Climate change, psychiatric drugs, genetically modified organisms, nuclear power, fluoridation, stem cell research — these are just a few of the hundreds of issues involving science and technology that are vigorously debated. If you care about an issue, how can you be more effective in arguing for your viewpoint and campaigning in support of it? The *Controversy Manual* offers practical advice for campaigners as well as plenty of information for people who want to better understand what's happening and to be able to discuss the issues with friends.

The *Controversy Manual* provides information for understanding controversies, arguing against opponents, getting your message out, and defending against attack. Whether experts are on your side or mostly on the side of opponents, you'll find advice for being more effective. While not taking sides on individual controversies, the emphasis is on fostering fair and open debate and opposing those who use power and manipulation to get their way.

The author Brian Martin is professor of social sciences at the University of Wollongong, Australia. He has been involved in and studied scientific and technological controversies since the 1970s, and is the author of numerous publications addressing controversy dynamics.

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Note about images

All the images used in the controversy summaries were found by searching on the web. None of them indicated a credit to a photographer or artist. When an image was on the site of a commercial or professional organisation, I wrote asking permission to use the image, but received no replies.

In scientific controversies, many campaigners seem to feel free to use whatever resources are available, with little concern for giving credit to creators. The result is that images circulate widely and it becomes difficult to trace the original source.

On some controversies, I found it a challenge to find suitable images for both sides. For example, there are vast numbers of graphics available on the hazards of GMOs, and relatively few on the benefits. Even when using search terms like "benefits of GMOs" or "safety of GMOs," a majority of the images that come up are opposed to GMOs. This might reflect the relative ease of symbolising danger compared to safety or economic gains, or perhaps the enthusiasm of citizen campaigners for using pictures to get their message across.

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1 Robert Boice, *Advice for New Faculty Members: Nihil Nimus* (Boston: Allyn & Bacon, 2000); Tara Gray, *Publish & Flourish: Become a Prolific Scholar* (New Mexico: Teaching Academy, New Mexico State University, 2005).

1
Introduction

The Controversy Manual is designed for participants in scientific controversies — climate change, nuclear power, genetic engineering, vaccination, or whatever. The book is intended to be practical, offering ideas for engaging in debate. Others, including citizens, journalists and students, may also find it useful for understanding what goes on in controversies.

The text has lots of independent sections, so you can dip in wherever you like. There is some logic to the order, though, so you can read from the beginning. Chapter 2 describes some typical features of controversies. It is aimed at helping understand controversies, and is less relevant to campaigning. Chapter 3 is about arguing, namely being effective in conveying evidence and logic in support of a position, or in challenging the opponent's position. Chapter 4 is about communication, including various ways to present and disseminate information and viewpoints. Chapter 5 deals with groups, especially ones set up to promote a viewpoint. Chapter 6 addresses the topic of taking action, from lobbying to sabotage. Chapter 7 tells how to defend against attacks, for example harassment. Chapter 8 canvasses some principles worth considering when engaging in a controversy.

Many campaigners are on the lookout for tips on being more effective on their own issue. This is reasonable but can be limiting. There is a lot to be learned from

studying different sorts of controversies. There are some important patterns worth knowing about.

The examples are meant to illustrate points, not to give a comprehensive account of the arguments, pro or con, concerning any particular issue. Every statement concerning a controversy can be contested, and many of them are. Even naming a controversy can be contentious. So when you read a brief summary and are tempted to say "But what about …?" — add your favourite point here — remember that my aim is not to adjudicate controversies or to provide a balanced view, much less to cover every possible claim and objection, but to offer some ways to understand and engage in controversies.

One of the challenges in giving practical advice is that you might side with scientific orthodoxy on one issue and oppose it on another. Therefore, on one issue you might want to defend mainstream scientists against misguided critics whereas on another you might want to challenge the establishment, exposing its biases and vested interests. If nothing else, it's useful to learn how the other side thinks — and sometimes those on the other side are just like you.

In principle, either side in a controversy can use the information provided here. Supporters or opponents of abortion, climate change or creation science could use insights about the role of arguments or suppressing dissent. Is there a risk that the points here can be used to support retrograde positions? The answer is yes — there is always a risk of providing insights that will be helpful to the "wrong side."

However, the information here isn't entirely neutral. It is more likely to help those who play fair. There is information about the role of groups with vested interests, and how to counter them. There is information on suppression of dissent and how to counter it. There is information on how to build support for a campaign, using a variety of methods from letters to rallies.

I believe scientific controversies should be carried out in an open and fair fashion. This means they shouldn't be determined by the influence of powerful groups or by unscrupulous means. Therefore, I emphasise how to counter powerful groups and respond to abuse and underhanded methods. My hope is the information here will especially help those who seek to promote public understanding of the issues and to enable interested members of the public to participate in decision making.

Climate change

What it is

The temperatures of the earth's atmosphere and oceans are increasing. Most climate scientists say this is primarily due to various human activities, especially the increased production of carbon dioxide by burning coal, oil and natural gas. Carbon dioxide is one of a number of "greenhouse gases" that create the greenhouse effect that helps the earth retain heat. Climate change is also called global warming.

Arguments for urgent action to prevent climate change

• Global warming is occurring at an unprecedented rate, almost certainly due to human activities.

• A unique form of scientific review, the Intergovernmental Panel on Climate Change, attests to the reality and significance of global warming.

• If greenhouse gas emissions are not curbed, the earth's climate will warm significantly over the next century, with catastrophic irreversible effects on human populations and the environment.
• Although impacts are already being observed, most of the adverse consequences will affect future generations and people in poorer countries.

Arguments against urgent action to prevent climate change

• The evidence for global warming is flawed and inadequate: the earth's climate has often varied in the past.
• Even if global warming is occurring, human activities play only a small role in it.
• Curbing carbon dioxide emissions would be harmful to the world economy.
• It is more cost effective to address other environmental and social problems.

Experts and authorities

Nearly all climate scientists and other relevant experts say climate change is occurring, mainly due to human activities. A small number of scientists argue to the contrary.

Vested interests

Companies that sell fossil fuels — coal, oil and natural gas — have a huge stake in continued consumption.

State of play

Some countries and local communities are cutting back on greenhouse gas emissions. Internationally, emissions continue at a level that will cause catastrophic global warming by the end of the century, according to the IPCC.

Alternatives

Energy efficiency and renewable energy sources, such as solar and wind power, can be used to satisfy energy needs. Reductions in greenhouse gas emissions can also be achieved through lifestyle changes such as eating less meat and planning towns to encourage walking, cycling and use of public transport.

2
Understanding controversies

Each controversy has its own special features: colourful personalities, characteristic arguments, startling developments and much else. Yet despite the differences between controversies, there are quite a few standard features.

You might think you really only need to know about the controversy that interests you — and you may know a lot about it. However, it can be very useful to make comparisons with other controversies, in order to provide ideas for campaigning, reveal hidden assumptions in the opponent's position and (if you care about logic) to become more consistent in taking stands.

2.1 What is a scientific controversy?

A scientific controversy is a debate, dispute or disagreement about something to do with science. To count as a controversy, the debate needs to occur over an extended period or involve a lot of people. For example, if two scientists argue for a day about which formula to use, no one will pay much attention. But if two major scientific labs argue for years about which formula to use, it makes sense to call this a controversy.

The focus here is on controversies that involve both scientists and non-scientists, and that involve matters outside scientific journals and labs. Examples are genetic engineering and climate change. Often government policy is involved. These can be called public controversies: they

occur in the public domain and they involve members of the public as well as scientists.

These sorts of controversies involve disputes over scientific knowledge and disputes over matters such as benefits, risks, ethics and policy. Some social scientists who study these sorts of controversies divide them into two parts: a controversy over scientific knowledge and a simultaneous controversy over social issues. So, with this way of thinking, the genetic engineering controversy involves disputes about research findings and disputes about risks, policy and other matters.

Scientific and social issues are often mixed together and interact with each other. The science can't be easily separated out and adjudicated on its own. For example, the existence of a social controversy can affect the research that scientists undertake.

Science and technology

A distinction can be made between science and technology. Science deals with knowledge about the world, so scientific controversies are concerned with what knowledge about the world is correct and with relevant social issues. Technology, on the other hand, involves objects created by humans. Some so-called scientific controversies would better be called technological controversies, for example debates over nuclear power or genetic engineering. For convenience, I usually just refer to scientific controversies, assuming this includes controversies over technology.

In any case, distinguishing between science and technology can be difficult. Scientific knowledge is

needed for many contemporary technological developments. For example, creating new pesticides or antibiotics often depends on scientific advances. There is still a role for practical skills and for trial and error, but the role of scientific understanding is often crucial. Furthermore, testing of pesticides and antibiotics is a scientific process.

Science often depends on technology. Many sorts of experiments rely on sophisticated apparatus. New forms of technology create entire scientific fields. The advent of the computer gave an enormous boost to fields such as numerical analysis.

What are people arguing about?

People involved in a controversy are disagreeing about *something*. What is it? Risks, benefits, ethics? The issues sometimes seem obvious, but it's worth looking more closely to see what's involved.

In many controversies, the debate seems mainly to be about benefits versus risks, such as the economic and social benefits of nanotechnology versus the health and environmental risks and costs. Others that seem to fit this mould are nuclear power, genetic engineering, vaccination, pesticides and fluoridation. Proponents believe these innovations are valuable, even essential, whereas critics say there are risks or economic costs that have been overlooked or are unacceptably high.

Other controversies involve different issues. The abortion debate is often posed as a matter of protecting the human life of the unborn child (opposing abortion) versus a woman's right to make decisions about her body and life (supporting abortion as an option).

The main debate might seem straightforward, but in every controversy, there are several issues involved. Consider for example the nuclear power debate, often posed as a matter of benefits (electricity from nuclear power) versus risks (from reactor accidents and long-lived radioactive waste) and costs. Actually, each side raises a host of issues.

- Nuclear power proponents highlight the power needed to satisfy expanding demand; low cost; low greenhouse gas emissions; large energy reserves; reduction in hazards and pollution from coal-based electricity
- Nuclear power opponents warn about reactor accidents; proliferation of nuclear weapons; long-lived radioactive waste; high cost; energy alternatives based on efficiency and renewable energy sources; mining on indigenous land; vulnerability to terrorism; reduction in civil liberties

Because so many issues are potentially relevant, you can't assume that everyone involved has identical concerns. Some opponents of nuclear power are mainly concerned about environmental and health issues (such as reactor accidents) whereas others are primarily driven by political issues (nuclear weapons proliferation, civil liberties). Campaigners in a controversy often form a coalition held together with a common goal, but with different or overlapping reasons for being involved.

What are the *real* issues? This question is misleading, because it assumes that there are important issues — the so-called real issues — and other issues that aren't impor-

tant. The issues in a controversy are whatever things people think are important.

In many controversies, authority figures — scientists, politicians or media commentators — will say what they think are the real issues, and then dismiss other concerns as irrelevant. Scientists often define the issues as scientific, for example looking at evidence of hazards and dismissing concerns about fairness. Therefore it's important to be aware of all possible issues.

Checklist of issues

• Benefits, for example social welfare, health, jobs, profits
• Risks and harms, for example dangers to health and the environment
• Fairness. Often the benefits go to one group while another group suffers the harm or risk.
• Economics. What are the costs?
• Alternatives. Are there other ways to achieve the same goal?
• Human rights. There may be implications for privacy, freedom of speech and sanctity of life.
• Decision-making. How will decisions be made? Will governments or other authorities impose decisions, or will members of the public — especially those adversely affected — have a say?

Going through this checklist, one thing is apparent: many of the issues are not about science and technology, but about other matters such as fairness and human rights. These are sometimes said to be about "values."

Many scientific authorities assume or say the debate is about facts and evidence, and try to sweep values under the carpet. What they're really doing is making judgements about values but not acknowledging them. In these cases, highlighting the values is worthwhile.

For example, in debates about fluoridation, proponents say that their case is solid: the benefits of fluoridation are huge and the risks are small or non-existent — and therefore opposition is irrational. But there is an assumption about values contained in this argument: collective benefits outweigh individual freedom. When opponents say fluoridation is compulsory medication with an uncontrolled dose, they are opposed to the compulsion and to the violation of medical ethics involved in an uncontrolled daily dose.

2.2 Coherent viewpoints

Suppose that in a controversy, there are four main issues: benefits, risks, ethics and decision-making.[1] How will partisans line up on these issues?

Table 1 presents typical positions of proponents and opponents of fluoridation. The key point here is that hardly anyone prominent in the public debate takes a mixed or intermediate position.

---

1 I used this framework in *Scientific Knowledge in Controversy: The Social Dynamics of the Fluoridation Debate* (Albany, NY: State University of New York Press, 1991).

Table 1. Common stances by fluoridation proponents and opponents

Issue	Proponents	Opponents
Goal	Recommended fluoride levels in public water supplies	No fluoride added to public water supplies
Benefits	Huge	Questionable; not as large as claimed
Risks	Minimal or non-existent	Significant
Ethics	Fluoride in the water supply serves the entire community	Fluoride in the water supply is compulsory medication with an uncontrolled dose
Decision-making	Decisions should be made by governments in consultation with experts	Decisions should be made by communities after hearing both sides

Suppose you join the debate and say the benefits are fairly small but so are the risks. Proponents won't want you saying the benefits are small and opponents won't want you saying the risks are small. Or suppose you say that fluoridation levels should be reduced, to lower the risks.[2] Proponents won't like your concession to oppo-

2 In 2011, the US Department of Health and Human Services recommended lowering the level of fluoride in public water supplies from the range 0.7 to 1.2 parts per million to a flat figure of 0.7 ppm: Centers for Disease Control and Prevention, "Community water fluoridation: questions and answers," http://www.cdc.gov/fluoridation/fact_sheets/cwf_qa.htm

nents and opponents won't like your support for continued fluoridation.

The dynamics of public debates push partisans — those who give talks, write articles and organise activities — to develop *coherent viewpoints*. Their viewpoints take one side or the other on every issue, for example always pro-fluoridation or always anti-fluoridation. Those with intermediate or complex positions receive less encouragement to be involved.

The result is that debates become *polarised*. The two sides become distinct and well-defined.

> The dominant scientific view in the climate-change debate is that evidence shows global warming is occurring, most likely due to human activities. Most of those accepting this view also say action is urgently needed to reduce emissions of greenhouse gases. Sceptics, on the other hand, say the evidence for global warming is not good enough and that any warming that is occurring may be due to natural processes. They also say greenhouse abatement actions are costly and unwise.
>
> There are, inevitably, some intermediate positions. For example, it is possible to argue that significant global warming is occurring but abatement measures are unwise. Or that the evidence for global warming is not all that good but nevertheless it is vital that measures be taken to reduce greenhouse gas emissions. But these sorts of intermediate positions receive relatively little attention. Most of the time, the debate is seen as between the two coherent positions.

