

The postmodern assault on science

If all truths are equal, who cares what science has to say?

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The scientific method has been the guiding principle for investigating natural phenomena, but postmodernist thought is starting to threaten the foundations of the scientific approach. The rational, scientific view of the world has been painstakingly built over millennia to guarantee that research can have access to objective reality: the world, for science, contains real objects and is governed by physical laws that existed before our knowledge of these objects and laws. Science attempts to describe the world independently of belief by seeking universal truths, on the basis of observation, measurement and experimentation. The postmodernist school of thought arose to question these assumptions, postulating that claims about the existence of a real world—the knowledge of which is attainable as an objective truth—have only been relevant in Western civilization since the Enlightenment. In recent decades, the movement has begun to question the validity of claims of scientific truth, whether on the basis of their belonging to larger cultural frames or through heavy criticism of the scientific method.

However, postmodernist thought has mostly gone unnoticed by scientists, despite its growing importance in the twentieth century. The origins of this ‘deconstruction’ of the ‘Enlightenment project’ can be traced back to Friedrich Nietzsche, who was among the first to question our ability to discern objective truth: “In so far as the word ‘knowledge’ has any meaning, the world is knowable; but it is interpretable otherwise, it has no meaning behind it, but countless meanings” (*The Will to Power*, 1883–1888; [1]). During the late twentieth century, postmodern philosophy picked up where Nietzsche left off. In his book, *Against Method* (1975; [2]), philosopher of science Paul Feyerabend argued that the

progress of acquiring scientific knowledge is not governed by any useful and universal methodological rules, and summarized this “epistemological anarchy” as “anything goes”. The concept of paradigm shift proposed by Thomas Kuhn in his famous book, *The Structure of Scientific Revolutions* (1962; [3]), has also given weight to the critics of science and of its pretension to understand reality. If science is not a gradual process of accumulation of knowledge, but rather subject to sudden “revolutions” that overwhelm outdated theories, they argue, how can one trust scientific knowledge? If, as according to Kuhn, scientific revolutions are also political upheavals in scientific policy, it is easy to understand why Kuhn’s theory has attracted so much attention in a period that calls into question the established political order in the Western world.

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This ‘deconstruction’ gained momentum when it was also adopted in the realm of the sociology of science, particularly in the so-called ‘strong programme’ belonging to a school of thought known as ‘science studies’ [4]. The ‘strong programme’ or ‘strong sociology’ was a reaction to previous sociologies of science that had only been applied to failed or false theories. ‘Strong sociology’ claims that the existence of a scientific community, bound together by allegiance to a shared paradigm, is a prerequisite for scientific activity, and that as such, both ‘true’ and ‘false’ scientific theories should be treated equally, as both

are the result of social factors or conditions. Several deconstructionist thinkers, such as Bruno Latour and Ian Hacking, have rejected the idea that the concepts of science can be derived from a direct interaction with natural phenomena independently of the social environment in which we think about them. The central goal of science, defining what is true and what is false, becomes meaningless they argue, as its objectivity is reduced to ‘claims’ that are simply the expression of one culture—one community—among many. Thus, all systems of thought are different “constructs” of reality and all additionally have political connotations and agendas.

As Simon Shackley and Brian Wynne have written with regard to defining uncertainty in climate change science policy from the perspective of science studies: “...the mere occurrence of uncertainty talk is not interesting unless we can document and interpret its construction, representation, and/or translation. According to constructivist accounts, representations of uncertainty do not reflect an underlying ‘reality’ or a given ‘state of objective knowledge’ but are constructed in particular situations with certain effects” [5]. The inverted commas around ‘reality’ and ‘objective knowledge’ are there to shed doubt on what is expressed. Thus, science being in constant dispute, controversy becomes the essence of science.

As Shawn Lawrence Otto discussed in his book, *Fool Me Twice: Fighting the Assault on Science in America* (2011; [6]), in conjunction with the emergence of multiculturalism and the civil rights movement, ‘relativism’—and its direct attacks on the validity and the authority of science, and not only that of scientists—gained a strong moral influence, first in post-Second World War America and then in Europe.

