**THE ROLE OF (SCIENTIFIC) EXPERTS IN A DEMOCRACY**

In every poll asking the public to rank professions by prestige, scientists excel. They command great respect and earn high marks for trustworthiness. They consistently compare well to judges and rank much higher than lawmakers. Scientists also outrank polltakers, which I suppose reveals the public’s view that polls are not scientific. In democratic societies, however, despite general esteem for scientists, political authorities and members of the public often ignore or override what scientists have to say about science. In what follows, I want to consider three major roles that experts play in democratic societies, and to take a brief look at how experts handle some cases when their authority is challenged.

# 1. The educational role of experts.

In democracies, the citizens of the state exercise power either directly or through their elected representatives.1 Most democracies require no special knowledge to vote. The trend, until recently at least, has been to do away with literacy tests and other alleged tests of competence in favor of universal suffrage. Similarly no special knowledge is required to run for elective office. Nevertheless, most would agree that an educated citizenry strengthens democracies because (1) educated voters will choose officials more wisely and (2) educated officials will govern better. Thus, an obvious and traditional role of experts in a democracy is to share their expertise by educating its future and current voters and leaders. Educators agree that some scientific knowledge is an essential part of a successful curriculum. In the US, for example almost all universities require at least one science course for graduation. Depending on how these “science for non-science majors” courses are taught, students can learn a lot about how science works even when the scientific content is fairly rudimentary. Ideally, these courses include not only up-to-date factual information but also techniques for evaluating arguments and exercising critical reasoning. Students gain a more nuanced view of how science works if they learn, for example, that

(1) Available evidence is not always sufficient to command agreement among well-trained scientists.

(2) Despite more or less standardized training, scientists can come to a problem with different backgrounds and assumptions.

(3) Revisions, both minor and major, in scientific theories as the result of discovery of new evidence are normal.

Critics of scientific authority try to exploit these features to devalue science, but students can learn that differences in scientific opinion do not mean that anything goes. Not all opinions are equally good, and criteria exist for judging whether some opinions are worthy of any consideration at all.

Moreover, since education does not end with formal schooling, it is appropriate for experts to engage the public by making themselves available for lectures and media presentations. To do this successfully, experts must not only understand science but also to be able to communicate with their audience. Organizations such as Café Scientifique, with open meetings in many cities throughout the world, foster this sort of communication.

In democracies, science teachers enjoy considerable freedom in how they teach their subject. Teaching evolutionary biology is a notable exception. In the U.S., challenges to teaching evolution began just after the publication in 1914 of a textbook designed for that purpose. The early struggle culminated in the famous Scopes trial of 1925, which resulted in laws that prohibited teaching evolutionary theory in state schools. The courts have overturned many of these laws on the ground that they violate the separation of church and state, but attempts continue to prevent students from learning about a theory almost universally accepted by biologists. Furthermore, what seemed to be an American problem now infects Europe as well. In 2012, for example, a Serbian minister of education tried to block the teaching of evolution in state schools. Fortunately, his efforts were thwarted by activism on the part of the Serbian Academy of Science. Some elements of the religious right have worked to make anti-evolutionism such an integral part of religious identity that apparently no amount of evidence supporting evolution can prevail, and a powerful political group has formed on the basis of anti-evolutionism. It seems that resistance to this particular scientific theory will not be overcome by better scientific education but only by political or judicial means.

# 2. The advisory role of experts.

Because governing a modern democracy is so complicated, democracies expect their elected officials to turn to unelected experts for help. Thus, a second way experts employ their expertise in a democracy is by advising their elected leaders. The advisory role is a natural extension of the educational role. Political authorities commission experts to instruct them about the science that is relevant to policies being considered and the likely scientific consequences of enacting those policies.

In some cases, this advice comes in a highly structured and official form. The High Level Group of Science Advisors to the European Commission is charged with providing the EC with “high quality, timely and independent scientific advice on specific policy issues where such advice is critical to the development of Union policies or legislation.” The Group comprises carefully vetted distinguished scientists, selected to ensure that their advice will be based on the best possible scientific evidence.

