

CAUSE TO REFLECT

Thoughts & Opinion

Facing biology's open questions

Rupert Sheldrake's "heretical" hypothesis turns 40

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Funding information

Spanish Ministry of Science, Grant/Award Number: RyC-2017-23599

Abstract

Despite the triumphant rhetoric of mechanistic materialism, current biology has no shortage of unsolved fundamental problems. In 1981, seeking a way forward, Rupert Sheldrake proposed the hypothesis of "formative causation" as a unifying organizing principle of life. Expanding the concept of morphogenetic fields, Sheldrake posited a spatio-temporal connection termed "morphonic resonance" whereby the more often a self-organizing process takes place, the easier it will be for it to take place in the future. After initial acclaim, his project was quickly met with dogmatic skepticism, dismissed as scientific heresy, and ultimately ignored. Forty years later, the experimental implications of his ideas remain largely untested. Visionary or not, Sheldrake's case illustrates the conceptual resistance of the scientific enterprise to revise its own deepest theoretical commitments. Beyond career-building selection pressures, young researchers need to be presented with the major questions in their field and encouraged to entertain radically alternative points of view. Science is what scientists make of it.

KEYWORDS

dogmatic skepticism, formative causation, morphonic resonance, Rupert Sheldrake, scientific heresy

Some bold scientific ideas are celebrated as works of genius; others as crackpot speculation. The first category is reserved for a very small minority. Yet, at first glance, paradigm-changing science can be indistinguishable from pseudo-science. The reception of Rupert Sheldrake's book *A New Science of Life*,^[1] published 40 years ago this year, remains an illuminating example of the full range of possible responses to seemingly improbable new ideas.

Sheldrake's ideas were controversial from the outset. An editorial in *Nature* by Sir John Maddox deemed Sheldrake's book to be "the best candidate for burning there has been for many years".^[2] Later, Maddox commented that "Sheldrake is putting forward magic instead of science, and that can be condemned in exactly the language that the Pope used to condemn Galileo, and for the same reason. It is heresy". Despite his track record as an innovative plant scientist at Cambridge and at

an international agricultural research institute in India, Sheldrake was excommunicated from the mainstream scientific community.

Maddox's memorable verdict was unfortunately dogmatic. Sheldrake's book was not anti-science, but rather an attempt to face up to a number of open questions in biology, many of which, four decades later, remain largely unanswered. Regarding development, the book argued for the insufficiency of molecular explanations, a prescient observation in light of recent findings that show bioelectric fields "prepattern" morphogenesis. With regard to cognitive neuroscience, Sheldrake proposed new mechanisms of learning and memory, prompted by the ongoing struggle to locate memory traces in the brain—the quest for the engram continues to this day. In evolution, Sheldrake entertained the prospect that acquired characteristics might be inherited, then one of biology's biggest taboos, now largely accepted thanks to research on

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epigenetic inheritance. So much for the problems. What was his solution?

Sheldrake argued for the existence of a memory principle in nature, supported by a radical re-interpretation of morphogenetic fields—an established concept within developmental biology—as a previously unrecognized type of form-shaping field. By means of a process he termed “morphing resonance”—a similarity-based non-local connection across time—Sheldrake hypothesized that the more frequently any self-organizing natural phenomenon occurs, the easier it will be for it to occur again in the future. In this view, the laws of nature might be more like habits than eternal edicts. In an evolutionary universe, why not entertain the idea of evolving laws?

Does this idea make testable predictions? Yes. For example: train rodents to solve a task in Lisbon, and other rodents in Boston should solve it more quickly. Crystallize a chemical compound for the first time, and it should become progressively easier to do so. Expose cells to a stress to which they adapt, and subsequent similar cells should adapt faster.

Controversy aside, forty years later, where is the evidence for morphing resonance? It is not overwhelming. This is not because the open questions Sheldrake identified have been definitively answered. Nor is it for a lack of potential experiments and testable predictions: the appendix to the new edition of Sheldrake’s book contains ten experiments ranging from low temperature physics, to the melting points of crystals, to the spread of bait-shyness in rats, and accelerated human learning. The problem is that almost none of these experiments have been performed. Technical feasibility is not enough to pursue a scientific research program. A high profile ruling of heresy hinders the ability to obtain funding, to have a lab and students, and to expect cordial behavior from scientific colleagues and peer-reviewers. Sheldrake’s approach has been to focus on experiments that can be performed by civilian scientists on a shoestring budget, rather than sophisticated and expensive laboratory investigations. He and a few others have also carried out small-scale morphing resonance experiments in the field of human learning, with some positive, but disputed, results. The outcome? His hypothesis remains largely untested.

Whatever one makes of Sheldrake’s ideas, his story reveals something about how the sciences proceed. The history of science is peppered with “heretics.” Galileo is a classic example, as Maddox pointed out, apparently blind to the irony. The physicist David Bohm—who was sympathetic to Sheldrake’s proposal—is another: the man Einstein

called his “spiritual son,” and whose ideas so perturbed Robert Oppenheimer, the “father of the atomic bomb,” that he remarked “if we cannot disprove Bohm, then we must agree to ignore him”. A recent case is the astronomer Avi Loeb, a professor of science at Harvard, whose openness to entertaining evidence of extraterrestrial intelligent life has become a subject of bad-tempered dispute. Some heretics turn out to be right, others do not. The jury is still out on Sheldrake, Bohm and Loeb. Meanwhile Sheldrake’s book, now available in a revised and updated edition, remains a source of stimulation for new generations of researchers, both through the questions it asks and the possibilities it proposes.

ACKNOWLEDGMENTS

This work was supported by the Spanish Ministry of Science (RYC-2017-23599 grant).

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Data sharing not applicable – no new data generated

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1. *A New Science of Life: The Hypothesis of Formative Causation* was published by Blond & Briggs, London in 1981. The third edition, revised and updated, was published in the UK by Icon Books, London in 2009, and in the US under the new title *Morphing Resonance* by Park Street Press, Rochester, VT.
2. John Maddox 1981’s editorial in *Nature* 293 (5830): 245–246 was entitled *A book for burning?*. In 1993, Maddox appeared in the BBC Special: *Rupert Sheldrake, the most Heretical Scientist of our time*, whose excerpt can be found here: <https://www.youtube.com/embed/QcWOz1xjtsY>

How to cite this article: Gomez-Marin A. (2021). Facing biology’s open questions: Rupert Sheldrake’s “heretical” hypothesis turns 40. *BioEssays*, 43, e2100055. <https://doi.org/10.1002/bies.202100055>