Paradigms

The positions in a controversy sometimes become so standardised that they can be said to be paradigms. It is useful to understand the concept of paradigm in order to understand how new evidence is treated in controversies.

Thomas Kuhn, an historian of science, said that within a research field, most scientists carry out their investigations using a standard set of assumptions, methods and goals. They don't actively try to disprove their basic approach. This sort of research, undertaken within the prevailing ideas, Kuhn called "normal science." The standard set of assumptions, methods and goals is called a "paradigm."[3]

Consider the idea of the earth-centred universe, with the sun and planets revolving around the earth. This was the standard view for hundreds of years. It was called the Ptolemaic model, after the ancient astronomer Ptolemy. One problem with the Ptolemaic model was that observations of some celestial objects — such as planets Venus and Mars — didn't fit the model, which assumed objects followed circular orbits. So the idea of epicycles, circular orbits around circular orbits, was introduced. Then more epicycles became necessary. The Ptolemaic model became very complicated with ever more epicycles. Centuries later, Copernicus advocated the concept of a sun-centred

3 Thomas S. Kuhn, *The Structure of Scientific Revolutions,* 2nd edition (Chicago: University of Chicago Press, 1970). This became the most highly cited book in the social sciences. Kuhn's framework is often seen as challenging that of philosopher Karl Popper, whose ideas are mentioned in section 2.8.

universe, eliminating the need for many of the epicycles. However, some were still required, because Copernicus didn't know about elliptical orbits.

The Ptolemaic model was a paradigm: a way of thinking about the universe and analysing all observations. The things that didn't fit were patched up with epicycles. The Copernican model was a different paradigm, with different assumptions. Kuhn called the replacement of one paradigm by another a "scientific revolution."

Back in the 1960s and 1970s, many scientists were thrilled when they discovered Kuhn's idea of normal science occasionally punctuated by revolutions, because it helped them make sense of their experience of boring away at small details within a bigger picture that was never questioned. Kuhn's ideas have been challenged within the history and sociology of science, but they have remained influential in all sorts of fields, well beyond the history of science, including the study of controversies.

In many polarised controversies, the two sides are entrenched in standard debating positions, and nothing seems to dislodge the basic assertions. This applies to controversies like climate change, vaccination, fluoridation and genetic engineering. Each side has a well-developed set of arguments, examples and claims. These coherent positions can be likened to paradigms. In essence, the two sides cannot agree on the same set of rules for resolving their differences. What is convincing to one side is not to the other.

Kuhn's idea of normal science — the research carried out without challenging standard assumptions and methods — requires modification when applied to

publicly controversial topics, in which social issues are more prominent. Scientists are not the only ones involved in the debate or affected by the research: many others, from citizens to companies, are implicated and arguably should have their voices heard. In addition, the level of uncertainty about evidence is far greater than with research programmes within the scientific community, the stakes are high and, in many cases, there is an urgency to take action. Research in this sort of context has been called "post-normal science."[4]

2.3 Evidence

One of the striking features of scientific controversies is that new scientific evidence seldom makes much difference. This can be explained by using the idea of paradigms, along with the role of values.

If participants were open-minded seekers after the truth, then you might imagine that they would look to scientific findings to help adjudicate the controversy. Surely a new study of temperature data should affect the climate-change debate, or a new study of microwaves and brain tumours should affect the mobile-phone debate. But often the two sides continue on much the same, as if no new studies had been done.

---

4 Silvio O. Funtowicz and Jerome R. Ravetz introduced this concept. For a convenient summary see S. Funtowicz and J. Ravetz, "Post-normal science: environmental policy under conditions of complexity," http://www.nusap.net/sections.php?op=viewarticle&artid=13

There are three main reasons why new evidence seldom makes much difference.

• First, partisans look at the issues from their own perspectives — their paradigms — and only evidence that fits their perspective is taken up. Evidence that doesn't is treated as an "anomaly" and ignored or explained away.

• Second, evidence is only part of what keeps a controversy going. There are also differences in values that are seldom challenged by evidence.

• Third, numerous techniques can be used to question unwelcome evidence. See box.

How to deal with a threatening research study

• Ignore it.
• Question the quality of the research.
• Note that the findings don't apply to all situations.
• Say the researchers or research methods were biased.
• Say the research is funded by a group with a vested interest.
• Say the researchers have a conflict of interest.
• Question the relevance of the research: it doesn't address core concerns.
• Note that other research gives different results and focus on the research that supports your own position.
• Say that the study is not definitive: more research is needed.

Evidence does influence *some* people. Indeed, evidence is a powerful tool in controversies, because partisans can use it to challenge opponents and win more

supporters. But evidence doesn't speak for itself. Just because some new research findings are published doesn't mean they will make any difference. What does make a difference is how partisans use the evidence in their campaigning.

Implications

• New evidence seldom makes a big difference in controversies. So don't think that some new study — even one touted as definitive — will decide the matter and convince everyone.

• When new evidence is available, expect each side to use it, question it or twist it to its advantage.

• All evidence can be challenged. No evidence is definitive. Ultimately, it's impossible to know whether evidence is correct or relevant. There are too many examples of bias and distortion, especially when vested interests are involved, to rely on any findings.

News report

"The most prominent political climate sceptics see no reason to change their minds, despite the welter of studies over the past fortnight showing forecasts of global warming were correct or underestimates."[5]

Statistics

In many scientific controversies, claims about numbers play a big role, for example the number of people killed due to a nuclear accident or the risk of an adverse reaction

5 Lenore Taylor, "Sceptics cool on climate studies," *Sydney Morning Herald,* 11 December 2012, p. 4.

to a drug. Statistics, which are used to summarise and evaluate those numbers, thus can become tools in a controversy, used to attempt to win arguments, recruit supporters and denounce opponents. Statistical evidence is a special type of evidence, sometimes treated with undue respect, as if numbers are sacred.

The way numbers are presented makes a difference to their impact. To most people, it sounds more alarming to say that 60 people have been paralysed from an adverse drug reaction than to say the risk of paralysis is one in every 10 million doses. Advocates usually present numbers in ways that support their cause. In the case of risky technologies, opponents usually give larger figures for potential deaths, injuries and environmental impacts, whereas proponents give smaller figures.

One problem is that data often haven't been collected (sometimes due to undone science — see the next section). Another is when the figures can't be accurately evaluated. Yet another is when advocates get the numbers wrong, inadvertently or intentionally, for example by looking at data not relevant to the issue or using statistical models and tests inappropriately.

Supporters of vaccination say adverse reactions are rare and that reports of adverse reactions may be due to coincidence. Just by chance, some children will have seizures at any given time, for various reasons. Having had a vaccination the previous day or week may not be the cause of or trigger for the seizure, especially when young children have numerous vaccines. Hence, such seizures may be dismissed as "anecdotal." Critics of vaccines say the research hasn't been done and there may be 10 or 100

adverse reactions for every one reported. Statistics about adverse reactions are debated, often rightfully so. It is not difficult to bolster one's viewpoint by using statistics, much more than people might suppose.

In the case of new technologies, such as genetic engineering or nanotechnology, drawing conclusions from statistical tests might be premature, because the risks are mostly hypothetical: there might be hazards, but there hasn't been enough time or testing to know. The consequences of global warming are largely in the future, so there can be big differences in the assessments of risk.

Another problem is that many people, including controversy campaigners, do not understand statistics and, as a result, can innocently make mistakes, usually by exaggerating or misinterpreting findings in a way that supports their cause. Many people get their information from the media, but unfortunately some journalists also do not understand statistics and just report claims from advocates without scrutiny. The result is that claims with little or no foundation can be perpetuated.

In the debate about the effects of nuclear war, peace activists have long stated or suggested that everyone will die. Some have said that nuclear arsenals represent "overkill," enough destructive power to kill everyone in the world many times over. However, it is difficult to track this claim back to a careful calculation, aside from an extrapolation from the effects of the atomic bombs dropped on Hiroshima and Nagasaki in 1945, assuming that subsequent arsenals would kill the same number of people per ton of explosive power.

> But extrapolating this way is misleading, because a 2-megaton bomb does not kill 100 times as many people as a 20-kiloton bomb. It would be like assuming that a spider with a venom 100 times as great will kill 100 times as many people, which doesn't take into account the number of people bitten. However, most people have no idea about research on the effects of nuclear weapons and, especially if they are opposed to nuclear weapons, are ready to believe the worst — including that everyone will die.[6]

As well as unfamiliarity with statistics, another factor is deception: some advocates are willing to use numbers in any way possible to support their cause, including by picking numbers out of the air or by exaggerating or minimising without justification. Some are hired to do a job, such as those who work for tobacco companies. Others believe totally in their causes and believe that numbers, because they aren't accurate anyway, can be used in a way to get the best result to promote their views. However, misuse of statistics can sometimes backfire, when claims are exposed as ridiculous or, worse, as having been intentionally manipulated.

In an ideal world, campaigners would try to understand statistics and to use them in a fair way. More pragmatically, understanding statistics enables you to

6 I wrote about the lack of evidence for overkill in "The global health effects of nuclear war," *Current Affairs Bulletin,* Vol. 59, No. 7, December 1982, pp. 14–26. Since then, some campaigners have claimed human extinction from nuclear war is possible from nuclear winter. This is another claim that can be contested.

detect and counter misuse by opponents. The foundation of better understanding is to recognise that statistics are not facts, but are created by humans for specific purposes, and they can be misunderstood, misrepresented, manipulated and mangled. But rather than cynically rejecting figures altogether, it is sensible to understand that some statistics are far better than others. The better ones have been carefully collected using methods to minimise bias, and are presented in a non-partisan manner.[7]

Nuclear accidents: the role of evidence

Proponents of nuclear power say it is extremely safe. They often make comparisons with coal. To produce one megawatt of electricity from burning coal, lots of coal has to be mined, and there is a cost in death and injuries to miners. But to produce one megawatt of electricity from nuclear power, a relatively small amount of high-grade uranium needs to be mined, so fewer miners will be injured or die.

In terms of routine emissions from operating plants, burning coal has even greater health effects, with poisonous emissions from coal-burning contributing

7 For excellent primers on the use of statistics on contested policy issues, with many revealing examples, see Joel Best, *Damned Lies and Statistics: Untangling Numbers from the Media, Politicians, and Activists* (Berkeley, CA: University of California Press, 2001; 2012); *More Damned Lies and Statistics: How Numbers Confuse Public Issues* (Berkeley, CA: University of California Press, 2004); *Stat-spotting: A Field Guide to Identifying Dubious Data* (Berkeley, CA: University of California Press, 2008). In this section I have drawn heavily on Best's work.

significantly to respiratory disease. Routine emissions from nuclear power plants cause far less disease, according to standard calculations about the effect of radioactivity on human health.

Critics of nuclear power have raised several concerns, including the risk of catastrophic accidents at nuclear power plants and the problem of long-lived radioactive waste. Burning of coal doesn't have these problems. Let's look at the debate about nuclear accidents.

If the core of a nuclear power plants overheats, it can melt down and result in the release of massive quantities of radioactivity, as in the case of the Fukushima Daiichi reactors in March 2011. To prevent this, there are cooling systems and other protective features. In 1975, the Rasmussen report[8] appeared with its calculation that the risk of a reactor meltdown was extremely low — in other words, nuclear power was extremely safe. Critics of nuclear power said that the Rasmussen report had overlooked some possibilities.

This was a classic case of evidence not having much effect on the position of the key partisans. Proponents treated the Rasmussen report as authoritative, but opponents continued with their criticisms just the same.

One of the most effective techniques of the anti-nuclear campaigners was to highlight earlier accidents

8 Norman Rasmussen et al., WASH-140 ("The Reactor Safety Study"), Report to the Nuclear Regulatory Commission, 1975.

and near misses. For example, there was an accident in 1975 at the nuclear power plant at Browns Ferry, Alabama, in which several safety systems simultaneously failed. There was no meltdown, but it was a near miss, according to critics.

The proponents preferred not to mention Browns Ferry. Instead, they said that no member of the public had died from the operation of nuclear power plants.

The opponents pointed to a serious accident at a military nuclear plant, in which several workers died. Proponents again referred to the safety of *civilian* power plants.

The efforts of the opponents made nuclear safety a key issue in debates. Media were much more sensitised to the risks. Hollywood jumped on the bandwagon with a film about a possible reactor meltdown. Titled *The China Syndrome* and released in 1979, the drama featured Jack Lemmon as a nuclear engineer and Jane Fonda as a journalist. Shortly after this, life imitated art: a nuclear reactor at Three Mile Island, Pennsylvania, suffered a partial meltdown. Over a period of several days, the reactor drama transfixed the world. Nuclear accidents were a vivid reality, not just a hypothetical possibility.

The Three Mile Island accident shifted the debate about nuclear power — but why? It was new evidence, to be sure, but what did it mean?

Proponents of nuclear power claimed that no one was harmed by the accident. The safety systems worked to prevent a massive release of radioactivity. The proponents had always accepted that there would

be some nuclear accidents. If this was the worst case scenario, then it wasn't that bad, certainly compared to the tragic toll of deaths and disease from coal-fired electricity.

This pro-nuclear take on Three Mile Island was logical enough, even taking into account that it ignored possible cancers and subsequent deaths from the releases of radioactive gases during the accident. But the pro-nuclear position had been already weakened by the constant attention to nuclear accidents in the debate, with opponents continually raising it. Because nuclear meltdowns were in people's awareness — and the media's awareness — the near miss at Three Mile Island had a far greater impact than it might have otherwise.

Think back to the Browns Ferry accident in 1975. The nuclear debate at that time was much lower key, so the accident received little media attention. The point here is that new evidence had an impact in part due to groundwork laid earlier in the debate.

In 1986, there was a much more serious nuclear accident at a power plant in Chernobyl in the Ukraine, then part of the Soviet Union. A massive explosion (a steam explosion, not a nuclear explosion) spewed radioactivity into the atmosphere and before long it was detected in Sweden. This was the sort of accident that opponents had been warning about.

Nuclear proponents weren't about to give up. They blamed the accident on operator error, said it wouldn't have occurred in western plants that have better safety systems, and said the death toll was relatively small.

They interpreted the accident in the way most favourable to nuclear power, again illustrating that no evidence is definitive.

However, anti-nuclear activists were better able to make use of the Chernobyl accident as new evidence, because they had been raising concerns about nuclear accidents for a long time, and both the media and the general public were sensitised to the issue.