If there is no universal truth, as postmodern philosophy claims, then each social or political group should have the right to the reality that best suits them. What, then, are the consequences of applying postmodernist thinking when it comes to science? Risk assessment provides illuminating examples of how it corrupts the role of science in the public sphere, especially if one considers the dispute over genetically modified organisms (GMOs).

The idea that GMOs are harmful to the environment and humans arose mainly from opposition to biotechnology from some agricultural groups and environmentalists. These farmers in particular felt disempowered by globalization and feared that technology and scientific research might increase global corporate power to their detriment. Whilst environmental groups initially raised sensible concerns about potential environmental damage, they soon shifted to an ideological position of opposition, as science demonstrated that such risks are often small, sometimes hypothetical and generally not specific to GMOs. Given the lack of scientific evidence to support the purported health or environmental effects of GMOs, opponents have moved on to attack the risk assessment of GM crops. Scientific authorities are not only questioned on the quality and honesty of their experts—which is unpleasant for them but a matter of legitimate debate—but also attacked, by postmodernism, on the scientific method and its universality.

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In such a postmodern framing, these politically constructed claims about the dangers of GMOs bear as much ‘truth’ as science-based risk assessment. Scientists who object to these claims on the grounds of a lack of scientific merit often find themselves accused of being intellectually stuck in the old paradigm of ‘scientism’, or are told that scientists cannot be trusted, as illustrated by examples of past health scandals or scientific errors unrelated

to GMOs. At the extreme, such thinking can lead to violence against research and researchers, such as the destruction of field trials designed to assess the safety of GM crops [7]. In this way, not only do anti-GM groups assert their own ‘truth’ in justifying their actions—such attacks are rarely condemned—but they also deny scientists the opportunity to discover and demonstrate the objective truth about the safety of GMOs. Has a postmodern framing given more power to the people or more control over the use of biotechnology? Has it enhanced the public understanding of scientific processes? Apparently not, as opinion polls still indicate that after 15 years of ‘debate’, most people—74% in a March 2012 poll in France—think “it is difficult to form an opinion about GMOs” (http://www.ipsos.fr/sites/default/files/attachments/rapport_quantum_gm.pdf).

As part of their campaign against GM crops, activists have tried repeatedly to undermine the credibility of the European Food Safety Authority (EFSA), which performs risk assessments for GM crop varieties (<http://www.efsa.europa.eu/en/news/efsaanswersback.htm>). The reason that the EFSA and its scientists have become targets is that individual EU member states cannot reach consensus on whether to allow the cultivation of GM crops [8]. As such, the decision falls to the European Commission, which usually follows the EFSA’s advice. Given the political paralysis, the EFSA has become the *de facto* reference for risk management and, consequently, the target of political groups seeking a complete and indefinite ban on GM crops. Thus, anti-GMO activists are following Arthur Schopenhauer’s (1788–1860) ‘ultimate stratagem’ for a dispute that your opponent is winning: you move on from the subject of the dispute to the disputant himself, attacking his person and, in this case, his independence (*Eristic Dialectics: The Art Of Being Right*, 1831).

In this context, some postmodern discourses have sought to undermine the EFSA’s science-based risk assessment, by accusing it of wearing “a false mantle of objective, singular and uncontested science” [9]. From this it follows that if science is not objective and that if its truths are heavily influenced by the opinions of scientists—and the EFSA does call its scientific conclusions ‘opinions’, rather than facts, for example—then risk assessment by

the EFSA is merely a ‘framing of truth’ by a panel of people with shared presuppositions, which can be countered by any other group of people with their own frame or set of ‘truths’. More insidiously, such thinking can convince political authorities to abandon the “rigid division” [9] between scientific and non-scientific knowledge, and thereby open the door wide for what are called ‘participative’ policies. However, if these ‘participative’ policies and the involvement of stakeholders can be considered as relevant and legitimate where decision-making is concerned, they cannot and ought not to interfere with what are ultimately scientific questions.

