

## CAUSE TO REFLECT

### Thoughts & Opinion

# The complicated legacy of E. O. Wilson with respect to genetics and human behavior

Manuel Lerdau 

Department of Environmental Sciences,  
University of Virginia, Charlottesville, Virginia,  
USA

#### Correspondence

Manuel Lerdau, Department of Environmental  
Sciences, University of Virginia,  
Charlottesville, VA 22903, USA.  
Email: mlerdau@virginia.edu

#### Abstract

Over the arc of his career, E. O. Wilson first embraced, then popularized, and finally rejected an extreme genetical hereditarian view of human nature. The controversy that ensured during the period of popularization (largely in the 1970s and 1980s) obscured the fact that empirical and theoretical research during this time undercut the assumptions necessary for this view. By the end of his career, Wilson accepted the fact that individual/kin selection models were insufficient to explain human behavior and society, and he began conducting research based upon multilevel (group) selection, an idea he had previously scorned.

#### KEYWORDS

group selection, heredity, individual selection, kin selection, multi-level selection

When I was an undergraduate in the early 1980s, EO Wilson taught a non-majors science class on Evolution. I was one of the few Biology majors who sat through the class because I worked as a note-taker in it. I got to know him through my asking questions after class about things I might have missed. He was, as many who knew him have observed, kind and patient, and he regularly went above and beyond in helping me make my notes clear. There was far more, however, to EO Wilson than simply his patience toward confused sophomores. His friendly surface sat thinly over a steel core of determination to promote his ideas sometimes far beyond what the data supported. During his career, Wilson traveled from extreme hereditarianism and the belief that genetics sufficed to explain human behavior and society to a position that embraced environmental factors and multilevel (group) selection. In this journey, Wilson both mirrored and led human behavioral biology.

To set the stage a bit: In 1975 Wilson published what would become his most famous and influential book, *Sociobiology*.<sup>[1]</sup> This book argued for 26 chapters that much of the natural world could only be understood in the context of natural selection. Wilson based his reasoning on primarily on theoretical analyses by George Williams<sup>[2]</sup> and William Hamilton.<sup>[3]</sup> The book added two significant pieces of value to the ideas of Williams and Hamilton. First, and most importantly in terms of popular acclaim, it synthesized and expressed their thoughts in ways that non-mathematical-readers could easily grasp. This made these ideas

accessible to a broad audience that had previously not really noticed the revolution that was beginning in Biology. Second, in Chapters 1–26 the book drew together a vast array of empirical data to support the ideas of Williams and Hamilton and to argue inductively for their general applicability in Nature. In the 27<sup>th</sup> chapter (26<sup>th</sup> in the abridged edition<sup>[4]</sup>), Wilson extended his arguments to humans with a series of very strong claims and, in contrast to the rest of the book, almost no rigorous empirical data.

If he had stopped with that speculative final chapter of a grand synthetic book, Wilson would likely be remembered primarily for his Ecology, Ant Biology, and Conservation works. For several years, however, Wilson worked to push the extreme hereditarian idea of human behavior and society that he described in Chapter 27. During the period 1975–1982, Wilson published 23 peer-reviewed papers on this topic. These papers have gone largely unrecognized over the years, having received a total of only 242 citations to date (from the ISI Web of Science citation analysis service as of 2022-01-31). The two most prominent of these papers involved collaboration with the Canadian Biochemist Charles Lumsden. In 1980 they published two contributions in the *Proceedings of the National Academy of Sciences (PNAS)*, which have received a total of 72 citations.<sup>[5,6]</sup> Wilson was a member of the Academy and so, at that time, could contribute up to two papers a year.

Despite this lack of recognition in the peer-reviewed literature, Wilson succeeded wildly in spreading his hereditarian views through three

books published in 1978, 1981, and 1983, the latter two with Lumsden. The first of these, *On Human Nature*<sup>[7]</sup> won the 1979 Pulitzer for nonfiction, the second, *Genes, Mind, and Culture*,<sup>[8]</sup> took a more formal approach to the problem, and the last, *Promethean Fire: Reflections on the Origin of Mind*,<sup>[9]</sup> attempted to win over the nonscientific public. Along the way, however, Wilson and his collaborators faced extreme push-back from other scientists and activists. The gaudier efforts of these antihedarianists have received most of the attention and are discussed in nearly every piece on the history of Sociobiology. Unfortunately, this attention has meant that very serious scientific concerns about Sociobiology have not received their due.

Wilson understood early on that for Sociobiology to succeed among scientists he had to present it in a formal (mathematical) way that allowed explicit statements of assumptions and predictions. His work with Lumsden in *PNAS*, mentioned above, took on that task. Unfortunately for him, a few scientists took his ideas seriously and scrutinized them closely. The results were not pretty. Joseph Alper and Robert Lange published in 1981 in *PNAS* a formal analysis of Lumsden and Wilson's paper from the previous year on the evolution of culture and effectively dismantled the paper from the ground up.<sup>[10]</sup> At the same time, several Biologists, including Luca Cavalli-Sforza and Marc Feldman, also tackled Sociobiology explicitly and furthered the realization that this extreme genetical hereditarian view simply did not work.<sup>[11]</sup> It demanded assumptions that could not be met, and it led to very few unique predictions that were borne out in the data.

At the same time, Ecologists were looking in detail at some of the crucial nonhuman examples of Sociobiology that Wilson had used: bees, ants, and wasps. Several important empirical results emerged. Ant biologists, for example, Deborah Gordon, discovered that caste and function in ants were not as strict and predictable from genetics as Wilson had thought (reviewed in Gordon<sup>[12]</sup>). Several workers on bees and wasps discovered that the genetics of kinship were not nearly so cut and dry as Hamilton (and Wilson) had thought. In other words, the crucial assumptions of Sociobiology were NOT met in even relatively "simple" nonhuman organisms.