The UK has a Government Chief Scientific Advisor who advises the Prime Minister and the Cabinet. In addition to advisory duties, the GCSA is head of the Government Office for Science. Also, in the UK, most individual departments have their own chief scientific advisors.

In the US, Cabinet officers, appointed by the President, head regulatory bodies, such as the Environmental Protection Agency, the Department of Energy and the Department of Health and Human Services. These agencies employ experts to gather information and offer advice. However, even as early as the 1950’s, Rachel Carson, the author of *Silent Spring* [1962] and a major force behind the environmental movement, worried that the heads of such agencies were chosen for political reasons rather than their scientific expertise. Carson’s concern is still relevant. While scientific experts employed in such agencies are civil servants and thus somewhat shielded from political changes, the politically appointed heads of agencies can undermine the work they oversee by failing to fill vacancies in the ranks of scientist-employees and refusing to fund programs. These facts remind us that though scientific experts have an important advisory role, in the end, it is the political leaders who are empowered to act or not act on their advice.

This inability to enforce the policies they recommend is understandably a source of frustration for scientists. Moreover, besides being aware that their role is advisory, experts recognize—or should recognize—another limit to their authority. While they have expertise concerning scientific facts and perhaps can calculate with some accuracy the risks associated with proposed policies, their expertise does not extend to whether the risks should be accepted. That decision is —or should be—up to those who must bear the risk, or up to their elected officials who have won the power to decide for them. In addition, while scientists may assign reasonable probabilities to consequences of particular scientific moves, they cannot predict the future. They may be unable to take into account all relevant circumstances that determine whether a policy will have its intended effect or to foresee unintended consequences. While experts are limited to their field of expertise when making pronouncements as experts, however, there are no such limitations on the appropriateness of their advocacy for positions they hold.

# 3. The advocacy role of experts.

When it appears that ignoring scientific advice can lead to civic peril, scientists often act as powerful advocates for the policies they endorse. This has already been mentioned in the case of filing lawsuits requiring schools to teach evolutionary theory. Although occasionally, individual experts act as advocates, as Einstein famously did when he encouraged President Franklin Roosevelt to heed Leo Szilard’s warning about the dangers of a nuclear arms race, more often advocacy in undertaken as a group effort. In the US, for example, two large non-profit organizations: the American Association for the Advancement of Science and the Union of Concerned Scientists, both non-profit organizations, have the mission of advocating for science, science-based policies, and scientists. These organizations and others, such as Greenpeace, also advocate against policies that they believe ignore scientific evidence to the detriment of the public.

In the U.S., the major, current focus of such groups is to counter attempts to deny the role of humans in bringing about global warming. The decision to pull out of the Paris Climate Accord and the appointment of Cabinet officers intent on undermining all efforts to reduce atmospheric CO2 has alarmed environmentalists all over the world. U.S. scientific groups have protested the disregard of scientific facts regarding the effects of carbon on the atmosphere, the relative costs of pollution prevention and cleanup, as well as the opportunities for workers in clean industry. The public is strongly divided on these issues. Attitudes towards climate change—like views on evolutionary theory—closely align with identification with some significant group, in this case, a socio-political rather than a religious group. Surveys by social scientists show that whether a person is a climate affirmer or denier correlates closely with how they voted in the last election, rather than with their level of education. As some prominent political scientists have pointed out “Citizens care less about the outcomes a policy produces and more about the groups and symbols with which a policy is associated.” 2 Here, it seems the way to change people’s behavior does not rely on better scientific understanding of global warming, but on somehow being able to convince people of the dangers of climate change without undermining their social identity.

Importantly, some advocates for clean energy are sensitive to the social sources of resistance to environmental efforts. They recognize, for example, the immense cost to coal miners and their families of eliminating coal as a major energy source, not only the economic cost but also the threat to their way of living. This problem must be addressed more adequately if public support is to be obtained for clean energy programs. Scientific experts have helped in various ways, such as retraining young miners in agricultural science as well as devising ways to reclaim their land for agricultural use. Environmental scientists also have been active in trying to change hearts and minds of opponents by making clear the immediate dire effects that exposure to pollution has on the health of children.

