Evolutionary sciences matter for social sciences and humanities

Chevallier, Coralie [1]

[1] *École normale supérieure – PSL, France*

DOI 10.5281/zenodo.8314544

TO CITE

Chevallier, C. (2022). Evolutionary sciences matter for social sciences and humanities. In *Proceedings of the Paris Institute for Advanced Study* (Vol. 5). https://doi.org/10.5281/zenodo.8314544

PUBLICATION DATE

17/05/2022

ABSTRACT

The best innovations are useless if they don't improve human welfare or if people don't adopt them. Consider nuclear power: it's a scalable, safe and low-carbon source of energy, but it is met by human resistance. Solving such issues isn't merely a matter of technological progress. Part of the problem is human, and part of the solution requires a better understanding of human nature. By integrating psychology and evolution with social sciences, a new generation of scientists is ready to generate productive knowledge about humans and impactful solutions to a variety of challenges, from increasing vaccine acceptance to fighting misinformation. Evaluation of Social Sciences and Humanities in Europe. Hcéres Colloquium Proceedings - Paris IAS, 16-17 May 2022. Session 3 "The participation of SSH to European Research" - SSH in interaction : perspectives

Many of the challenges ahead of us are human in nature and many of the technological solutions to these challenges will be met with human resistance. Consider climate change. A majority of people now believe that climate change is a serious threat, that it is already happening, and that more should be done to curb CO2 emissions. Yet, despite increasing levels of climate change awareness and the availability of carbon free technologies, mitigation efforts remain disappointing. Here, the barrier to action is not technological, it is *human*. A similar observation could be made for the COVID crisis and vaccine hesitancy. The problem is not technological – we have vaccines – it is *human*.

In the future, technological change will create new opportunities for people, new ways of living and interacting. But these changes will need to coincide with profound adjustments in the way humans think and behave. The difficulty here is that people's minds are not infinitely plastic, they simply cannot bend at will with technological and cultural changes. There are important constraints imposed by our biological and cognitive inner workings. Knowledge of these constraints makes it possible to predict

Chevallier, C. (2022). Evolutionary sciences matter for social sciences and humanities. In *Proceedings of the Paris Institute for Advanced Study* (Vol. 5). https://doi.org/10.5281/zenodo.8314544
2022/5 - HCERES - PFUE 2022 - Article No.3. Freely available at https://paris.pias.science/article/3-2-3_Chevallier - ISSN 2826-2832/

that people will resist future game-changing technologies in very particular ways. Building a desirable future will therefore require a deeper understanding of our human nature to ensure that technologies and policies are *human-friendly*.

How can we leverage human sciences to build a human-proof future? In all likelihood, the answer lies in evolution. Human beings, like all other living beings, are the product of biological evolution. Just as the theory of evolution provides a unifying framework in biology, evolution can work as a common thread that weaves together disparate human sciences (Tooby & Cosmides, 1992, Boyer, 2018). This general framework relies on concepts such as optimisation, cost-benefit analyses, and trade-offs, which are at the core of economics, business and the effective altruism movement. This evolutionary logic provides a principled way to think about individual interactions and social organizations, as well as emotions, altruism, personal goals and the meaning of life (Pinker, 2003, Diamond, 2014).

Going back to climate change mitigation for instance, evolutionary biology has demonstrated that cooperation can only emerge under specific conditions. Humans have evolved cognitive mechanisms that regulate cooperation (Baumard et al., 2013). These mechanisms—norm detection, reputation management, and fairness computations—can stand in the way of pro-environmental behaviors and limit the impact of environmental policies. At the same time, the very same mechanisms can be leveraged as powerful solutions for effective climate change mitigation (Boon-Falleur et al., 2022). Importantly, the existence of these mechanisms is currently not sufficiently taken into account by policy makers (Boon-Falleur et al., 2022, Chevallier et al., 2021).

Evolutionary human sciences matter to understand the consequences of economic growth and predict the dynamics of human values

Anticipating the future also requires understanding human values. There are many technological predictions (about AI, molecular machines and the like), but far fewer

Chevallier, C. (2022). Evolutionary sciences matter for social sciences and humanities. In *Proceedings of the Paris Institute for Advanced Study* (Vol. 5). https://doi.org/10.5281/zenodo.8314544
2022/5 - HCERES - PFUE 2022 - Article No.3. Freely available at https://paris.pias.science/article/3-2-3_Chevallier - ISSN 2826-2832/

human predictions: what will human preferences, human decisions, and human societies look like in 20, 50, or 100 years? Yet as technology improves and as individual freedom increases, everything about the world is somehow becoming the product of human decisions. The climate in which future generations will live, the species that will survive or go extinct, the pathogens we fight or craft, the technologies we develop or abandon, are all linked to human decisions, human priorities and human values. All existential risks are affected by human decisions in one way or another. Human preferences will therefore greatly determine the impact of future technologies and anticipating the future is impossible without a deeper understanding of our human nature.