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For example, the French Institut National de la Recherche Agronomique (INRA) and several other laboratories have developed transgenic grapevine rootstocks that are potentially resistant to the grapevine fanleaf virus (GFLV). Non-GM plants were grafted onto these GM rootstocks and a first field trial was set up in the Champagne region of France in 1996. This trial was terminated in 1999 due to pressure from a retail chain on the Champagne producer involved. INRA resumed its interest in these trials in 2001, officially to “deal with the challenges” that field trials are essential for research but might face public opposition [10]. A participative approach was chosen and a working group was set up in 2001. This initial consultation step provided support to restart the trial under certain conditions. However, even these conditions did not satisfy radical anti-GMO activists, who criticized the INRA initiative as being a “programme of opinion manipulation” [11]. In the spring of 2003, a Local Monitoring Committee (LMC) was set up for the new field trial at the INRA Centre in Colmar in France. The LMC had ‘broad stakeholder representation’, which is to say that a large number of representatives from ‘green’ organizations were involved. As a result, INRA congratulated itself for having developed “a research-action method based on the



principle of both acknowledging the learning of all parties and also the validity of other modes of reasoning" [10]. In truth, under the influence of the 'green' organizations, the LMC had actually redesigned the transgenic grapevine research trial to push for new research "on the environmental impact of GMO rootstocks as well as on the alternatives for controlling GFLV using organic viticulture". Ultimately, the field trial was vandalized by an individual in September 2009, restarted with unanimous support from the LMC and then uprooted by 65 activists in August 2010 (INRA press statement, 2010: http://www.international.inra.fr/press/destruction_of_a_gmo_trial).

In May 2009, the French High Council of Biotechnologies (HCB; www.hautconseildesbiotechnologies.fr) was founded to advise French politicians on biotechnology. It is composed of two separate entities: the Scientific Committee (CS),

which has 39 members, and the Social, Ethical and Economic Committee (CEES), which has 26 members who represent a range of stakeholders from 'green' organizations, farmers' unions and workers' unions, to representatives of state institutions, political parties and a few 'qualified' personalities. The scientific points of view of the CS are examined by the CEES, which then makes recommendations to deal with the economic and social impacts of GM crop imports and cultivation. In line with its anti-GMO policy [4], the government of former French President Nicolas Sarkozy gave most positions on the CEES to members of organizations known to oppose GMOs. As a result, and as explained by representatives of the workers union, the CFDT: "instead of analysing the pros and cons of each innovation, a diffuse majority favours description of methods allegedly to avoid the use of the examined biotech crops. Ideological assertions are mixed with agronomic arguments"

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(<http://alternatives-economiques.fr/blogs/bompard/archives/150>; translated here from French by M. Kuntz).

The French government has repeatedly cited the CEES as a model for 'improved' GMO evaluation in Europe, but the CEES has never produced a consensus, which was its alleged mission. For example, after the destruction of the Colmar field trial, several organizations represented in the CEES endorsed the criminal act through statements in the press and during a plenary CEES meeting (<http://alternatives-economiques.fr/blogs/bompard/archives/150>). This shocked members of

the CEES, and the ongoing disagreements between environmental groups and organic farming unions on the one hand, and other stakeholders on the other, eventually led to the resignations of several members of the CEES, including the representative of the CFDT, on 17 January 2012. The latter, Jeanne Grosclaude, has written of the problems: “The reason was the radical refusal of any rule or agreement for coexistence claimed by a small number of environmental associations and organic farmers organizations. Their attitude forbids the CEES in the future to analyse any demand for growing genetically modified plants with an open-minded view and to provide decision-making authorities with a balanced proposal. Any further participation to the debate would be useless” (http://ddata.over-blog.com/xxxxxy/1/39/38/37/Comments-from-J_Grosclaude.pdf).