Proponents of environmental deregulation complain that businesses must bear excessive costs to comply with regulations. Here economic experts can help by acknowledging the costs but also providing cost/benefit analyses to show that regulations should not be rejected carte blanche.

In a political climate hostile to improving the environment, a real threat exists to already-collected federal data on climate change. Government scientists have been working to ensure that those data will not be eliminated under adverse administrations. Also of great importance are the public rallies and marches that have been organized by scientists to support sound environmental policies, federal funding for sciences, and evidence-based policies. These have enjoyed widespread participation. Scientists recognize that addressing the problem of climate change is so important for the future of the planet that they advocate at many levels to spread the message.

Other areas that see conflicts between scientific authorities, political authorities, and the general public, include disputes about the enforcement of childhood vaccinations for communicable diseases and the safety of genetically modified foods.

The anti-vaxxers want to protect their children from scientifically unproven harms of vaccination, such as autism and childhood diabetes; their opponents want to protect society from the proven risk of epidemics of dangerous diseases such as measles. Scientific and political authorities, along with most of the general public, reject the anti-vaxxer arguments. State courts have intervened to require proof of immunization before a child can enter school, but it seems a strict national policy will be required to solve the problem.

Regarding the nutritional safety of genetically modified food, regulatory governmental experts in Europe and the U.S. generally agree about the nutritional safety of GMOs with certain qualifications, such as the assurance that the engineered food is “substantially equivalent” to the natural product, that is to say that it carries no foreign proteins, and that all genetically modified foods are labeled as such. Yet the opinions of these scientists face robust challenges from both groups of concerned citizens and groups of opposing scientists. Some field crops are modified to carry genes that make them pest resistant. This raises worries about whether they are safe for the environment, to say nothing of whether they are safe to enter the food chain. The notion of “substantially equivalent” is open to interpretation, and concerns about long-term effects and unintended consequences are also issues. If the regulatory expert opinions are correct, however, and policy decisions based on them are rejected, consequences ranging from food shortages and even famines can result. The GMO controversy pits experts against scone another. The scientists who work for companies, such as Montsanto, that produce seed for GMO crops testify to their safety, whereas other scientists who want to impose severe constraints on their use, claim otherwise. Impartial testing by government agencies is somewhat limited because companies hold proprietary rights to their GMO seeds.

When experts disagree, which expert—or group of experts—should the nonexpert believe? This is a difficult question, one too complicated to answer here, but there are a few guidelines a nonexpert can follow. For example, when nonexperts have assurances that experts on both sides have similar academic and professional competence, a lay person has some reason to place more confidence in the experts whose jobs do not depend on the corporation whose product they are guaranteeing to be harmless3.

Scientists have long recognized that political and religious ideology content is at the root of many challenges to scientific authority. Thus political activism is needed to supplement reasoned arguments. Appropriate forms of activism even extend to scientists’ running for political office. Such a move, of course, involves seriously interrupting or even abandoning one’s own scientific career. Yet, for many, the sacrifice seems appropriate. More than 400 scientists are currently running for political office in the US.\*

1. Some democracies are more democratic than others. Rankings of the world’s democracies by the UK-based Economist Intelligence Unit consider having such features as (1) free and fair national elections, in which the security of voters is protected, (2) a government free from the influence of foreign powers, (3) media that are largely free from government interference, and (4) civil servants who are empowered to implement policies. Full democracies, those that rank highest, include the UK, Germany, and Spain. Next in rank are flawed democracies, which are represented by the US, Italy, and France. Other studies of democracies, such as Freedom in the World 2018 [Freedom House ,US based NGO that conducts research on democracy], report increasing decline in political rights and civil liberties in leading democracies, particularly the US.

