, it is not enough to posit the emergence of language or advanced art without accounting for the actual Neanderthal genes and the relevant selection pressures that preserved them. This hypothesis, however, is a useful example characterizing the book's central theme that selection on one or a few genes can rapidly bring about a magnification of physiological, behavioral, and cultural change. In this regard, it is exemplary of the kinds of theoretical speculations that researchers need to engage in to properly understand the hidden trends of human biological and cultural evolution. Scientists must not shy away from bold theoretical conjectures and creative thinking.

Even if the Neanderthal hypothesis is later shown to be incorrect, there is knowledge to be gained in testing it.

The Importance of Adaptation

Cochran and Harpending clearly portray the ease with which beneficial genes can rapidly spread within a gene pool, even with modest selection pressures. Along with the Neanderthal introgression hypothesis, they hypothesize that this was the case in the spread of Indo-European language speaking populations. Cochran and Harpending attribute Indo-Europeans' success to the rapid selection of a single gene for lactose tolerance, which gave them a nutritional advantage over their competitors. They agree with Tooby and Cosmides's (1990) assessment that there was insufficient time for complex adaptations to have evolved since the onset of agriculture, but nevertheless argue for the "importance of simple adaptations" (p. 10), mostly involving the selection of "one or a few genes" (p. 10). Their depiction of Tooby and Cosmides as advocating the assumption that "all humans are effectively the same" (p. 10) is a straw man argument because genetic variation is a prerequisite for natural selection. Their disagreement with Tooby and Cosmides may simply be one of semantics. Cochran and Harpending do not offer a clear conceptual definition of what constitutes an important adaptation. There is little doubt that individual differences in genetic resistance to diseases such as smallpox and malaria, as well as the psychological differences that Cochran and Harpending hypothesize to have been selected to solve problems of agriculture and market economies, are the result of natural selection. These differences, however, pale in comparison to the evolved psychological similarities shared by all

modern humans, such as the propensity for sexual jealousy and adaptations to female ovulatory status (see Thornhill & Gangestad, 2008). Scholars should specify the level of analysis and the context within which evolved human differences are considered important. To their credit, Cochran and Harpending present convincing arguments for recent selection of traits such as lactose tolerance, immunity to diseases of domesticated livestock, and psychological traits that facilitate agricultural living. The fact that we are living, breathing, and reading book reviews means that our ancestors were more successful than were their competitors in surviving and reproducing. Cochran and Harpending want to know why.

Biology and Population Differences

Much like Jared Diamond's (1997) *Guns, Germs, and Steel*, this book acknowledges the role of agriculture in substantively altering the previous 10,000 years of human history. Diamond argues that genetic differences in psychological traits do not account for population differences in technological advancement, and claims instead that the differences in technological and economic advancement are due to geographical accidents and subsequent cultural evolution. Unlike Diamond, Cochran and Harpending stress the selective power that agricultural living may have had in building genetic adaptations that were useful to the socially dense and sedentary lifestyle of farmers. What may be most controversial is their claim that these adaptations are responsible for observed differences between populations in psychological traits and personality characteristics, not just genetic differences in resistance to pathogens—which Diamond acknowledges. Cochran and Harpending suggest that populations with a longer

exposure to agriculture may be more industrious, future-oriented, and submissive than are populations with a longer history of hunting and gathering. According to Cochran and Harpending, the long-term storage of goods enabled by agriculture led to the emergence of ruling elites who in turn “domesticated” their populaces into subordination. Likewise, although impulsivity may have been adaptive in hunter-gatherer populations, selection pressures associated with agricultural living may have acted on some population gene pools by selecting for patience and the foregoing of immediate gratification. If it is true that some populations are more “domesticated” than others, then the social repercussions would be immense. In the future, societies may face difficult decisions on how to tailor educational and legal policies to the strengths and weaknesses of different human populations, just as medical professionals must tailor their treatments to the genetic predispositions of ethnically diverse patients. This cannot be done without a proper scientific investigation of human genetic differences, so feared by many scholars in the biological and, especially, the social sciences.