What really happened at Chernobyl? What really is the death toll? (Advocates of nuclear power say as low as a few dozen; opponents say as many as 100,000 or more deaths can be attributed to the accident.) What really are the long-term environmental consequences? These are the sorts of questions typically debated. Scientists are divided. The point here is that no evidence is obvious and unambiguous as long as there are campaigners willing to argue about different interpretations.

Although new scientific evidence seldom helps to resolve controversies, evidence is one of the most highly contested aspects of controversies. Several potential facets of battles over evidence are covered in the next four sections.

- Undone science: evidence doesn't exist because the research to produce it hasn't been carried out
- Hidden evidence: evidence exists but is not readily available
- Bias in research: evidence might be untrustworthy
- Onus of proof: assumptions are made about what needs to be proved

2.4 Undone science

Scientists do not research every possible topic. There are so many possible things to investigate that choices must be made. Some topics are ignored because they are too costly, too difficult or simply uninteresting. Other topics are not researched because no one provides funding and support to study them. Critics of fluoridation say there have been no fully randomised controlled trials of the benefits of fluoridation. Governments and corporations may not want certain topics investigated, refuse to fund them, and put pressure on researchers to avoid them.

Governments and corporations sponsor research that serves their interests. In the 1950s, the US government massively funded research into nuclear power but largely ignored solar power, a different way to provide energy. In 1952, the Paley Commission in the US recommended a solar-based energy system, but its advice was not heeded. Nuclear power fitted into the agendas of nuclear states: it is centralised, high-tech and easier to monopolise. So, at the time, solar power research remained undeveloped compared to what could have been done.

For decades, pharmaceutical companies have been funding research into drugs to solve various health problems — but only some sorts of drugs, those that can be patented. Pharmaceutical companies seldom research the health benefits of unpatentable substances, such as vitamins and minerals. Pesticide manufacturers are not going to sponsor research into organic farming. Automobile manufacturers are not going to sponsor research into

cycling and public transport. Government nuclear agencies are not going to sponsor research into energy efficiency.

Funding is only part of the equation. Even scientists who do not depend on external funding, such as some who do desktop research in universities, are affected by the priorities set by the major funders of research. Scientists seek to publish their work, and know that journals are more receptive to submissions on topics seen as significant. Topics are more likely to be seen as significant when governments and industry endorse them and provide massive funding. For this reason, studies of genetic influences on disease receive much more attention than studies of environmental causation.

The result of this sort of selective funding and setting of research agendas is that scientific knowledge develops unevenly. If ignorance is like the darkness in a huge cavern, and scientists are trying to put some light on the subject, their endeavours are affected by those who supply the spotlights and help determine the way they point. When lots of scientists are looking in one direction, most others will look the same way.

When research areas are neglected because of political factors — the influence of money, power and careers — these areas are called "undone science."[9] Sometimes no

9 David Hess, *Alternative Pathways in Science and Industry: Activism, Innovation, and the Environment in an Era of Globalization* (Cambridge, MA: MIT Press, 2006). See also Scott Frickel et al., "Undone science: charting social movement and civil society challenges to research agenda setting," *Science, Technology, & Human Values,* Vol. 35, No. 4, 2010, pp. 444–473.

research in these areas is done at all; sometimes research is done but not published (often due to corporate or government controls, but sometimes resistance by editors and referees).

Standard assumptions and protocols concerning how research work should be carried out sometimes lead to areas of undone science. For example, conventional field studies of the effects of pesticides on honey bees look at only one or two chemicals at a time, comparing bee colonies receiving no pesticides to those receiving specific doses of the individual pesticide(s) in question. Commercial beekeepers, in contrast, have observed effects that point to a complex interplay between multiple chemicals and other factors such as nutrition and parasites. Because the beekeepers' observations do not constitute proper experimentation according to the historically established methods of conventional entomology, areas of scientific ignorance are perpetuated.[10]

Imagine a giant building in which all possible knowledge resides. Humans, through their investigations, have gradually extracted some of this knowledge near the doors, windows and various other apertures, making incursions of a few centimetres or metres. Deep within the building are vast areas as yet unknown and untouched,

10 Daniel Lee Kleinman and Sainath Suryanarayanan, "Dying bees and the social production of ignorance," *Science, Technology, & Human Values,* Vol. 38, No. 4, July 2013, pp. 492–517; Sainath Suryanarayanan and Daniel Lee Kleinman, "Disappearing bees and reluctant regulators," *Issues in Science and Technology,* Vol. 27, No. 4, Summer 2011, pp. 33–36.

perhaps unimagined. These are areas that have not been studied because no one yet has any idea of how to go about it, or technology does not exist to do it. Undone science, though, is much closer to the existing doors and windows. If we look in a window, we find that incursions have been made to the right-hand side but much less knowledge has been extracted nearby to the left. That's the undone science: research that could have been carried out but hasn't. Knowledge could have been extracted from the building but is still sitting inside while other knowledge has been pursued.

The usual debates are about the knowledge that has already been extracted from the building. The concept of undone science is a reminder to also argue about knowledge that still sits there in the building, even though it could be extracted without too much trouble. (Rather than the metaphor of knowledge in a building, you might prefer a different way of thinking about undone science.)

Uneven patterns of scientific development are common in scientific controversies. In many cases, one side has backing from powerful groups able to sponsor research, whereas the other side has support from only a relatively few scientists, often with little funding. For example, critics of vaccination want more documentation of adverse reactions to vaccines, but this is not a priority for proponents. Critics of genetically modified foods want more research into possible adverse health impacts. Critics of high-voltage power lines want more research into the health effects of living nearby.

When someone says, "The evidence overwhelmingly supports our position," it is worth looking closely at

undone science. Maybe there's little or no funding for non-orthodox research. Maybe contrary evidence hasn't been pursued due to antagonism from bosses or referees. Maybe scientists dismiss observations by non-scientists as anecdotal and not worth studying. The phenomenon of undone science is another reason why evidence is seldom a definitive way to resolve a controversy: the available evidence may not be a reasonable sample of all possible evidence that would be produced if funding were provided and research carried out.

2.5 Hidden research

Some evidence is hidden, denied and obscured, so that others do not find out about it. Tobacco companies sponsored research into the health effects of smoking, but when it was contrary to their interests they prevented or discouraged its publication.[11] Hiding of evidence is most common by groups with enough money or influence to both sponsor research and prevent adverse findings becoming known. But it can happen on the other side too, for example when a scientist sympathetic to a dissident view decides not to publish findings that support orthodoxy.

Sometimes research findings are published in obscure places such as a low-profile scientific journal, a working paper series of a small institution, or an expensive trade journal. Officially, the research has been published, but in

11 Stanton A. Glantz, John Slade, Lisa A. Bero, Peter Hanauer and Deborah E. Barnes, *The Cigarette Papers* (Berkeley, CA: University of California Press, 1996).

practice it is not readily accessible or widely known. If the findings support one side in a debate, then partisans on that side need to track down and publicise these results. This is easier when the results are available online. Print-only publication without obvious keywords is a path to obscurity.

Campaigners can obtain obscure but relevant findings in various ways, including by:

- searching through archives (physical and electronic)
- subscribing to newsletters and other publications from the other side
- writing to or phoning scientists asking for copies of papers, including unpublished ones, not readily available on the Internet
- interviewing scientists and research administrators
- using freedom-of-information legislation to obtain documents
- cultivating informants within organisations, who can reveal what has been done and perhaps leak copies
- talking to dissidents and investigative journalists, who often have access to inside information.

When a piece of research becomes known, the next level of struggle is over its meaning and significance.

2.6 Bias in research

In 1972, in the second year of my PhD, I started doing research related to the controversy over supersonic transport aircraft, or SSTs. These proposed jets fly faster

than the speed of sound — that's why they are called supersonic — at a very high altitude, sometimes in the stratosphere, a layer of the atmosphere starting about 10 km above the earth's surface. There was a raging controversy over SSTs, especially over the sonic boom, a thunderclap of sound at ground level when the jets fly supersonically. In 1970 and 1971, a new concern was raised: exhausts from SSTs might cause a reduction in stratospheric ozone. This ozone is important because it screens incoming solar radiation, reducing the amount of ultraviolet light that reaches the ground. Ultraviolet light in turn is a factor in skin cancer as well as having effects on plants.

Some of the exhaust gases from SSTs are nitrogen oxides, formed in jet engines by the burning of nitrogen in the atmosphere.[12] The research I was involved with concerned where these nitrogen oxides moved to in the stratosphere and how long they stayed there.

One of the most influential studies of the effects of SST exhaust on ozone was by Harold Johnston, a chemist at the University of California, Berkeley. In a paper published in the prestigious journal *Science* in 1971, he presented calculations showing significant reductions in

12 In atmospheric chemistry, "nitrogen oxides" refer to nitric oxide (NO) and nitrogen dioxide (NO_2). The two of them are denoted NO_x, where x can be 1 or 2.

stratospheric ozone due to the exhausts from a fleet of 500 SSTs.[13]

But not everyone agreed. Two years later, a paper was published in the similarly prestigious journal *Nature* authored by meteorological researcher Peter Goldsmith and colleagues.[14] They examined ozone levels before and after atmospheric nuclear weapons tests — which, like SSTs, deposit nitrogen oxides in the stratosphere — and found that ozone levels were not affected by injection of nitrogen oxides equivalent in amount to those emitted by a fleet of SSTs. This was exactly the opposite of Johnston's conclusion.

These sorts of divergences in scientific results are quite common, especially in controversial areas. One response is to toss up your hands and say, "the scientists disagree." Another is to try to discredit the authors, for example by finding links between Goldsmith and SST promoters. Here I will describe a different approach: delving into the scientific studies and examining what the researchers did. Back in the 1970s, I did just this, using

13 Harold Johnston, "Reduction of stratospheric ozone by nitrogen oxide catalysts from supersonic transport exhaust," *Science,* Vol. 173, 6 August 1971, pp. 517–522.

14 P. Goldsmith, A. F. Tuck, J. S. Foot, E. L. Simmons and R. L. Newson, "Nitrogen oxides, nuclear weapon testing, Concorde and stratospheric ozone," *Nature,* Vol. 244, 31 August 1973, pp. 545–551.

the papers by Johnston and by Goldsmith and colleagues as test cases.[15] The same approach is still relevant today.

Technical assumptions

In doing research, scientists have to make assumptions about all sorts of things. This depends a lot on the field. In chemistry it might be about reaction rates whereas in epidemiology it might be about the characteristics of different populations. The key thing to figure out is what the scientists have assumed in carrying out their research. Sometimes they spell out their assumptions, but you need to identify the significant ones. Other times the assumptions are implicit and need to be uncovered.

Johnston, in his model of how nitrogen oxides affected stratospheric ozone, made assumptions about where the exhaust from SSTs ended up. He used a variety of models. Some of his models — the ones showing the greatest effect from the exhaust — involved the nitrogen oxides being spread out from the bottom to high up in the stratosphere. A critic could argue that Johnston's models exaggerated the effect of SST exhaust because SSTs fly near the bottom of the stratosphere.

Goldsmith et al.[16] calculated the quantity of nitrogen oxides produced by nuclear explosions. In a

15 Brian Martin, *The Bias of Science* (Canberra: Society for Social Responsibility in Science (ACT), 1979). Available at http://www.bmartin.cc/pubs/79bias/, including reprints of the articles by Johnston and by Goldsmith et al.

> nuclear explosion, it is possible for condensation — rain, basically — to occur and to absorb some of the nitrogen oxides on its way down. One of Goldsmith et al.'s technical assumptions was that there was no rain-out of nitrogen oxides. Their assumption therefore had the effect of strengthening their conclusion.
>
> My assessment is that both Johnston and Goldsmith et al. made technical assumptions that "pushed" their arguments towards their preferred conclusions. In Johnston's case the push was towards showing a larger environmental impact of SSTs; in Goldsmith et al.'s case the push was towards showing a smaller impact.

Technical assumptions are found in most, if not all, scientific studies. Some examples are:

- climate change models
- calculations of the risk of a nuclear reactor accident
- epidemiological studies of the effect of fluoridation on tooth decay
- studies of the effectiveness of cancer treatments.

Suppose you are engaged in a scientific controversy and the other side touts some studies. You can obtain the studies, examine them closely, identify technical assumptions and decide whether different assumptions would have led to different findings — and how important this is. To do this requires a level of technical understanding, but you don't have to have a PhD in the field to undertake

16 The Latin expression "et al." means "and others." When an article has more than two authors, "et al." is commonly used after the name of the first author to refer to the other authors.

such an analysis. But it does require time and effort, and it's extremely valuable to be able to ask some experts in the field for advice along the way.

Selective use of evidence

Scientists, in developing their arguments, often draw on evidence from a range of sources. Darwin, in making his case for evolution, used evidence gathered from a range of species. Of course he couldn't use all possible evidence: that would be too much. So he had to select which evidence to use and which to ignore.

Inevitably, scientists' selection of evidence involves value judgements. Scientists might justify their selection on the basis of factors like quality, relevance, accessibility and timeliness.

Because evidence is selected, it is usually possible for scientists to pick evidence that supports the conclusion they favour. This can be a conscious or an unconscious process. Scientists often believe they are unbiased, but bias can creep in through their selections.

Johnston used information from a report, the Study of Critical Environmental Problems (SCEP), published the year before his own study. SCEP gave estimates of the amount of nitrogen oxides deposited in the stratosphere by a fleet of SSTs, and said the levels in heavily travelled areas might be ten times as high. Johnston in his model assumed the nitrogen oxides were spread across the stratosphere in different ways — this was a technical assumption — and then applied

the SCEP figure of ten as well. This could be interpreted as a kind of double counting of the SCEP data.

Goldsmith et al., to determine whether atmospheric nuclear tests affected levels of stratospheric ozone, had to select ozone records. They made some arbitrary assumptions about the ozone records they would include, with the result that the ozone data they examined was a small portion of the total possible data relevant to nuclear tests.

Goldsmith et al. also presented long-term ozone records from two stations. This appeared to support their argument, though the records from these particular stations had little relevance.

Most scientific research involves using data, either collected by the researchers themselves or chosen from results produced by other scientists. By selecting some data but not others, there is a possibility of biasing the results. The most obvious option is to select evidence that supports the argument and ignore or dismiss evidence that undermines it. It's also possible to present data that seems important but is actually irrelevant.

To analyse the use of evidence in a study, it's useful to find out about all possible evidence that could be used — a very big task! — and then see whether the evidence used by the researchers is a fair or a biased selection.

Selective use of uncertainties

Any piece of data is uncertain to some degree. Suppose you use a ruler to measure the length of a lizard. You might come up with a length of 273 millimetres. One

limitation is the precision of the ruler. Another is whether the lizard is fully stretched out. You might judge that your measurement is accurate to within 1 millimetre, so you could record the length as 273±1 millimetres.