Predicting human behavior might appear beyond our reach, as we lack a principled way of analyzing human phenomena and explain human behavioral diversity. Yet, large-scale initiatives in social sciences such as the World Values Survey have revealed that human values change in a predictable way in response to economic growth (Inglehart, 2018, Friedman, 2005) and that this is best explained in an evolutionary framework (Baumard, 2017). Humans have indeed evolved to adaptively adjust their priorities to their level of resources. With economic growth and technological progress, they move away from the most urgent needs (food, safety) to more future-oriented, high-risk/high reward goals ('venture behaviors', self-development, expanding the moral circle) (Baumard, 2019, Boon-Falleur et al., 2021). This adaptive plasticity of behavior can explain long-term changes in human history, from the rise of romantic love to the triggering of the industrial revolution and the increase in democratic regimes with time (Baumard, 2019, Baumard & Chevallier, 2015, Safra et al., 2020). A similar reasoning could shed light on the on-going societal changes such as the rise of veganism, sexual fluidity, imaginary worlds in fiction, and decentralized organisations, as well as the acceleration of innovations (André & Baumard, 2020).

Evolutionary human sciences matter to design sound epistemic institutions

For most of their history, human societies have been dominated by unreliable epistemic institutions, as people consulted oracles to know whether to wage wars, or plunge

Chevallier, C. (2022). Evolutionary sciences matter for social sciences and humanities. In *Proceedings of the Paris Institute for Advanced Study* (Vol. 5). https://doi.org/10.5281/zenodo.8314544
2022/5 - HCERES - PFUE 2022 - Article No.3. Freely available at https://paris.pias.science/article/3-2-3_Chevallier - ISSN 2826-2832/

women in rivers to ascertain their guilt. Recent work has shown that evolutionary human sciences allow us to understand why institutions such as oaths, ordeals, or divination can be found in most human societies (Boyer, 2020).

If we still find in modern societies remnants of these institutions—from astrologers to tarot dealers—we have also seen the emergence of better functioning epistemic institutions, as science replaces divination, and the adversarial system replaces oaths and ordeals. However efficient, these epistemic institutions still emerged in a haphazard fashion, guided more by intuitions and power struggles than by a sound understanding of their epistemic properties.

It is only very recently—in the second half of the 20th century—that conscious attempts have been made to design better epistemic institutions and systematically test them. These efforts were first guided by RAND, with the development of the Delphi technique for instance (Dalkey & Helmer, 1963), and then taken up by researchers such as Phil Tetlock and his colleagues, funded in part by DARPA (Dalkey & Helmer, 1963).

These experimentations point to the wisdom of crowds as providing a sound basis for epistemic institutions. For instance, forecasters make better predictions if they can discuss the predictions together. This work converges with research in many different areas showing the power of combining opinions—to improve medical diagnoses, judicial opinions, educational achievement, etc. (Mercier, 2016). However, the wisdom of the crowd can be organized in many different ways: Are larger groups always better? How much diversity should they encompass? Is it better to let people talk to each other, or to gather independent opinions?

If experiments are crucial to test epistemic institutions, it is not practical to test every possible combination of features—group size, diversity, mode of communication, etc. Instead, we must explain why people make better or worse predictions in different contexts, and why. This is what the interactionist theory of reasoning attempts to do, focusing on the role of reasoning. Grounded in evolutionary thinking, this theory suggests that the function of human reason isn't solitary ratiocination, but the public exchange of arguments. It can explain when people tend to reason poorly—when they are on their own or surrounded by like-minded peers—and when they tend to reason well—when they engage in good-faith arguments in a small group of people who

Chevallier, C. (2022). Evolutionary sciences matter for social sciences and humanities. In *Proceedings of the Paris Institute for Advanced Study* (Vol. 5). https://doi.org/10.5281/zenodo.8314544
2022/5 - HCERES - PFUE 2022 - Article No.3. Freely available at https://paris.pias.science/article/3-2-3_Chevallier - ISSN 2826-2832/

disagree on at least some points. This theory has received much empirical support (Mercier, 2016), it has been used to guide practical interventions (designing chatbots to fight COVID-19 hesitancy), and it can inform the design of epistemic institutions (e.g., by highlighting the importance of discussion in the wisdom of crowds).

Unreliable epistemic institutions such as divination have persisted for millennia. By contrast, reliable epistemic institutions that result from conscious, systematic testing are barely starting to emerge, and their uptake is depressingly slow. An evolutionarily grounded understanding of human psychology isn't only crucial to design epistemic institutions that should yield optimal results, but also to design epistemic institutions that will be culturally successful, spreading and hopefully persisting for many millennia in turn.

Conclusion

The future needs evolution-based thinking. But this requires more research, more communication toward the general public, and better training for academics, policy makers and the business world. None of this is possible if individual scientists and students are isolated from each other and if interactions between SSH and evolutionary sciences are not encouraged.