Most scientists are aware of the possibility that their findings can be misinterpreted or used for malicious intent. This possibility should not, however, lead to the immediate denunciation of the findings or the scientists themselves. Denying the fact that a force of utter destruction is unleashed when atoms are split does not make it any less true. Scientists have some responsibility in the way that they present their research to the public, but the politicization of scientific issues should not be the go-to approach whenever a scientific finding offends our sensibilities. Part of what makes science such a valuable tool is its unrivaled ability to see

through the fog of human emotions and wishful thinking, and present the world as it is reflected in the empirical evidence. Sweeping uncomfortable truths under the rug prevents us from maturely dealing with them, and will often bring more harm than benefit. There are obvious genetic differences in the physiological and immunological characteristics of different populations. If not *The 10,000 Year Explosion*, we should acknowledge the possibility that future work may unveil evidence for human differences that are more than skin deep, such as differences in temperament, aggression, and intelligence.

Ashkenazi Intelligence

Based on their research with Jason Hardy, Cochran and Harpending advance a series of hypotheses to explain the consistently higher-than-average intelligence of individuals of Ashkenazi Jewish descent (Cochran, Hardy, and Harpending, 2005). There are still wide expanses of academia that scoff at the overwhelming scientific evidence for the heritability of intelligence as measured by IQ tests and its influence on life outcomes. Within certain areas of social science, escaping the all-pervasive naturalistic fallacy is still an uphill battle. Perhaps fear of biological explanations for population differences in intelligence and aggression stems from the underlying fear of human inequality and biological determinism. These fears are unfounded. The scientific study of human similarities as well as differences should not be confused with the philosophical study of what constitutes ethical conduct. The revelation that some human groups may be more intelligent or more violent, on average, than other groups, says nothing about how all individuals should be treated. Scientific findings can inform policies as well as decisions of

ethical relevance, but science ultimately clarifies what our choices are—it does not prescribe what our choices should be.

Post-World War II study of biological differences between Jews and non-Jews has been a sensitive area due to the horrors of eugenics and the Holocaust. Amid such social tensions, Cochran and Harpending present their hypotheses quite objectively. According to their scenario, Medieval and Renaissance Ashkenazi communities in Europe were restricted to mostly financial and barter-related occupations, such as money lending and other middleman positions. Cochran and Harpending further argue that verbal and mathematical intelligence were correlated with success in these occupations, and Ashkenazim (presumably only men) who were successful in their occupations were also reproductively successful in their communities. Cochran and Harpending argue that low rates of exogamy in Ashkenazi communities during the medieval period created ideal conditions in bringing about rapid selection for Ashkenazi intelligence. Empirically testing these historical scenarios is difficult but not completely out of reach. Further study of historical records as well as recent applications of genetic research to historical matters will likely shed more light on these arguments. Meanwhile, Cochran and Harpending posit that the high instance of autosomal recessive disorders such as Tay-Sachs and Gaucher disease in the Ashkenazi community is evidence of prior selection for intelligence. Because many of these disorders affect the same metabolic pathways and are related to lysosomal malfunction and neural abnormalities, the authors hypothesize that the implicated genes provide heterozygotes with the advantage of increased intelligence. According to Pinker (2005), this hypothesis can be

tested by comparing the IQs of Ashkenazi individuals possessing these genes in a heterozygous state with the IQs of those that do not. This kind of research should not be avoided because of fears of identifying a genetic population difference in intelligence. There is no doubt that scientific knowledge can pose substantial risks when misused by bigots or ideologues, but by not doing this research, anti-Semitic interests may be given fodder to claim that Jews are stifling truths about themselves and their agendas.

Conclusions

The study of human evolution is a worthy pursuit regardless of whether any practical applications result. The hypotheses that Cochran and Harpending advance are interesting and illuminating, aside from their social implications. Cochran and Harpending are adamant that their analyses of genetic differences between populations are essential in guiding future policies in social and medical settings and offer that "...there's a world to win" (p. 227) by examining human genetic differences, although they do not present specific applications.

We believe that the pursuit of truth in matters of sociopolitical importance is a worthy endeavor. How can we hope to alleviate diseases, racial and ethnic tensions, and socioeconomic inequalities by blinding ourselves to empirical data? Along the way we must prepare ourselves for the uncomfortable findings that our quest for knowledge will inevitably uncover. The study of horrific diseases brought about life saving innovations in modern medicine, and the groundbreaking experiments of Milgram (1963) and Zimbardo (e.g., Haney, Banks, & Zimbardo, 1973) shined a light on the frightful behaviors that all humans are capable of. It is time to

abandon the mentality of the Dark Ages. We cannot hope to create a better world by wishing it to be something that it is not and ignoring it for what it is. For this reason, *The 10,000 Year Explosion* is a must-read for those who are not afraid to tackle controversial issues such as the evolution of human population differences.

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