To obtain a more accurate assessment of the uncertainty, you could measure the length 10 or 20 times, or get several people to measure the length. Then you would have a distribution of results from which you can calculate a mean and standard deviation. The mean is your best estimate of the length and the standard deviation is a measure of the uncertainty in the mean.

Uncertainties are involved in every aspect of scientific research. There are uncertainties in reaction rates, temperatures, numbers of cancers and just about anything else you can name. Some uncertainties occur when taking a measurement, like the length of the lizard. Others occur because different researchers have come up with different findings or because interpretation is involved, as in judging whether something counts as a cancer.

Johnston treated uncertainties in the distribution of nitrogen oxides in the stratosphere, but not concerning the amount of the nitrogen oxides. He emphasised small uncertainties that did not affect his result but gave less attention to larger ones.

Goldsmith et al. addressed uncertainties in their calculation of the amount of nitrogen oxides produced in a nuclear explosion. But they hardly mentioned other important uncertainties in the amount of nitrogen oxides produced by SSTs and whether nitrogen oxides from SSTs were likely to have the same effect on

ozone as equal amounts of nitrogen oxides from nuclear weapons tests. Like Johnston, Goldsmith et al. emphasised uncertainties that had little effect on their results and de-emphasised ones likely to have a large effect.

Uncertainties are a crucial part of scientific research: when observations are involved, there is always the possibility that the results could be different. To give an honest account of the findings, every important uncertainty should be spelled out.

However, there are pressures on scientists to de-emphasise uncertainties. If the uncertainties are too large, the results may not seem significant. Emphasising that a result is subject to numerous qualifications can make a scientific paper seem wishy-washy and hence harder to publish. A definite, confident result is usually more memorable.

In many studies, uncertainties are expressed statistically, for example as standard deviations or p values. These seem to be a precise way of presenting the precision of results. The question then becomes, are all of the most important uncertainties presented?

The implication is that when analysing a scientific paper, it is worthwhile paying close attention to possible sources of uncertainty and whether these are fully spelled out.[17]

17 Brian L. Campbell, "Uncertainty as symbolic action in disputes among experts," *Social Studies of Science,* Vol. 15, 1985, pp. 429–453, analysed the arguments of scientists about uncertainty in a dispute over a pipeline in Canada, finding that

Selective use of results

Suppose a botanist counts the number of anteaters in six coastal zones and comes up with these figures: 16, 42, 25, 3, 150, 61. These figures are listed within a paper on the subject. The abstract of the paper might say, "Anteater numbers were found to be as low as 3 in coastal zones," or it might say, "Anteater numbers were found to be as high as 150 in coastal zones." By selecting certain results rather than others, a very different message can be sent to readers.

> Johnston used four models for how nitrogen oxides from SSTs would be spread through the stratosphere (a technical assumption) and came up with ozone reductions of 3, 12, 23 and 20 percent. For each model, he then assumed ten times as much nitrogen oxide (selective use of evidence) and came up with ozone reductions of 3, 14, 42 and 50 percent. So Johnston had results ranging from 3% to 50%, quite a range. One of the sentences in the abstract to his paper reads "The projected increase in stratospheric oxides of nitrogen could reduce the ozone shield by about a factor of 2 …" A factor of 2 is a reduction of 50%: Johnston chose the largest result from his calculation for emphasis in the abstract. The figure of 50% is also emphasised in summaries in his paper.

"Critics tend to claim uncertainty while defenders tend to claim adequate knowledge" (p. 439).

> Goldsmith et al. looked for, but didn't find, reductions in stratospheric ozone from nuclear explosions and then pointed out that these explosions had put as much nitrogen oxide into the stratosphere as a fleet of SSTs. A major qualification is that nitrogen oxides from SSTs would be in different places in the stratosphere than nitrogen oxides from nuclear explosions. But Goldsmith et al.'s abstract states, "Although amounts of nitrogen oxides equivalent to the output from many Concordes were released into the atmosphere when nuclear testing was at its peak, the amount of ozone in the atmosphere was not affected." The abstract doesn't even hint at the major qualification. Consider this alternative, hypothetical abstract: "Although nitrogen oxides equivalent in amount (if not necessarily in their effect on ozone) to the output of many Concordes probably were released into the atmosphere when nuclear testing was at its peak, our analysis reveals no detectable correlated changes in total atmospheric ozone."

Both Johnston and Goldsmith et al., in referring to their own results in their abstracts and summaries, made their findings appear much more striking and unqualified than the full treatment of results in the bodies of their papers. In other words, they pushed their conclusions by the way they referred to their own results.

Many people, when reading a scientific paper, start with the abstract and perhaps look at the conclusion, and don't bother studying the more technical treatments in the body of the paper. When scientists misrepresent their own

research by emphasising extreme results or downplaying uncertainties or contrary findings, many readers won't notice.

The takeaway message is that in analysing a scientific paper, it is vital to study the findings embedded in the body of the text, and compare them to the results highlighted in the abstract and in summary sections. Sometimes the abstract gives an exaggerated or unqualified representation of the full range of findings. In a few cases, the abstract is actually contrary to the findings. Boring even more deeply, it's worth checking the data in tables or supplementary files and seeing whether they are compatible with summaries in captions or statements.

Although it is sometimes said, "The data never lie," interpreters of the data may apply a bit of spin.

Referring to alternative arguments

A scientific paper usually presents a point of view: there is a finding and a conclusion. What about other papers that present different points of view? How are they referred to? Some possibilities are:

- Alternative arguments are given full and respectful treatment.
- Alternative arguments are briefly mentioned.
- Alternative arguments are denigrated.
- Alternative arguments are totally ignored.

By ignoring or casually dismissing alternative arguments, scientists can push their own arguments.

> Johnston in two cases put information inconvenient to his argument in the reference notes at the end of his

> paper. One case involved figures on emissions from SSTs. Johnston used the larger figures, that made his results larger, and stuck the qualification about the figures into a note. The other case involved a calculation by two scientists, Park and London, with a different result. Johnston wrote later that Park and London had made a mistake but he didn't want to embarrass them about it in print.
>
> Goldsmith et al. referred to alternative findings with dismissive language. They referred to Johnston's work as "speculation" while referring to their own conclusions as "inescapable." They also referred to a different study, by Johnston, Whitten and Birks (JWB), that came up with a different finding concerning the effects of nuclear explosions on stratospheric ozone. Goldsmith et al. said that JWB only "suggested" their findings and used their own data to rebut an argument based on JWB's data without showing that their own data were superior. The tenor of Goldsmith et al.'s treatment of ozone records denigrated the quality and significance of JWB's work.

It's worthwhile to pay close attention to the way authors refer to alternative arguments. If you know the field, you should be familiar with research with contrary findings. Check to see whether it is cited at all. If it isn't, this is a likely indicator of bias. If it is discussed but dismissed in cursory or misleading ways, that's a different approach — and still biased.

Mood of a paper

The way a scientific paper is written and presented establishes a mood or atmosphere that can influence the way readers think about the issue. This is most commonly done through language.

It is worthwhile to pay attention to the language used in a scientific paper. Although overtly emotive language is not common, there are always choices between different terms, which will have different connotations. Tables, diagrams and formatting can also contribute to the mood of a paper.

Table 2. Examples of language used by Johnston and by Goldsmith et al.

Johnston	Goldsmith et al.
"ozone shield"	"ozone layer"
"burden of NO_x"	"amounts of NO"
"threat to stratospheric O_3"	"interact with, and so attenuate"
"permitting the harsh radiation … to permeate the lower atmosphere"	"increase the ultraviolet radiation reaching the planetary surface"

Johnston's language creates images of a precarious environment, in which stratospheric ozone (O_3) is a shield against dangerous ultraviolet light ("harsh radiation"). However, this shield is threatened by nitrogen oxides (NO_x) emitted by SSTs; these nitrogen oxides are a "burden" on the atmosphere. Goldsmith et al.'s language is more neutral. Nitric oxide (NO) is present in "amounts" that "interact with, and so

attenuate" or reduce stratospheric ozone, called the "ozone layer."

Language is also important in the way alternative arguments are referred to and in the way other researchers are described. In some debates, choice of language indicates a position. In the abortion debate, "pro-life" and "pro-choice" indicate the two main opposing perspectives. In the euthanasia debate, opponents commonly refer to "suicide" and "killing," whereas proponents use expressions such as "right to die" and "dying with dignity."

Summary

Scientific research is commonly presented as being dispassionate or objective, aiming to determine truths about nature. In practice, studies can be biased towards particular conclusions. To uncover bias, it can be useful to closely analyse key scientific papers, looking at technical assumptions, the way evidence is used, the way uncertainties are used, the way authors refer to their own results, the way they refer to arguments other than their own, and the language they use.

It is tempting to allege that individual scientists are themselves personally biased. No doubt many of them are. However, it is usually safer to point to bias in their work. Many scientists believe they are neutral, objective researchers. It is easier to show bias in their writings and speech than in the way they think.

Table 3 lists some of the many biases that can occur in the choice of research topics, the carrying out of

research, publicising of findings and treatment of dissenters.[18]

Table 3. How to foster bias in scientific research

Category	Approach	Behaviours
Undone science	Discourage research in areas in which results might be unwelcome	• Do not fund research in the area • Pressure researchers not to do studies in the area • Refuse ethics approval for unwelcome studies • Refuse access to resources (laboratories, equipment, data); refuse access to patients • Reduce job prospects for researchers who do or might do studies in the area • Attack scientists doing dissenting studies (see "suppression" below)
Censorship	Stop selected research from being published or reported	• Reject submissions • Prevent employees from submitting work for publication • Refuse to publish rebuttals • Refuse permission to give talks; block publicity about talks • Pressure journalists and editors to run only certain types of stories

18 Special thanks to Melissa Raven and Adrienne Samuels for valuable suggestions concerning this table. For an informative discussion of biases in drug trials, and several other methods in this table, see Ben Goldacre, *Bad Pharma: How Drug Companies Mislead Doctors and Harm Patients* (London: Fourth Estate, 2012).

Deception	Produce and publish deceptive studies	• Design studies so they come to predetermined conclusions • Use subjects not representative of the sample said to being studied • Use a reactive placebo • Use inappropriate comparison drugs or dosages (too low to be effective; too high, so likely to cause significant side-effects) • Study the wrong subjects • Prime subjects to express a particular view • Evaluate irrelevant variables (e.g., ingestion of GMOs as the cause of an immediate rise in blood pressure) • Omit data • Omit information on error ranges • Use incorrect statistics • Falsify data • Draw conclusions that don't follow from the results • Give misleading abstracts/summaries (that don't reflect a study's results) • Withhold trial protocol details • Hide conflicts of interest
Sponsorship	Support selected scientists and publications	• Hire/fund sympathetic scientists • Hire/fund hostile or dissenting scientists, to divert, muzzle or co-opt them • Provide gifts and other favours to sympathetic scientists • Sponsor journal supplements

		• Sponsor journals that appear scholarly but are corporate fronts • Sponsor conferences/symposia • Ghostwrite articles • Send submissions to sympathetic reviewers • Stack ethics committees and institutional review boards • Infiltrate professional organisations
Impression management	Promote favourable findings; dismiss unfavourable findings	• Recruit journalists through gifts and exclusives • Trumpet favourable findings • Ignore contrary findings • Dismiss contrary findings • Tout apparently independent experts who have undisclosed conflicts of interest • Set up fake citizens' groups
Suppression of dissent and dissenters	Hinder or attack critics	• Refuse to hire dissenters • Deny research grants • Deny ethics approval • Prevent access to data and resources • Make derogatory comments • Spread damaging rumours • Publish criticisms in the mass or social media • Make formal complaints (e.g., to a dissenter's boss) • Threaten, harass, reprimand and dismiss dissenters • Infiltrate groups and disclose damaging inside information

2.7 The onus of proof

If the onus of proof is on you, it means you have to prove your case, otherwise you're assumed to be wrong. In a court of law, the onus of proof is traditionally put on the prosecution, which has to prove the defendant is guilty. If there is any doubt, the defendant is supposed to be found not guilty, along the lines of the saying "Better ten guilty people go free than one innocent person be convicted." Note that "not guilty" is different from "innocent." For the defence to prove innocence would be much harder than creating reasonable doubt about guilt.

When the onus of proof is on you, those on the other side have it easy, because they are assumed to be right — without evidence or argument — unless you can show they are wrong. You will be in a much stronger position if you can put the onus of proof on them. The onus of proof is sometimes called the burden of proof. It is indeed a load to bear.

Johnston assumed all he had to do was show at least a small risk of danger to stratospheric ozone from SSTs. Implicitly, he put the onus of proof on others to show there was absolutely no risk. Johnston's assumption helps explain his technical assumptions, reference to alternative arguments and other methods of pushing his argument. Given his assumption about the onus of proof, it didn't matter that his technical assumptions excessively favoured his conclusion, because he had still achieved his task of showing that a risk to ozone existed.

> Goldsmith et al. assumed all they had to do was show that the threat to stratospheric ozone from SSTs was unlikely to be significant. Implicitly, they put the onus of proof on others — such as Johnston — to show that the threat was significant. Goldsmith et al.'s assumption helps explain their technical assumptions and other methods of pushing their argument. It didn't matter that their technical assumptions unfairly favoured their conclusion, because they still accomplished the task they set themselves of showing that a major injection of nitrogen oxides into the stratosphere didn't have dramatic consequences.

Scientists don't necessarily think about the onus of proof. Like Johnston and Goldsmith et al., they simply make an assumption about what they have to prove, either a little or a lot. This assumption, or presupposition, can shape their entire argument — and they may not even spell out the assumption. It is implicit. Discovering or inferring the assumption can provide an insight into how scientists push their arguments.

Putting the onus of proof on the opponents is a powerful tool in a controversy. It makes their task far more difficult. In many controversies, the two sides seem to be talking past each other, in part because each side has implicitly assigned the onus of proof to the other side.

> Mainstream climate researchers have come up with a standard set of conclusions about global warming, exemplified by the assessments of the Intergovernmental Panel on Climate Change (IPCC). The researchers implicitly put the onus of proof on critics

to show that these assessments are wrong. They dismiss climate sceptics as having failed to do this, because the climate sceptics haven't developed better models, nor have they developed testable hypotheses, not relying on greenhouse gases, to explain global warming.

Climate sceptics point to flaws and uncertainties in the standard viewpoint. They put the onus of proof on mainstream researchers to conclusively refute their criticisms, otherwise they conclude the orthodoxy should not be accepted.