Chevallier, C. (2022). Evolutionary sciences matter for social sciences and humanities. In *Proceedings of the Paris Institute for Advanced Study* (Vol. 5). https://doi.org/10.5281/zenodo.8314544
2022/5 - HCERES - PFUE 2022 - Article No.3. Freely available at https://paris.pias.science/article/3-2-3_Chevallier - ISSN 2826-2832/

Bibliography

André, J. B., & Baumard, N. (2020). Cultural evolution by capital accumulation. *Evolutionary Human Sciences*, *2*, 18. https://doi.org/10.1017/ehs.2020.19

Baumard, N., André, J.-B., & Sperber, D. (2013). A mutualistic approach to morality: The evolution of fairness by partner choice. *Behavioral and Brain Sciences*, *36*(1), 59–78. https://doi.org/10.1017/S0140525X11002202

Baumard, N., & Chevallier, C. (2015). The nature and dynamics of world religions: a life-history approach. *Proceedings of the Royal Society B*, *282*(1818), 20151593. https://doi.org/10.1098/rspb.2015.1593

Baumard, N. (2017). Phenotypic Plasticity' in What Scientific Term Or Concept Ought To Be More Widely Known? In *Edge*. https://www.edge.org/response-detail/27196

Baumard, N. (2019). Psychological origins of the industrial revolution. *Behavioral and Brain Sciences*, *42*. https://doi.org/10.1017/S0140525X1800211X

Boon-Falleur, M., Grandin, A., Baumard, N., & Chevallier, C. (2022). Leveraging social cognition to promote effective climate change mitigation. *Nature Climate Change*, *12*, 332–338. https://doi.org/10.1038/s41558-022-01312-w

Boon-Falleur, M., Baumard, N., & André, J. B. (2021). Risk-seeking or impatient? Disentangling variance and time in hazardous behaviors. *Evolution and Human Behavior*, *42*(5), 453–460. https://doi.org/10.1016/j.evolhumbehav.2021.04.001

Boyer, P. (2018). *Minds make societies : How Cognition Explains the World Humans Create*. Yale University Press. https://yalebooks.yale.edu/book/9780300248548/minds-make-societies/

Boyer, P. (2020). Why divination?: Evolved psychology and strategic interaction in the production of truth. *Current Anthropology*, *1*(61), 100–123. https://doi.org/10.1086/706879

Chevallier, C., Hacquin, A. S., & Mercier, H. (2021). COVID-19 vaccine hesitancy: Shortening the last mile. *Trends in Cognitive Sciences*, *25*(5), 331–333. https://doi.org/10.1016/j.tics.2021.02.002

Dalkey, N., & Helmer, O. (1963). An experimental application of the Delphi method to the use of experts. *Management Science*, *9*(3), 458–467. https://www.jstor.org/stable/2627117

Diamond, J. (2014). *The third chimpanzee: on the evolution and future of the human animal*. Oneworld Publications. https://www.simonandschuster.co.uk/books/The-Third-Chimpanzee/Jared-Diamond/9781780746050

Chevallier, C. (2022). Evolutionary sciences matter for social sciences and humanities. In *Proceedings of the Paris Institute for Advanced Study* (Vol. 5). https://doi.org/10.5281/zenodo.8314544
2022/5 - HCERES - PFUE 2022 - Article No.3. Freely available at https://paris.pias.science/article/3-2-3_Chevallier - ISSN 2826-2832/

Friedman, B. M. (2005). *The moral consequences of economic growth*. Alfred A. Knopf. https://scholar.harvard.edu/bfriedman/publications/moral-consequences-economic-growth-0

Inglehart, R. (2018). *Cultural evolution: People's motivations are changing, and reshaping the world*. Cambridge University Press. https://www.cambridge.org/core/books/cultural-evolution/34F637928AB1AA87B6409C28B4DFC9F5

Mercier, H. (2016). The argumentative theory: Predictions and empirical evidence. *Trends in Cognitive Sciences*, *20*(9), 689–700. https://doi.org/10.1016/j.tics.2016.07.001

Pinker, S. (2003). *The blank slate: The modern denial of human nature*. Penguin UK.

Safra, L., Chevallier, C., Grèzes, J., & Baumard, N. (2020). Tracking historical changes in trustworthiness using machine learning analyses of facial cues in paintings. *Nature Communications*, *11*(1), 1–7. https://doi.org/10.1038/s41467-020-18566-7

Tetlock, P. E. (2005). *Expert political judgment: How good is it? How can we know?* Princeton University Press.

Tooby, J., & Cosmides, L. (1992). The psychological foundations of culture. The adapted mind: Evolutionary psychology and the generation of culture. In J. H. Barkow (Ed.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 19–136). Oxford University Press.

Chevallier, C. (2022). Evolutionary sciences matter for social sciences and humanities. In *Proceedings of the Paris Institute for Advanced Study* (Vol. 5). https://doi.org/10.5281/zenodo.8314544
2022/5 - HCERES - PFUE 2022 - Article No.3. Freely available at https://paris.pias.science/article/3-2-3_Chevallier - ISSN 2826-2832/