2. Johnson, C, Lavine, H.G., and Federico. (2017). [Open versus Closed: Personality, Identity, and the Politics of Redistribution](https://books.google.com/books?hl=en&lr=&id=SfURDgAAQBAJ&oi=fnd&pg=PR8&ots=HMxHdmT-n7&sig=UQ9acEsyptm5kgPZ6VV0z9tplPg" \l "v=onepage&q&f=false" \o "" \t "_blank), Cambridge University Press, Cambridge.

3. Elizabeth Anderson (2011). Democracy, Public Policy, and Lay Assessments of Scientfic Testimony. Episteme, 8, pp144-1 64 doi:10.3366/epi.2011.0013

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The animosity between authoritarians and non-authoritarians has helped establish what Johnston, Lavine and Federico describe as the “expressive dimension” of policy choices:

In this view, the influence of personality on economic opinion arises not because the expected outcomes of a policy match an individual’s traits, but because those traits resonate with the social meaning a policy has acquired.

They explain further:

Citizens care less about the outcomes a policy produces and more about the groups and symbols with which a policy is associated.

Last year, Federico, writing with [Christopher Johnston](https://polisci.duke.edu/people/christopher-johnston" \o "" \t "_blank) of Duke and [Howard G. Lavine](https://cla.umn.edu/about/directory/profile/lavine" \o "" \t "_blank) of the University of Minnesota, published “[Open versus Closed: Personality, Identity, and thLast year, Federico, writing with](https://books.google.com/books?hl=en&lr=&id=SfURDgAAQBAJ&oi=fnd&pg=PR8&ots=HMxHdmT-n7&sig=UQ9acEsyptm5kgPZ6VV0z9tplPg" \l "v=onepage&q&f=false" \o "" \t "_blank) [Christopher Johnston](https://polisci.duke.edu/people/christopher-johnston" \o "" \t "_blank) [of Duke and](https://books.google.com/books?hl=en&lr=&id=SfURDgAAQBAJ&oi=fnd&pg=PR8&ots=HMxHdmT-n7&sig=UQ9acEsyptm5kgPZ6VV0z9tplPg" \l "v=onepage&q&f=false" \o "" \t "_blank) [Howard G. Lavine](https://cla.umn.edu/about/directory/profile/lavine" \o "" \t "_blank) [of the University of Minnesota, published “Open versus Closed: Personality, Identity, and the Politics of Redistribution,” which also explores the concept of authoritarian voting.](https://books.google.com/books?hl=en&lr=&id=SfURDgAAQBAJ&oi=fnd&pg=PR8&ots=HMxHdmT-n7&sig=UQ9acEsyptm5kgPZ6VV0z9tplPg" \l "v=onepage&q&f=false" \o "" \t "_blank)

[In an email, Johnston summarized some of their findings:](https://books.google.com/books?hl=en&lr=&id=SfURDgAAQBAJ&oi=fnd&pg=PR8&ots=HMxHdmT-n7&sig=UQ9acEsyptm5kgPZ6VV0z9tplPg" \l "v=onepage&q&f=false" \o "" \t "_blank)

[Over the last few decades, party allegiances have become increasingly tied to a core dimension of personality we call “openness.” Citizens high in openness value independence, self-direction, and novelty, while those low in openness value social cohesion, certainty, and security. Individual differences in openness seem to underpin many social and cultural disputes, including debates over the value of racial, ethnic, and cultural diversity, law and order, and traditional values and social norms.](https://books.google.com/books?hl=en&lr=&id=SfURDgAAQBAJ&oi=fnd&pg=PR8&ots=HMxHdmT-n7&sig=UQ9acEsyptm5kgPZ6VV0z9tplPg" \l "v=onepage&q&f=false" \o "" \t "_blank)

[e Politics of Redistribution](https://books.google.com/books?hl=en&lr=&id=SfURDgAAQBAJ&oi=fnd&pg=PR8&ots=HMxHdmT-n7&sig=UQ9acEsyptm5kgPZ6VV0z9tplPg" \l "v=onepage&q&f=false" \o "" \t "_blank),”