Each of the two sides assigns the onus of the proof to the other, which helps explain the persistence of the dispute. The onus of proof is also helpful for understanding positions within the mainstream. The standard position is that adopted by the IPCC. Those in the mainstream put the onus of proof on anyone who takes a position considerably outside the IPCC assessments. That applies also to scientists such as James Hansen who think the IPCC is too conservative, namely that global warming is likely to be more severe than anticipated by the IPCC, and to scientists who think global warming is occurring but not as quickly as judged by the IPCC.

Shifting the onus of proof to the other side can be a goal in a controversy. Tracking the onus of proof over time is a way of determining which side is succeeding.

Back in the 1950s, tobacco companies had an advantage: smoking was accepted and critics had to prove it was harmful. But as the epidemiological

evidence became stronger — and critics mobilised — the tide gradually turned. For decades, the companies continued to argue that there was no proof that smoking caused lung cancer, and they were correct that there was no proof at the level of an individual smoker. But the epidemiological evidence became the basis for a new orthodoxy, and the tobacco companies were put at a disadvantage: they had to prove smoking was safe, which was much harder to do.

The change in the onus of proof concerning smoking was a signal that the companies had mostly lost the struggle for scientific credibility. They turned to a completely different argument: that people have a right to smoke, because it is a legal activity. The companies attempted to put the onus of proof on critics to say why this freedom should be revoked. The critics counter-attacked with claims about the hazard from second-hand smoke: the freedom to smoke was not absolute when the health of others was at risk.

The evolution of arguments about smoking shows how the onus of proof can change and how it can involve both scientific and non-scientific elements — health hazards and human rights in the case of smoking.

Shifting the onus of proof

The onus of proof often is assumed to fall on those who challenge scientific orthodoxy. Defenders of orthodoxy can simply ignore or dismiss challengers unless they come up with something definitive, especially something with political or popular appeal. If you are on the side of

orthodoxy, you might say that critics should have to prove their case because:

- The weight of evidence is on our side.
- Most scientists support our position.
- Extraordinary claims (by the other side) require extraordinary evidence.
- It is too risky to change unless the contrary case is beyond doubt.

Now think about this from a different angle: the perspective of the critics. Wily challengers will try to put the burden of proof on the orthodoxy, using techniques such as framing and deconstruction.[19] Perhaps the most potent technique is simply to assume the other side must prove its case to an extremely high level of certainty, without even having to present a case of your own. Your underlying assumption is that if they can't prove their claims to your satisfaction, then your position must be correct. This is the thinking behind conspiracy theories: if there are flaws in the standard explanation, there must be a conspiracy (rather than some other explanation). Those who say the moon landings didn't actually happen use this technique: some details of the standard story don't seem to add up — *therefore* there must be a conspiracy.[20] There are a few lessons from this.

- Never accept the onus of proof willingly.
- If appropriate, give reasons why the onus of proof should rest with the other side.

19 See sections 3.2 and 3.4.

20 See section 3.5 for a discussion of conspiracy theories.

• If you are stuck with the onus of proof, consider changing to a different set of arguments or issues where you can put the onus on the other side.

2.8 Truth

Many people think the key to issues involving science is finding the truth. If people would only agree on what's true, then those who adhere to wrong ideas could be persuaded or, if they persist in their error and delusion, they could be dismissed. Unfortunately, this is not a fruitful way to understand or engage with controversial scientific issues.

Philosophers have debated the meaning of truth for many centuries. A common understanding is that truth is a statement that corresponds to external reality and can be verified. However, this isn't much use when scientists disagree. Nor is it much use if value judgements are involved, which they normally are.

When someone starts talking about knowing the truth, it is useful to think of this as a tactic. Claiming to have access to the truth is a way of trying to get your way in a dispute. It can be potent, because the truth supposedly overrules other considerations, such as ethics and politics. Some people just assume they have access to the truth, without stating this outright.

To counter claims to truth, it can be useful to raise the ideas of Karl Popper, a prominent philosopher of science. Popper's ideas have been subject to much criticism, but nevertheless they are frequently claimed by scientists to be at the foundation of their method.

Popper said scientific theories can never be proved, because it is always possible that new evidence will show them to be false. This means all knowledge is provisional. Popper advocated an approach called falsificationism, saying that scientists should attempt to falsify (disprove) their theories. He said that any theory that could not be falsified was not scientific.

When someone claims to have access to the truth, one good response is to say that all scientific knowledge is provisional: potentially it could be falsified or superseded in the future. Nearly all scientists will agree, at least in principle, that knowledge is provisional. The question then becomes, "How solid is the support for this viewpoint?" which can be discussed more fruitfully. The aim is to get away from claims about truth.

2.9 Who is involved?

In a typical controversy, individuals can be involved at various levels. At the centre are highly active partisans, some putting every available free moment into campaigning. These are the *core campaigners.*

In some controversies, there are paid workers committed to working on issues. For example, Friends of the Earth might fund a campaigner position on nanotechnology. Corporations sometimes pay employees to present positions on a controversy, undertake lobbying and give talks. Some scientists, working in universities or research laboratories, devote significant effort to campaigning. As well, some citizens put in enormous time to issues without any payment. Any of these can be core campaigners.

Next are *occasional campaigners*. They might be members of action groups who join campaigns organised by core campaigners. They might be scientists who give talks or comment to media when the opportunity arises. They might be corporate employees who are assigned to campaigning tasks when an issue flares up. They might be individuals — not members of any groups — who regularly write letters and join online debates.

The core campaigners usually drive the action on an issue. They have greatest influence over choices of what to do, though sometimes they are expected to work within parameters set by employers, whether Greenpeace or Exxon. Occasional campaigners also help set directions for campaigns, but on a less regular basis.

Next, in terms of involvement, are *participants*. They are supporters who do something, usually along the lines encouraged by campaigners. Participants attend public meetings, write letters, join rallies, lobby politicians, sign petitions and much else. They can be very active — as much as campaigners — or just occasionally do something. They differ from campaigners in that they tend to follow directions decided by others. Using a military metaphor, campaigners are the commanders and participants are the troops.

At a less active level are *sympathisers*. These are usually members of the public who know something about the issue and definitely support one side. Sympathisers are important in controversies because they provide a reservoir of support that influences wider opinion and can be drawn upon. Sympathisers, in conversations with friends and co-workers, can gradually change attitudes.

Some sympathisers are in crucial positions and might influence school syllabuses, advertising campaigns or stands taken by churches, corporations and other organisations. Campaigners often encourage sympathisers to become participants.

Groups involved in controversies can fit into the same categories. There are core campaigners, such as the National Vaccine Information Service, focusing entirely on problems with vaccines. There are occasional campaigners, such as a business organisation or trade union that mobilises on an issue such as climate change. There are participants, such as local dental associations that support a campaign for fluoridation. And there are numerous sympathisers, such as church groups opposed to abortion.

Groups can also be involved in controversies in other, more complex ways. Greenpeace is an organisation dedicated to campaigning, usually on several issues at once, some of which will be controversies, such as nuclear power and rainforest logging. Many organisations are divided internally on issues: some members support one position and some another, such as individual churches on climate change. Whether the organisation takes an official stand or joins a campaign may depend on an internal struggle. Anti-smoking campaigners gradually won over a range of organisations to their position.

Another role of groups is to set up or fund other groups. On contested mining or forestry operations, a large company might create or support campaigning groups. Pharmaceutical companies sponsor many patient advocacy groups, thereby shifting their agendas. In these sorts of

configurations, the relationships between campaigners, participants and sympathisers can become complex.[21]

2.10 Scientists

In most scientific controversies, scientists are key players. A few scientists are campaigners. Many others are participants or sympathisers. Some are not personally involved, but their research findings are used in debates. Because of their important role in controversies, it is useful to understand how scientists think and behave. I'm focusing here on what are called natural scientists, such as physicists, geologists, chemists and biologists, namely scientists who study nature rather than study humans. (Those who study people's behaviour are called social scientists.)

Different sorts of scientists are relevant to different controversies, and for the purposes here I expand the term "scientist" to include technically trained professionals such as doctors and dentists. Consider the types of experts that seem to be most relevant to a few different controversies.

- Climate change: atmospheric scientists
- Fluoridation: dentists
- Euthanasia: doctors
- Nuclear power: nuclear scientists and engineers
- GMOs: biotechnologists

However, in these and other controversies, other groups have relevant expertise. Here are some possibilities.

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21 For more on groups, see chapter 5. Section 5.7 deals with front groups and captured groups.

- Climate change: computer modellers
- Fluoridation: doctors
- Euthanasia: nurses
- Nuclear power: biologists
- GMOs: doctors

There are also some groups whose expertise is relevant to a range of controversies.

- Statisticians
- Epidemiologists
- Applied mathematicians

These are specialists with data and numbers who can analyse information to explore and test hypotheses. To make informed contributions to debates, these sorts of specialists often need to team up with others knowledgeable about the issues involved.

Nearly all professional scientists — those who work in universities or in government or industry labs — have had a long training. They typically studied science in high school and university. Most have PhDs, a degree that involves three or more years of apprentice research, sometimes on an individual project and other times as part of a team or collective project. Research training is the common factor among scientists.

After their degrees, career scientists usually obtain full-time jobs, though the pattern varies. Some are full-time researchers, as post-doctoral fellows or as permanent employees in some research lab. Others are academics, doing a mixture of research, teaching and administration.

By the time scientists get involved in a controversy, as researchers or participants, most of them have spent at least a decade in study and research, and often several decades.

What do scientists learn in all this time? Firstly, and most importantly, they learn to see the world through a set of standard lenses. This varies from discipline to discipline: physicists see the world differently from biologists. What these perspectives have in common is that the world is seen as an object to be understood using observations and experiments in combination with theory.

Many students are taught science as if it is the truth about the world. Standard theories such as evolution and relativity are commonly taught as certified knowledge rather than as constructs that have proven to be useful but are always open to challenge and revision. Students learn a lot of facts, and many scientists see their task as discovering or establishing facts. These facts are seen as objective, not involving any value judgements.

Junior researchers discover that science is more than a pile of facts and a set of authoritative theories. As they push at the frontiers of knowledge, researchers learn that establishing facts and testing theories involves ambiguity, uncertainty and questioning. However, this questioning has strict limits: it is seldom applied to standard views in the field.

Many scientists ignore or dismiss research findings that conflict with standard ideas, for example findings in parapsychology (the study of psychic phenomena such as precognition and psychokinesis) or homeopathy (treating diseases using small doses of substances that cause

symptoms of the disease). Some are actively hostile to findings in such areas. The important point is that very few scientists bother to look at the research themselves. For example, there is a large body of parapsychological research, some of it with exceptionally strict protocols,[22] but few scientists have ever read a single paper in the field — they are content to reject the entire body of findings on the basis that it conflicts with what they have learned are the standard views about nature. They simply assume the findings must be wrong.

Most scientists believe there are truths about the world and that scientific research is best way to discover these truths. This sounds straightforward and fairly tame, but can lead to an attitude of superiority or even arrogance. Scientists may see other roads to truth — such as reflection, revelation, personal experience and even social research — as inferior or worthless. An extreme belief in the power of the methods of natural science is called scientism. Scientists may believe they are the only ones able to discover reliable knowledge about the world.

Furthermore, many scientists believe in the power and standing of their own fields. Take physicists for example. Many of them believe their understanding of physical laws and processes gives them a superior or conclusive insight into issues. They can reject precognition because it conflicts with physical laws, reject cold fusion likewise and reject claims of harm from mobile phones because, according to physics, the radiation does not produce enough heat to cause damage. The possibility

22 For example, see the *Journal of Parapsychology.*

that the laws of physics have exceptions or shortcomings is rejected. In the case of mobile phones, harm could be due to resonances rather than heating, but biological resonances are not part of the repertoire of physicists. They are more likely to think in terms of physical processes.

Scientists, when they pay attention to controversies, often look initially or primarily at technical dimensions — the ones most amenable to their technical expertise. Nuclear scientists who address the issue of nuclear power are more likely to focus on the risk of nuclear accidents or the disposal of nuclear waste than on the proliferation of nuclear weapons (a political issue).

Within science, the standard rhetoric is that claims are judged on their merit. So when someone submits a paper to a scientific journal, it is supposed to be judged by the quality and significance of the data and findings, not the stature of the author. To the extent that this actually occurs, it is admirable.

In practice, though, there are many departures from the ideal. Papers submitted by researchers not at institutional addresses, for example from a home address, may be dismissed without consideration. Papers not written in the standard style are even more likely to be dismissed. Conforming to the conventional style is a sign of having received standard research training, so those who diverge from this style are suspect.

Prestigious scientists — those who are authors of numerous publications, holders of high-level positions, members of elite academies, winners of awards — are often treated with undue reverence, as if their views are

automatically worth more than those with lesser attainments. Junior scientists may be reluctant to challenge a prominent figure, due to the status difference or because of a potential risk to their careers.

Within the scientific community, there are numerous bitter disputes over theory and observation, priority for scientific discoveries, and obtaining funding and jobs. Some top scientists are widely respected whereas others are resented and challenged, just as in any occupation. Therefore, the status of a scientist in conventional terms, such as rank in an organisation, does not automatically translate into respect by peers. However, formal scientific status can be used in public controversies, because few journalists or members of the public know whether a particular scientist is respected or disdained by peers.

Some scientists, when they comment on public debates, stick entirely to their own expertise. However, there usually isn't a lot a technical specialist can say that is of wider interest. A specialist on tree-ring dating can't say very much about climate change. A specialist on neutron scattering cross-sections can't say very much about nuclear power. To say something of general interest in a public debate, it is necessary to go outside one's own technical area and engage with wider issues. A scientist might become quite knowledgeable about these wider issues and be able to make informed comment. The point here is that the scientist's achievements as a researcher do not give any special warrant for making informed comment on issues involving policy or values. Just because a scientist has published 100 papers about recombinant

DNA does not give special expertise on the political, ethical, legal or public health dimensions of GMOs.

Only a tiny minority of scientists join public debates in an ongoing fashion. What do other scientists think about them? In general, scientists seek the respect of peers, principally through doing high-quality research and secondarily through good work as colleagues, for example in teaching and management. Public recognition through other means is potentially suspect. Obtaining media coverage for scientific work is acceptable, but coverage for views on controversial issues is less so. Writing popular books and articles is a low-status activity — indeed, it may even be seen as a negative.[23]

Astronomer Carl Sagan authored a very large number of scientific papers. However, he was better known as a media personality, especially through television. He was also vocal about the seriousness of nuclear winter — the climatic consequences of nuclear war — and a campaigner against nuclear weapons. Among scientists, his public roles overshadowed and even discredited his scientific contributions.[24]

Scientists who enter public debates almost always step outside their expertise. However, even when peers think a campaigning scientist is unscientific, biased or just plain wrong, few of them will say anything in public about

23 Saleem Ali and Robert F. Barsky (eds.), "Quests beyond the ivory tower: public intellectuals, academia and the media," *AmeriQuests,* vol. 3, no. 2, 2006.