Thus, the danger of a postmodern approach to science, that seeks to include all points of view as equally valid, is that it slows down or prevents much needed scientific research, even denying that science should have a role in such decisions. Of course, such a postmodern approach, which raises the value of ‘independent’ views to the same level as scientific ones, is usually justified by the apparently reasonable political and democratic need for the pluralistic expression of opinions. Indeed, some politicians openly support anti-technology activists in the name of democracy and freedom of speech. For example, in January 2011, members of the Alliance of Liberals and Democrats for Europe (ALDE; www.alde.eu), a group of politicians within the European Parliament, organized a seminar on the risk evaluation of GMOs. The invited speakers were a Senior Scientific Officer from the EFSA, who faced representatives from both the European Network of Scientists for Social and Environmental Responsibility (ENSSER) and the Committee of Independent Research and Information on Genetic Engineering (CRIIGEN); two openly anti-GMO organizations.

The announcement of the seminar was steeped in thinly veiled accusations against the EFSA and the independence of its scientists. Member of the European Parliament (MEP)—and founder of CRIIGEN—Corine Lepage, who co-organized the ALDE seminar, asserted that “it is crucial for policy-makers to have access to unbiased expertise

and to consider all sides of an argument. Fact-finding processes should be systematically organized to hear all sides, as in a court room.” MEP George Lyon, co-organizer, found similarly that “it is vital for farmers, consumers and the environment that the impasse between the two opposing sides be broken”. ALDE itself announced the seminar on its website by stating that the EFSA “has been criticized by independent scientists, NGOs [and] farmers’ unions” (<http://www.alde.eu/event-seminar/events-details/article/seminar-gmo-risk-evaluation-a-contradictory-debate-35941/>). The whole event implied that EFSA scientists are not independent and that trustworthy views from outside the EFSA should be sought. Moreover, implicit in the idea of an EFSA scientist and a non-EFSA scientist is the idea of ‘EFSA science’—which cannot be trusted—and ‘non-EFSA science’—which presumably can. In reality, however, there is only one science, as defined by the application of the scientific method in an objective and unbiased manner.

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Given the foregoing, with the respectable aim to ‘break’ an impasse, it becomes clear that politicians hoist to the rank of major interlocutor a kind of ‘parallel science’. Unlike regular science, ‘parallel science’ serves political goals and describes itself with positive-sounding terms such as ‘science in society’, ‘concerned’, ‘responsible’, ‘independent’ and ‘citizen’ science, which the ‘other’ science is not. It aims to substitute apolitical scientists, especially for risk assessment, with ‘experts’ sympathetic to the cause; they can be from official institutions, universities or self-proclaimed, irrespective of whether their opinion is accepted by other scientists or whether their research methods and conclusions are trustworthy.

‘Parallel science’ emulates normal scientific research: it is published in scholarly journals, it is the subject of international meetings, seminars and congresses, and it is supported by both public and private funding. What distinguishes parallel

scientists from ‘normal’ scientists, however, is that their conclusions are invariably predictable—that GM crops are a danger to human health and the environment for instance—and that criticisms or rebuttals of their results or conclusions will neither change their views nor the conclusion of their next publication.

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Since anti-GMO organizations have based their communication strategy on claims of risk that are by and large rejected by the scientific community, it is logical that these organizations, in their non-compromising political strategy, try to deconstruct science. Thus, anti-GMO groups and environmental organizations at large have a vested interest in teaming up with a postmodernism view of science as a social construct; the aim is to attack the science that stands against their agenda. Thus, postmodernist sociologists—mostly in the discipline called ‘science studies’—have recognized this opposition to innovation as an opportunity to increase their influence and funding possibilities: “not only must existing controversies be welcomed and recognized as participating in democratization of democracy, but in addition they should be encouraged, stimulated, and organized” [12].

In the face of alleged uncertainties, many politicians and citizens find it reassuring to examine several ‘truths’ and shifting paradigms in risk assessment. However, doing so with no reference to indisputable scientific knowledge [13] renders risk assessment unscientific, increases uncertainty and paves the way for arbitrary decisions. This form of postmodernist assault on science has been difficult to grasp for many scientists, because it comes disguised in the clothes of democracy, freedom of speech and tolerance of opinion. However, as the GMO dispute has shown, scientists will never be able to win in postmodern courtroom-style debates: all “social constructs” of science are equal, but some are more equal than others.

CONFLICT OF INTEREST

The author declares that he has no conflict of interest.

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