Scientific ideas fail all the time, and measures of the quality of the idea depend less on the failure than on where that failure leads. Sociobiology succeeded as one more brick in the road leading to the idea that Evolution by Natural Selection is important for everything on Earth, from human society to microbial ecology to the ozone layer in the stratosphere. Sociobiology also led to one clear and positive outcome, the Biologists and Social Scientists who thought extreme hereditarianism did not explain much of psychology, culture, and society were forced to articulate their views more clearly and to develop models with explicit assumptions and predictions.

While this controversy and conflict were capturing the attention of media and others, science did what it often does, continue along quietly and, through clever observations, experiments, and analyses, find a novel path seen by none of combatants. This path involved the revival of Group Selection as a legitimate evolutionary force, able to explain phenomena mysterious to the models of individual and kin selection that had emerged from WHP. Interestingly, some the crucial

early papers by Michael Wade,<sup>[13]</sup> Robert Colwell,<sup>[14]</sup> and David Sloan Wilson<sup>[15]</sup> appeared during the peak of the Sociobiology Storm (and Drang) in prominent scientific journals but caused no noticeable ripples in the midst of the ongoing maelstrom.

These authors and their colleagues developed a testable mathematical framework where empirical data could be used to distinguish between the predictions of individual/kin selection on the one hand and group, or multilevel, selection the other. In 1992, multilevel selection became better known among scientists when GC Williams (one of the architects of individual/kin selection) published a book arguing that, in many cases multilevel selection was an important evolutionary force.<sup>[16]</sup> Williams had spent years thinking about and working on the models of Colwell, Wade, DS Wilson, and colleagues and had come to the conclusion that they were likely correct. Williams' behavior stands as an example what scientists are supposed to do when new data and theory contradict previous understanding, he changed.

Fifteen years later, first with DS Wilson and then with Martin Nowak and colleagues, EO Wilson also changed his mind and recognized that multilevel selection rather than indiv/kin selection was a better way to explain many aspects of animal behavior and society. EO Wilson's and colleagues' 2010 paper in *Nature* on multilevel selection and social behavior in animals ignores humans until the final single-sentence paragraph "We have not addressed the evolution of human social behavior here, but parallels with the scenarios of animal eusocial evolution exist, and they are, we believe, well worth examining."<sup>[17]</sup> In other words, in one line they cast doubt on all of Human Sociobiology.

After this final foray into Evolutionary Theory, EO Wilson spent most of his last ten years on his other great love, conservation. Many others have written at length about his efforts here, and I won't repeat them. When it comes to the influence of what many see as Wilson's great and original contribution to Biology, the theory of Sociobiology and its applications to humans, all we can say is that by the end even he did not believe it.

## ACKNOWLEDGMENTS

I thank David Sepkoski, Betty Smocovitis, the Editor, and two anonymous reviewers for help during the preparation of this paper.

## CONFLICT OF INTEREST

The author declares no conflict of interest.

## DATA AVAILABILITY STATEMENT

Not applicable.

## ORCID

Manuel Lerdau  <https://orcid.org/0000-0003-1864-0834>

## REFERENCES

1. Wilson, E. O. (1975). *Sociobiology: The new synthesis*. Harvard University Press.
2. Williams, G. C. (1966). *Adaptation and natural selection: A critique of some current evolutionary thought*. Princeton University Press..
3. Hamilton, W. D. (1964). The genetical evolution of social Behaviour. *Journal of Theoretical Biology*, 7, 1–16.

4. Wilson, E. O. (1975). *Sociobiology: The abridged edition*. Harvard University Press.
5. Lumsden, C. J., & Wilson, E. O. (1980). Translation of epigenetic rules of behavior into ethnographic patterns. *Proceedings National Academy of Sciences (USA)*, 77, 4382–4386.
6. Lumsden, C. J., & Wilson, E. O. (1980). Gene-culture translation in the avoidance of sibling incest. *Proceedings National Academy of Sciences (USA)*, 77, 6248–6250.
7. Wilson, E. O. (1978). *On human nature*. Harvard University Press.
8. Lumsden, C. J., & Wilson, E. O. (1981). *Genes, mind, and culture*. Harvard University Press.
9. Lumsden, C. J., & Wilson, E. O. (1983). *Promethean fire: Reflections on the origin of mind*. Harvard University Press.
10. Alper, J. S., & Lange, R. V. (1981). Lumsden-Wilson theory of gene-culture coevolution. *Proceedings of the National Academy of Sciences (USA)*, 78, 3976–3979.
11. Feldman, M. W., & Cavalli-Sforza, L. L. (1976). Cultural and biological evolutionary processes, selection for a trait under complex transmission. *Theoretical Population Biology*, 9, 238–259.
12. Gordon, D. M. (1999). *Ants at work: How an insect society is organized*. Free Press.
13. Wade, M. J. (1976). Group selection among laboratory populations of *Tribolium*. *Proceedings National Academy of Sciences (USA)*, 73, 4604–4607.
14. Colwell, R. K. (1981). Group selection in implicated in the evolution of female-biased sex-ratios. *Nature*, 290, 401–404.
15. Wilson, D. S. The group selection controversy – History and current status. *Annual Review of Ecology and Systematics*, 14, 159–187.
16. Williams, G. C. (1992). *Natural selection: Domains, levels, and challenges*. Oxford University Press.
17. Nowak, M. A., Tarnita, C. E., & Wilson, E. O. (2010). The evolution of eusociality. *Nature*, 466, 1057–1062.

**How to cite this article:** Lerda, M. (2022). The complicated legacy of E. O. Wilson with respect to genetics and human behavior. *BioEssays*, e2200034.  
<https://doi.org/10.1002/bies.202200034>