24 David Morrison, "Carl Sagan: the people's astronomer," in Ali and Barsky, ibid.

it. The result is that scientist campaigners can be influential with public audiences and give the impression that their views are more widely held than they actually are.

Arrogance and the myth of talent

Experienced scientists are highly skilled. They are able to understand, analyse and manipulate complicated data, formulas, apparatus or procedures in ways that seem extraordinary to outsiders. To someone who says, "I was never any good at maths," the ability to grasp advanced mathematics and statistics may seem to indicate super-intelligence. This is mistaken.

Research shows that anyone who can perform at an extremely high level — in mathematics, chess, athletics or whatever — has spent a very long time practising their skills. To perform at a world-class level usually requires spending at least 10,000 hours practising a skill. This amounts to 3 or 4 hours per day for a decade, or less per day over a longer period. Furthermore, not just any sort of practice will do. It has to be what is called "deliberate practice," which means intense concentration on the task, usually under the guidance of a good teacher. For a chess player, this might to analysing positions and games; for a violinist, it might be practising difficult passages; for a swimmer, it might mean intensive training; for a mathematician, it might be trying to solve problems just out of reach.[25]

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25 K. Anders Ericsson, Neil Charness, Paul J. Feltovich and Robert R. Hoffman (eds.), *Cambridge Handbook of Expertise and Expert Performance* (Cambridge: Cambridge University Press,

The implication of research on expert performance is that natural talent plays a relatively small role. Great achievers have to work extremely hard over a long period, and there are no known exceptions. This goes against popular beliefs in what can be called the myth of talent — a myth that many scientists believe in and try to cultivate. According to the myth of talent, scientific greats like Newton, Darwin and Einstein had exceptional innate capacities above and beyond ordinary mortals, because only super-human powers can explain their magnificent achievements. This assumption serves to put scientific achievements on a pedestal: only fools — or those with equivalent genius — would dare to challenge them.

The belief in natural talent also serves to set scientists off from non-scientists. To be able to enter into the temple of science, special gifts are required: a natural aptitude granted only to a few. The result is, among some scientists, a sense of superiority that can come across as arrogance. Some scientists think they are special, because they are good at something that is exceptionally difficult: they are the holders of special knowledge about the universe, and anyone who is not at their standard is just a

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2006). Accessible treatments of research on expert performance include Geoff Colvin, *Talent is Overrated: What* Really *Separates World-class Performers from Everybody Else* (New York: Penguin, 2010); Daniel Coyle, *The Talent Code. Greatness Isn't Born. It's Grown. Here's How* (New York: Bantam, 2009); David Shenk, *The Genius in All of Us: Why Everything You've Been Told about Genetics, Talent, and IQ Is Wrong* (New York: Doubleday, 2010); Matthew Syed, *Bounce: The Myth of Talent and the Power of Practice* (London: Fourth Estate, 2011).

pretender. This belief afflicts scientists in some disciplines more than others. Physicists, especially theoretical physicists, are among the worst. Many physicists think they are superior to scientists in lesser fields, because physics is the queen of the disciplines, dealing with the ultimate building blocks of the universe. That means they must be far above researchers in "soft" fields like sociology or history.

This belief can go a step further. When scientists think they are good at science because they have high intelligence, they may assume researchers in other arenas are not very good because they have lesser natural capabilities. This sort of arrogance can come across in controversies when scientists look down on critics who are not scientists, or whose skills are in areas considered inferior.

Research on expert performance shows that skills are highly specific. Experts have highly developed skills in specific areas, but outside a narrow domain, they are little or no better than anyone else. Grandmasters in chess can remember chess positions with amazing ease, and grasp the strategic situation at a glance. However, if chess pieces are placed randomly on the board, grandmasters are no better at remembering their location than beginners. What this means is that chess experts do not have a better memory than anyone else, but they have learned certain characteristic positions. In other words, their capabilities are specific to playing chess, and not more general.

The same applies to scientists. Their skills in their areas of research are exceptional, but outside those areas, they are, likely as not, no better than average. They do not

have exceptional natural talent, but rather they have acquired exceptional domain-specific skills.

This is the explanation why champion chess players cannot become instant champions at the game of go, why acclaimed violinists are more like beginners when playing the oboe, and why world-class basketball players cannot win elite tennis tournaments. By the same token, scientists are skilled in their narrow domains but are novices in other disciplines.

This is highly relevant in scientific controversies, in which scientists often claim generalised expertise on the basis of narrow accomplishments. Those on the other side need to recognise that the advanced skills of most scientists are highly specific to their research areas. Therefore, when they enter a public debate, nearly all of them are engaging with issues well beyond the area in which they have demonstrated expert performance. A geneticist might know a great deal about the DNA of pigeons, but this has limited relevance to most of the GMO debate. What happens in practice is that narrow expertise is treated, by scientists themselves and sometimes by their opponents, as a proxy for more general expertise when actually this is not warranted.

Scientists seldom recognise this, in part because of the myth of talent. Their thinking might go like this: "I know a lot more about genetics than those GMO critics; they are ignorant and ill-informed; therefore I must know a lot more about everything to do with the GMO debate."

Some of my scientist friends, when I tell them about research on expert performance, find it hard to believe. Is this the way scientists are supposed to react to ideas that

challenge their preconceived ideas? According to the idealised picture of science, scientists should withhold judgement and go and check the research (on expert performance) and compare it to the evidence. But the scientists I've talked to do not do this. In rejecting the findings (or sometimes accepting them), they rely on their personal knowledge and accumulated beliefs. In this, they are no different from most non-scientists.

It is worth noting that some scientists become highly knowledgeable about all facets of a controversy. Invariably, these individuals have studied the issues, and many of them have personal experience too. Their insights into controversies are primarily due to their study and involvement, not to their specialist training and credentials. Non-scientists, with equivalent study and involvement, can become just as knowledgeable about controversies — at least according to research on expert performance. Read about it for yourself.

Political naiveté

Scientists spend most of their time studying nature and relatively little time learning about social dynamics. The result is that they can be naive about politics, with "politics" referring to the exercise of power in society.

Of course quite a few non-scientists are politically naive, and some scientists learn a lot about political dynamics. Nevertheless, there are several reasons why scientists are likely to be less politically sophisticated than professionals in other fields.

Open, peer-reviewed scientific research is a realm in which nearly everyone seeks the truth about nature and

reports their findings honestly. (Exceptions, when exposed, are severely castigated as having perpetrated scientific fraud.) Therefore, scientists in the course of their work tend to think in terms of facts, truth and explicit rules. This is useful for doing scientific research but can be a hindrance for grasping social and political dynamics.

In everyday life, and in politics, facts are not nearly as solid. Governments, corporations and media organisations can try to create facts, through lying, cover-up, framing and various other processes. Facts about the social world are therefore more easily distorted and contested. Scientists, in their research work, are not regularly reminded of the possibility that others might be using their power to alter reality.

Even setting aside the manipulation of information, in social and political life the idea of truth is more malleable than in science. Scientists often assume there is an ultimate truth about nature, or at least a provisional truth that is better than any other current option. Truth, for scientists, is something to strive towards, even if it is unattainable. In politics and in everyday life, in contrast, truth is better thought of as something useful for a purpose. There is no single truth that everyone will accept, because different people see things in different ways and what is useful for them in understanding the world is not so useful for others. There is no single political truth about democracy, freedom or security.

Scientists look for rules that explain how the natural world operates. These are sometimes called scientific laws, such as the second law of thermodynamics, or theories, such as the theory of evolution. Scientists see the

world as governed by such rules, even if they are potentially open to revision.

When scientists enter the realm of social behaviour, they are prone to look for rules, and the easiest ones to observe are formal rules such as constitutions, laws, written procedures, official statements and the like. Although rules of nature are a relatively solid basis for understanding the natural world, explicit rules in society are far less reliable for understanding social dynamics.

Children are often taught that the world operates according to explicit claims. The political system is supposed to operate according to election rules, separation of powers, and rational planning in bureaucracies. Therefore they may take on face value what a politician promises. Those who become involved in political systems usually learn, sooner or later, that a large role is played by deception, vested interests, ideology, hidden agendas and entrenched behaviour. People familiar with the legal system realise that courts do not dispense justice — but others may think they do. People familiar with government realise that policies do not necessarily accomplish what they proclaim — but others may think they do.

Scientists have a harder time learning this, and even when they learn it theoretically, it may be harder for them to make this understanding intuitive. They spend most of their working life attending to a reality — nature — that operates differently from social and political life. Therefore, they are less likely to readily grasp the sordid and sometimes deceptive nature of everyday reality.

This political naiveté can make scientists susceptible to being used. Nearly all scientists think they are objective

and that if they do good science, they are making a valuable contribution to the world. The result is that they are ideal tools for powerful groups, especially governments and large corporations, able to sponsor research.[26] Pharmaceutical companies, for example, can find enough researchers to carry out studies of drugs. These researchers may think that their professional responsibility lies in doing good quality research and nothing more. Therefore, very few of them object when companies select only favourable findings for publication. Some academic scientists even allow themselves to be listed as authors of papers written by pharmaceutical company staff.[27]

Nearly all scientists reject altering or manufacturing data: that is scientific fraud. But they are less squeamish about not publishing some findings, about highlighting results favourable to sponsors, or doing research on behalf of companies with vested interests. These forms of misrepresentation and bias are never given the stigmatising label of fraud, even though they are bigger problems than individuals falsifying data.[28]

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26 This perspective is powerfully developed by Jeff Schmidt, *Disciplined Minds: A Critical Look at Salaried Professionals and the Soul-Battering System that Shapes their Lives* (Lanham, MD: Rowman & Littlefield, 2000).

27 Marcia Angell, *The Truth about the Drug Companies: How They Deceive Us and What to Do about It* (New York: Random House, 2005).

28 I develop this view in "Scientific fraud and the power structure of science," *Prometheus*, Vol. 10, No. 1, June 1992, pp. 83–98.

Earlier I discussed the idea of undone science: some topics are not researched because powerful groups either are uninterested — for example pharmaceutical studies of substances that can't be patented — or actively hostile. Few scientists see it as their responsibility to address the imbalance in research due to powerful groups. In other words, undone science is not a concern to them.

To put it another way: most scientists focus on the quality of the research they do and are usually less concerned about being independent of patrons. They may discriminate between different patrons but they are unlikely to pursue research paths where there are no obvious patrons and, as well, peers might be hostile.

Career situation

Where scientists are in terms of their careers can affect how they respond to issues. Productive mid-career researchers are typically most tied to establishment positions, because they may be receiving significant research grants and are aspiring to promotions and greater peer recognition, including election to prestigious academies and possibly awards. In contrast, some scientists towards the end of their careers become more open to unorthodox positions and are also more willing to speak out. This is because they have already attained the standard career milestones and so are less tied to further research success. Some scientists at the beginning of their careers, perhaps while doing their PhDs or for some years after, are as focused on getting ahead as their mid-career peers, but others are open to challenging the system. This is because

they have less stake in conventional views and are less acculturated to them.

Summary: scientists and controversies

- Most scientists are technical specialists. Few are politically sophisticated.
- Most scientists are primarily oriented to peers: they seek, above all, respect from others like themselves. Hence most are reluctant to become engaged in public controversies.
- Many scientists feel superior to those without scientific credentials, jobs or research experience. Hence they may dismiss the capabilities of such campaigners.
- Scientists are easily used by powerful groups, via research funding and job prospects. Only a minority of scientists will pursue research paths away from the mainstream where ample money is available.
- Scientists, outside of their specialities, can be just as emotional and biased as other people.

2.11 Interests

Controversies keep going because people have a stake in the outcome. What sort of stake? It can be financial, political, professional, career or psychological. When an individual or group has something to lose or gain — something at stake — it is called an interest. When the stake is strong and systematic, it is called a vested interest. For example, groups can have different sorts of interests in genetically modified crops:

- Companies like Monsanto: profits, market share
- Governments: economic growth
- Scientists: jobs, grants
- Farmers: livelihoods

Let's look a bit closer at the interests of Monsanto and other companies that produce and sell genetically modified seeds. This can be called a corporate interest — and it is definitely a vested interest, because vast amounts of money and resources have been invested in this enterprise. Monsanto has an interest in GM crops, and this will affect its position on the GM controversy. This part is straightforward.

It's possible to look a bit more deeply and say, "Who exactly in Monsanto has a personal interest in GM?" Lots of people have a general interest, including cleaners, computer programmers and shareholders. Monsanto is a huge company with thousands of employees. If the company prospers, most of the employees benefit with greater job security and, for some, higher wages.

Terms
Interest: a stake, which can be financial, professional, political, career or psychological
Vested interest: a strong, deeply embedded interest
Interest group: a group with an interest

On the other hand, Monsanto is a diversified multinational corporation, so not every employee is going to get excited about some particular new product or

> market share. To identify those who have the greatest personal stake in GM crops, just zoom in on the parts of the company promoting them and benefiting the most from them. This includes some scientists and, most importantly, the top managers in the relevant divisions devoted to marketing these crops. Their careers and reputations depend on success, so they are more likely to strongly pursue GM crops.
>
> Also crucial are the resources involved. If there's a lot of money involved, then it's possible to hire talented and ambitious staff to push ahead in the area, for example to create new markets, mount publicity campaigns, analyse the opposition and even set up fake citizen groups. Top managers in the area may be able to commission research and recommend buying small companies.
>
> With this sort of investment involved — investment in salaries, buildings, research, marketing, training and much else — it is reasonable to say that Monsanto has a vested interest in GM crops. This is not just one individual's personal stake: it is deeply embedded within the organisation.

Vested interests are important in controversies, for several reasons. One is that vested interests can have a powerful influence on beliefs. When people's careers are linked to pesticides or pharmaceuticals, then they are far more likely to believe in the value of these products. Furthermore, they work in an environment that reinforces their beliefs. Those who are sceptical are unlikely to pursue careers in these areas to start with.

Some studies of the role of vested interests in controversial scientific issues

John Abraham, *Science, Politics and the Pharmaceutical Industry: Controversy and Bias in Drug Regulation* (London: UCL Press, 1995)

Philip M. Boffey, *The Brain Bank of America: An Inquiry into the Politics of Science* (New York: McGraw-Hill, 1975)

David Dickson, *The New Politics of Science* (New York: Pantheon, 1984)

Samuel S. Epstein, *The Politics of Cancer* (San Francisco: Sierra Club Books, 1978); *Cancer-gate: How to Win the Losing Cancer War* (Amityville, NY: Baywood, 2005)

Ralph W. Moss, *The Cancer Industry* (Brooklyn, NY: Equinox, 1996)

Naomi Oreskes and Erik M. Conway, *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming* (New York: Bloomsbury, 2010)

Joel Primack and Frank von Hippel, *Advice and Dissent: Scientists in the Political Arena* (New York: Basic Books, 1974)

Robert N. Proctor, *Cancer Wars: How Politics Shapes What We Know and Don't Know about Cancer* (New York: BasicBooks, 1995)

Beth Savan, *Science under Siege: The Myth of Objectivity in Scientific Research* (Montreal: CBC Enterprises, 1988).

If you work for an extended period in a hospital surgical unit with colleagues sceptical of complementary medicine, then you are likely to shift your views in their direction — and similarly in a unit dedicated to complementary medicine. When vested interests are involved, the influence on your views is likely to be greater.

Monsanto has invested a lot of money in GM crops, so it is unlikely to exit the field just because there's a bit of opposition. Groups with vested interests have a lot at stake and will not budge easily.

Conflicts of interest

A conflict of interest is when someone or some organisation has multiple interests that aren't compatible. Suppose a scientist receives funding from a company to carry out a study of a drug and also sits on a government committee dealing with the drug's safety. The drug company funding means the scientist has an interest, namely a stake, in the funding and possibly in the drug's success. The scientist has benefited from the funding: it helped pay for the scientist's staff and lab, helped generate scientific papers and added to the scientist's reputation. That's one interest. In sitting on the government committee, the scientist is supposed to be concerned about public health and safety, namely to put the interests of the public first. But this is a different interest than the one associated with the drug company funding. There's a tension or divergence between these two interests, which is called a conflict.

There are various ways in which a conflict of interest can occur.

- A scientist sits on a decision-making panel of a research grant agency that awards research funds to the scientist.
- A doctor is wined and dined by a pharmaceutical company and dispenses the company's drugs to patients.
- A scientist sits on a selection committee for a post; one of the applicants is the scientist's closest collaborator (or the scientist's lover, or a relative).
- A scientist who regularly receives industry funding writes an editorial in a scientific journal supporting a policy that favours industry.
- An agency is responsible for both promoting a technology and regulating it.

It is important to note that a conflict of interest is generated by relationships between two sets of interests. It does not depend on psychology. A conflict of interest can exist even though the scientists involved are personally honest and objective.

Here's a typical misunderstanding, involving a scientist who received research funding from a pharmaceutical company and sat on a committee dealing with one of the company's drugs:

> "I don't believe it is a conflict of interest at all," he tells *The Australian*. "I'm a scientist. I'm rigorously

> objective about what I observe, scrupulous about the ethics of what I do."[29]

A conflict of interest can exist whether or not the person is objective or scrupulous. The conflict in this instance is generated by the existence of the two interests that are potentially in tension, one in funding and the other in public safety.

Conflicts of interest are rife in science. Many scientists hide, deny or dismiss them.

- Scientists hide the existence of conflicts of interest by not declaring income or other benefits from companies or by not declaring relationships or other relevant associations.
- Scientists dismiss conflicts of interest as irrelevant or not significant.
- Scientists incorrectly equate conflicts of interest with lack of objectivity (as in the quote above).

Left, right, conservative, radical

The positions taken in scientific controversies are sometimes categorised using political terms such as left-wing and right-wing. Seldom do such terms provide much insight into the positions taken.

The terms right and left are most appropriate for referring to the positions of capitalists on the right and labour on the left. A right-leaning political party is more likely to support employers against workers and a left-

29 Natasha Bita, "A flu jab too close for comfort," *The Australian,* 29 September 2010, p. 13.

leaning political party the workers against employers. However, different employers sometimes have different interests, for example multinational corporations compared to corner shops, and likewise different workers can have different interests, for example male airline pilots compared to female nurses. It is not always obvious whether a policy that affects workers is better classified as right or left.

When applied to scientific controversies, the right-left spectrum can be irrelevant or misleading. Some controversies, such as vaccination and fluoridation, have little connection with employment, so the terms right and left should be considered irrelevant. In others, there are employment impacts, but with diverse patterns. More smoking means more jobs for tobacco farmers and shopkeepers, among others; less smoking means more jobs in businesses patronised by non-smokers. Fewer abortions might mean more work for midwives and obstetricians; more abortions means more work for abortion clinics.

Another classification is conservative versus radical. Sometimes conservative and right-wing are treated as the same and radical (or liberal) and left-wing as the same, in which case there is nothing new to say. But it's also possible to look at the deeper meanings: conservative means sticking with traditional ways of doing things whereas radical means transforming them. Creation science is conservative in this sense compared to the radical change introduced by evolutionary theory, though within science evolution is now so standard that it might be considered the conservative position.

Environmentalists are often called radicals, but there is another way to look at things: the changes introduced by new technologies are the truly radical changes, and opponents are the real conservatives. Nuclear power, nuclear weapons, pesticides and genetic engineering represent, from this perspective, the radical position, because they involve dramatic changes in both technology and social arrangements. Opponents are the true conservatives, as they want to protect society from these innovations and their consequences.

Another complication is that what are considered left and right can vary over time on the same issue.

In the 1960s and 1970s, some left-wingers supported nuclear power and condemned opponents as being members of the middle class defending their privileged living conditions. After popular opposition to nuclear power developed, many left-wing parties opposed nuclear power — but some small Marxist parties remained supporters. Unions were divided, with some on one side and some on the other.

In the US in the 1950s, opponents of fluoridation included such icons as the John Birch Society and the Ku Klux Klan, a connection satirised in the film *Dr. Strangelove.* Proponents labelled opponents as right-wing fanatics. But in other countries the right-wing connection to anti-fluoridationism was much less prominent. Indeed, in capitalist Western Europe, with social democratic ("left") governments, fluoridation was not taken up except in a few countries. It was adopted more readily in English-speaking countries

(with more free-market orientation than in Western Europe) and by communist governments of the Soviet Union and Eastern Europe. As the years rolled on, fluoridation began to be seen as an environmental issue, and hence opposition more identified with the left.

These examples illustrate how positions on scientific controversies may be difficult to put into boxes called right-wing and left-wing or conservative and radical. A few controversies may fit the right-left picture, but applying this framework to other controversies may just be misleading.

The more important use of the labels is as rhetorical tools. It is common for partisans to try to discredit their opponents by labelling them left-wing extremists or out-of-touch conservatives, or whatever, depending on the audience. If the opponents can be pigeon-holed as members of some undesirable group or as subscribing to a stigmatised belief system, then this supposedly justifies ignoring or deriding their views on the issues. What this means is that labels are used not for accurate description but for devaluing and dismissing opponents.

Labelling can be important in the way people make up their minds about controversies. When people think of themselves as part of a group — conservatives, Republicans, left-wingers or whatever — they are likely to adopt the positions taken by the group rather than assessing issues on their own merits. So if the Republican Party supports the right to bear arms (interpreted as including automatic weapons), people who think of themselves as

Republicans are likely to adopt the same position — without looking at the arguments. However, they *believe* they were influenced only by the arguments.[30]

Lesson When you hear someone in a controversy being labelled right-wing, left-wing, conservative or radical, be sceptical. If you are subject to this sort of labelling, be prepared with illustrations or pungent arguments to shine a light on the labelling itself. For example, "opponents of genetically modified food are the true conservatives."

2.12 Entrenched technology

It's far easier to stop a new technology than to get rid of it after it has become established.

A technology that has become standard and is deeply embedded in the way society operates is called *entrenched.* Cars, airports and mobile phones are entrenched. It would be very hard to get rid of them.

A *proposed* technology is easier to resist because people aren't used to it and there are fewer vested interests. Supersonic transport aircraft were proposed in the US but never built there.

Some technologies are in between. They have been introduced but have not become dominant. Nuclear power and GM food are examples.

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30 Geoffrey L. Cohen, "Party over policy: the dominating impact of group influence on political beliefs," *Journal of Personality and Social Psychology,* Vol. 85, No. 5, 2003, pp. 808–822. For example, "Once the policy was socially defined as liberal or conservative, the persuasive impact of its objective content was reduced to nil." (p. 811).

Some technologies are entrenched in some places but absent elsewhere. Fluoridation is entrenched in Australia and the US but absent in most of Europe. To better understand what happens in a technological controversy, look to see how entrenched the technology is.

Planes

In the 1960s, the next new aircraft on the agenda was the supersonic transport (SST). In the US, officials anticipated a fleet of 500 large SSTs that would fly in the lower stratosphere.

Before a single one of these was built, a controversy erupted.[31] As usual, it had many facets, covering questions of cost, equity and environmental impact. One of the crucial issues was sonic boom. Another issue was the effect on stratospheric ozone from the exhausts from a fleet of SSTs.

The opponents of the SST prevailed before a single US SST was built. Britain and France constructed a total of 15 SSTs, called the Concorde, and the Soviet Union constructed a few called the Tupolev-144. These flew for years but eventually were withdrawn and not replaced.

Some industries and governments pushed strongly for the SST: they believed in it and had much to gain from it, in terms of money, status and VIP travel. But because the SST industry never became large, it was easier to stop. A large SST industry — with commit-

31 Mel Horwitch, *Clipped Wings: The American SST Conflict* (Cambridge, MA: MIT Press, 1982).

ments from manufacturers, airlines, airports and governments — would have been much harder to bring down.

Cars

A major controversy involving cars concerns auto safety. Ralph Nader wrote the book *Unsafe at Any Speed*[32] and helped bring about a movement towards greater safety for drivers and passengers. The thing to note is that the automobile industry, and associated industries including oil and road-building, form an extremely powerful complex, one of the strongest in the world. That makes a big difference to the outcome of controversies.

One debate has been about large four-wheel drives, called SUVs in the US. These might be likened to SSTs in air travel. Opponents of SUVs could not stop their introduction.

Another debate is about large trucks, and how much they should pay to use the roads, given that they cause vastly more road damage than cars. Some governments, such as in New Zealand, impose road-user charges to take some of such damage into account; other governments, such as in Australia, do not.

Yet another debate is about universal mobility. Critics of car-dominated transport systems say that they exclude a minority of the population, including those who are unable to drive due to age, disability or

32 Ralph Nader, *Unsafe at any Speed: The Designed-in Dangers of the American Automobile* (New York: Grossman, 1965).

poverty.[33] A transport system designed around mobility for all would privilege walking, cycling and public transport, restricting the role of motor vehicles. Only in a few European countries has this vision made headway.

2.13 How controversies proceed

Active and inactive periods

Controversies can flare up and die down. You may not have heard anything about an issue for years, but it still might be boiling away in some areas or arenas.

Climate change was debated back in the 1980s, but it was not all that prominent an issue at that time. In the 2000s, a number of factors, such as the film *An Inconvenient Truth* featuring Al Gore, made climate change the biggest environmental issue around the world. Hundreds of local climate change groups were formed and there was extensive media coverage.

Fluoridation has been debated since it was first introduced in the 1950s. In most places and most times, it is hardly discussed. The one thing that puts it

33 Ivan Illich, *Energy and Equity* (London: Calder and Boyars, 1974); K. H. Schaeffer and Elliott Sclar, *Access for All: Transportation and Urban Growth* (Harmondsworth: Penguin, 1975). See also Terence Bendixson, *Instead of Cars* (London: Maurice Temple Smith, 1974); Jeff Speck, *Walkable City* (New York: Farrar, Straus and Giroux, 2012); Delbert A. Taebel and James V. Cornehls, *The Political Economy of Urban Transportation* (Port Washington, NY: Kennikat Press, 1977).

> on the agenda is the possibility of a change in fluoridation status. If fluoridation is proposed for a town, then a debate will flare. Likewise, if a town's water is fluoridated and it is proposed to stop fluoridating, a debate will flare. Some places have had a succession of referenda, which always trigger debate. On the other hand, fluoridation is hardly mentioned in places where fluoridation has been comprehensively rejected *and* in places where it has been used for decades. A stable status quo can be hard to disturb.
>
> Ever since ***nuclear weapons*** were dropped on Hiroshima and Nagasaki in 1945, peace activists have opposed them. The anti-nuclear weapons movements flared in the late 1950s and early 1960s, with mass participation, and then faded away. Opposition flared again in the early 1980s and then faded away by the end of the decade. Although the mass movement waxed and waned, even in the quieter periods there were dedicated campaigners working away.[34]

Issues can be hot or low-key in different arenas. Scientists might be fiercely debating an issue unknown to the public or, alternatively, members of the public might be arguing about it even though scientists think it's a non-issue.

During lulls in controversies, there will always be some partisans who are still active, gathering information, contacting supporters, producing articles and so forth.

34 Lawrence S. Wittner, *The Struggle Against the Bomb,* 3 volumes (Stanford, CA: Stanford University Press, 1993–2003).

These committed individuals are often highly knowledgeable about the issue and about campaigning.

Local and global dimensions

Some controversies are local issues, of interest only to a few people. Others are major issues across the globe. The way debates start and are waged can either be similar or different in different places.[35]

> In Wombarra, a suburb of Wollongong, Australia, there was a debate over how to deal with the risk of rainfall runoff. Wombarra is a narrow strip of land between the Pacific Ocean and a steeply rising slope to a bluff, called the escarpment. When the rain is heavy, the runoff from the slope can be high volume and potentially threaten houses and lives. Some of the risk arises from prior coal mining on the cliff-side and from work on the rail line. In the 1990s, a major debate developed about whether to address the problem via ecological repair or building an ocean outfall.[36]
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> This is an example of a local scientific controversy. It is of interest to local residents, environmentalists and local government (due to the cost of the outfall), but few others. If the same sorts of problems occurred

35 Brian Martin, "The globalisation of scientific controversy," *Globalization,* Vol. 7, No. 1, 2008, http://globalization.icaap.org/content/v7.1/Martin.html

36 Thanks to Ian Miles and Ariel Salleh for comments about this example. See Ariel Salleh, "Water politics," http://www.arielsalleh.info/praxis/water-politics.html

in other places, there would be the possibility of wider significance.

In Louisiana, there was a debate about the safety of the levees containing Lake Ponchitrain, just north of New Orleans. This debate was little known until 2005, when Hurricane Katrina hit the south coast of the United States, causing devastation through several states and breaching the levee, causing extensive flooding in New Orleans. The scale of the disaster led to intense scrutiny of prior decision-making about the adequacy of the levees and responsibility for dealing with the risk.[37]

This is an example of a local scientific controversy that became much more widely known and debated because of the scale of the disaster.

A similar case was the Challenger disaster. In 1986, a spacecraft was launched with seven astronauts aboard. It exploded only a few seconds afterwards. The cause was traced to O-rings that were not capable of fully functioning in the low temperatures. It turned out that engineers had warned about the potential problem with the O-rings but had been overruled by senior administrators. The problem of the O-rings was a technological controversy. Before the launch, it was a small matter, one of many debatable technical issues. If the O-rings had functioned all right, no one would

37 For example, Thomas O. McGarity and Douglas A. Kysar, "Did NEPA drown New Orleans? The levees, the blame game, and the hazards of hindsight," *Duke Law Journal,* Vol. 56, No. 1, October 2006, pp. 179–236.

have known or cared about the issue. Because the O-rings malfunctioned and caused a failure in an extremely high-profile event, the matter became one of the most closely scrutinised technical disagreements in history.[38]

Biological weapons are organisms designed to be used in war or other hostile action against an enemy. Anthrax is an example. There are a number of controversies associated with bioweapons. Should they be used? Should they be illegal? What should be the status of "dual-use technologies," namely biological agents that can be used for both peaceful and military purposes? Debates about bioweapons flare up sporadically, sometimes when a government wants to stigmatise another country's weapons programme.

While issues might be global, nevertheless much of the controversy is carried out in local contexts, and sometimes different policies are adopted in different places, for example about GMOs or climate change.

Ideas for campaigners

• Find out how issues are treated in other parts of the country and the world. Sometimes useful arguments can be discovered.

38 Diane Vaughan, *The Challenger Launch Decision: Risky Technology, Culture, and Deviance at NASA* (Chicago: University of Chicago Press, 1996).

• Analyse the special conditions that are locally relevant. This might provide ideas for different sorts of arguments and tactics.

• When policies and outcomes are different somewhere else, try to figure out why. When, from your point of view, policies are better elsewhere, this can be used as an argument for similar policies where you are. On the other hand, when policies are worse elsewhere, you need to develop arguments as to why they shouldn't be applied.

• Contact campaigners in other places and learn from their insights and experiences.

Why controversies continue

Some controversies keep going for decades. What makes this possible?

Psychological factors

When people support a particular viewpoint, they are more likely to interpret new evidence as supporting their own stand. Researchers have studied the way people respond to US presidential debates. In 1960, supporters of Nixon thought he did better whereas supporters of Kennedy thought he did better. The same applies to evidence. When people have a strong view on an issue, then when they are exposed to new information, they are likely to think the information is more credible when it supports their position. If it opposes their position, they will automatically try to dismiss the evidence or discredit its source.

This process is called confirmation bias.[39] Everyone with a viewpoint treats evidence in a biased way, rather than a neutral way. Amazingly, being exposed to contrary information sometimes can lead to a stronger commitment to one's original position. Confirmation bias is grounded in cognitive dissonance. If there is a discrepancy between your viewpoint and some evidence, then you try to reduce the discrepancy — and usually the easiest way is to ignore or dispute the evidence. Even people who know all about confirmation bias are subject to it.

Leading figures in major debates hardly ever switch sides. They might become less active or die, and thus exit the public arena, but they nearly always maintain their views, which in part reflects the power of confirmation bias. The exceptions are too rare to have much influence on most controversies.

Organisational factors

When groups are set up to support a position, they help to maintain the dispute. People in a group pursuing a cause are self-selecting: they join because they are sympathetic to the cause, especially when the group is voluntary. Group members reinforce each other's commitment

39 For discussions of various sorts of cognitive biases, see Margaret Heffernan, *Willful Blindness: Why We Ignore the Obvious at Our Peril* (New York: Walker & Company, 2011); Daniel Kahneman, *Thinking, Fast and Slow* (New York: Farrar, Straus and Giroux, 2011); Carol Tavris and Elliot Aronson, *Mistakes Were Made (but Not by* Me*): Why We Justify Foolish Beliefs, Bad Decisions, and Hurtful Acts* (Orlando, FL: Harcourt, 2007).

through discussions of issues and campaigning that assume certain positions. An absence of dissenting voices means groups can be remarkably single-minded and oblivious to alternative evidence and viewpoints. The mutual reinforcement of viewpoints within a group is sometimes called "groupthink."[40]

Groups are subject to internal conflict, power plays, bullying and numerous other pathologies.[41] Members of campaigning groups often differ concerning stands on issues and how to proceed. Despite these sorts of problems, group membership provides a sense of identity and helps maintain commitment. The operation of groups helps explain the continuation of controversies. It is almost unheard of for a campaigning group to change its position and start supporting the opposite viewpoint.

Vested interests

Groups with strong financial, political or ideological commitments will persist in promoting their views. The tobacco industry disputed links between smoking and lung cancer far longer than nearly any other group. Governments with numerous nuclear weapons defend the need to maintain them. Some fundamentalist Christian churches maintain a long-term commitment against abortion.

Groups with vested interests typically have money, organisations and alliances, all of which can be used for

40 The classic treatment is Irving L. Janis, *Groupthink: Psychological Studies in Policy Decisions and Fiascoes* (Boston: Houghton Mifflin, 1983, 2nd ed).

41 See chapter 5.

campaigning purposes. Groups with money can sponsor research that serves their interests and can pay employees to do lobbying or public campaigning. Groups with extensive networks and strong allegiances, like churches, can draw in large numbers of individuals to join controversies. Groups with connections, for example with politicians, can get their way more easily.

In many controversies, such as nuclear power and pesticides, groups with vested interests are confronted by citizens' movements, some of which have relatively little money or formal organisational structure.

Issue-based factors

The medical profession is overwhelmingly supportive of vaccination and most members of the public have their children vaccinated. Nevertheless, there is a continuing controversy. One thing that keeps the critics going is adverse vaccination events, such as when a child has convulsions or permanent disability following a vaccination. Parents of some of these children suspect the damage is due to vaccines and are potential recruits to vaccine-critical groups.

On the other hand, parents whose children become dangerously ill or die from infectious diseases such as measles or whooping cough may become passionate advocates for vaccination. Personal experiences involving vaccination thus provide a continuing basis for engaging in the controversy.

Some other controversies are quite different. The controversy over nuclear winter involves differing assessments of the climatic consequences of nuclear war. Since

this is hypothetical — without nuclear war, no one directly experiences the climatic aftermath — there is no continuing input of energy from people with relevant personal experiences. The controversy emerged in the early 1980s, during the peak of the movement against nuclear war. After this movement declined at the end of the decade, the nuclear winter controversy almost disappeared from view.

In summary, controversies can persist due to individuals' psychological commitments, campaigners' experiences in groups, and the involvement of groups with vested interests. For some controversies, people's personal experiences can make them receptive to joining one side or the other.

Resolving controversies

How are controversies resolved? In principle, everyone could agree that one side is right. But this seldom happens. Just as evidence hardly ever is convincing to everyone, so resolution of controversies is more a matter of power than knowledge.

It's more useful to say that a controversy is closed.[42] What this means is that there is little or no debate. It doesn't necessarily mean that everyone agrees, just that the weaker side is hardly trying any more, or perhaps is totally excluded from public arenas.

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42 H. Tristram Engelhardt, Jr. and Arthur L. Caplan, eds., *Scientific Controversies: Case Studies in the Resolution and Closure of Disputes in Science and Technology* (Cambridge: Cambridge University Press, 1987).

So what closes down controversies? There are quite a few possibilities.

- Leading partisans on one side die, retire or burn out, so their viewpoint is seldom expressed.
- Key outlets — usually including scientific journals and mass media — no longer accept or cover one side in the debate.
- Informed opinion — meaning the most prominent and influential scientists, editors, politicians or other leaders — supports one side, and most other people go along with them.
- One side is so stigmatised or discredited that few will admit to supporting its position.
- All sources of research funding accept one position, so it is impossible to investigate alternatives.
- A key meeting of opinion leaders — scientists, politicians or others — endorses one position, and most others go along with it.
- Challengers to orthodoxy are discriminated against, sometimes to the extent of losing their jobs.
- A government makes a decision that endorses one position, and adopts policies that enforce it.
- A public referendum supports one position, leading to policies that enforce it.

Quite commonly, more than one of these sorts of possibilities is involved.

Pasteurisation is the process of heating or otherwise treating milk to destroy bacteria. It was adopted to reduce disease. Initially, there were opponents who

believed that un-pasteurised milk was healthier. For example, pasteurisation destroys vitamin C.

Pasteurisation became standard through government regulations and standard practice in production and sales. This case involves informed opinion, discrediting of opponents and government decision-making. (In recent years, supporters of raw milk have resurfaced: the controversy is not closed after all.)

In the debate about the ***origin of AIDS,*** two main theories have been taken seriously within the scientific community. Both involve viruses from chimpanzees entering humans to become HIV. The standard scientific view is that the virus was transmitted via a chimp bite or via a hunter who, in the course of butchering a chimp, got chimp blood in a cut. The alternative view is that a chimp virus entered humans via contaminated polio vaccines used in Africa in the late 1950s. At a conference of the Royal Society of London in 2000, supporters of the standard view organised the agenda and media coverage to discredit the polio-vaccine theory.[43]

A different view on the ***origin of AIDS*** is that HIV was inadvertently or deliberately manufactured in a research or weapons lab. This view has been presented in a number of books, alternative magazines and online treatments. However, it has not been taken

43 Brian Martin, "The politics of a scientific meeting: the origin-of-AIDS debate at the Royal Society," *Politics and the Life Sciences,* Vol. 20, No. 2, September 2001, pp. 119–130.

> seriously within the scientific community: scientists do not publish papers on the theory, even to rebut it. The mass media have not given much attention to the theory. For example, there have been few mainstream reviews of books advocating this view.

> In the US, decisions about ***fluoridation*** are sometimes made by local or state governments. However, sometimes governments, to offload responsibility, prefer to hold public referenda on the issue. There have been hundreds of referenda over the decades. In some towns, there have been successive referenda, sometimes resulting in fluoridation being introduced and later withdrawn.[44]

The ways decisions are made can have effects on the way controversies evolve. A decision point — such as a referendum or passing of a law — often becomes a focus for campaigning. After a decision is made, the losing side may become demoralised, or perhaps alter its methods and goals. Decision-making methods can affect campaigning strategies, for example whether to orient arguments to politicians, voters or special-interest groups.

Some observers believe that official decisions mean the controversy is over: if a government makes a policy on climate change or stem cells, there's no point arguing any more. Campaigners usually realise that official decisions, no matter how definitive they seem, are not the end of the

44 Robert L. Crain, Elihu Katz and Donald B. Rosenthal, *The Politics of Community Conflict: The Fluoridation Decision* (Indianapolis: Bobbs-Merrill, 1969).

debate. Almost always, there are further things that could or should be done by each side. An official decision changes the terrain for the debate but doesn't end it.

2.14 Why people get involved

People get involved in scientific controversies for all sorts of reasons, but there are few systematic analyses of how people became involved in particular controversies. It is difficult to determine what influences people's actions: sometimes they don't know themselves, or will reconstruct an explanation in retrospect that sounds more plausible or respectable than what actually happened.

Possible reasons for people getting involved in a scientific controversy

1. They study the issue, become concerned and decide to do something.
2. They are concerned about the issue due to a personal experience. For example, their child might have had an adverse reaction to a vaccination or they have been exposed to a pesticide.
3. They see what happened to others they know. For example, a family member might have been exposed to chemicals and developed an extreme sensitivity to them.
4. They are paid to campaign.
5. They have a connection through their job. For example, they work as a nuclear engineer and support nuclear power — or they work for a solar energy business and oppose nuclear power.

6. A friend told them about the issue and got them interested.
7. They received some information about the issue and decided it was important.
8. They went along with a friend to a rally or public meeting and developed a concern from that experience.

Reason 1 is based on rationality. We can imagine someone who objectively studies a number of issues and decides that a particular issue is the most important, or at least sufficiently important to warrant taking action. This hardly ever happens.

Reasons 6 and 8 are two of the most important factors, according to research into social movements.[45] Involvement comes through personal contacts and personal experience. Rather than trying to convince someone that GMOs are important, it's often far more effective to invite them to a meeting or a protest rally or some other event.

The usual idea is that thought precedes action, namely that people need to be convinced before they will do something. This occasionally happens, as in reason 1. More commonly, though, action leads to thought: people become involved with the issue in some way and hence

45 See James M. Jasper, *The Art of Moral Protest: Culture, Biography, and Creativity in Social Movements* (Chicago: University of Chicago Press, 1997) for a useful discussion of the different factors influencing the decisions of individuals to join a social movement, including friends, beliefs, previous activism and "moral shocks."

are stimulated to learn more about it, as in reasons 6 and 8, leading to greater commitment.[46]

On a few issues, vivid campaign materials can make a difference. Photos of aborted foetuses can stimulate some people to join pro-life action groups, and photos of animals being experimented on can lead some to join the animal liberation movement.[47] However, even in the pro-life and animal liberation movements, the majority of new recruits are attracted through friendship networks. For issues without such vivid imagery, like mobile phone radiation and chronic fatigue syndrome, networks are the dominant mode of recruitment.

In a few issues, personal experience can trigger interest and involvement (reason 2). This is especially important in the health area: people with breast cancer, or whose children have autism or ADHD, may become involved in action on those issues. But most do not. To become involved requires energy and initiative, for example to find out about an action group or even set one up. On the other hand, those with personal experience are often quite responsive to approaches by campaigners.

Then there are paid campaigners (reason 4). Are they mercenaries? Not at all. Most were highly committed

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46 Ziad W. Munson, *The Making of Pro-Life Activists: How Social Movement Mobilization Works* (Chicago: University of Chicago Press, 2008).

47 James M. Jasper and Jane D. Poulsen, "Recruiting strangers and friends: moral shocks and social networks in animal rights and anti-nuclear protests," *Social Problems,* Vol. 42, No. 4, November 1995, pp. 493–512.

before they even considered taking a paid position. But this depends on the level of payment. A nanotechnology campaigner working for Friends of the Earth is likely to be on quite a low wage: this sort of paid campaigner is personally committed, first and foremost, with the wage allowing more time to be devoted to the issue. A pro-smoking campaigner working for a tobacco company is a different matter: a high salary may help to overcome scruples. Nevertheless, only some people will take such a job, and those who do are likely to be sympathetic to the cause to begin with.

Reason 5 is a link with interests. When a person works for an industry, then it's natural to take the industry side in a controversy. When you work for a pharmaceutical company selling antidepressants, you're more likely to agree with the arguments about the safety and effectiveness of antidepressants, otherwise working life would contain more tensions. But does this provide a motivation to become a vocal advocate of antidepressants? Possibly, but not a very strong one, because only a tiny minority of pharmaceutical company employees are active participants in any relevant controversy. But for those who do become active, their industry experience or links provide a way of looking at the world that makes commitment seem natural.

Interests can be employment, research grants, consultancies, appointments on advisory boards, sponsored travel, gifts and various other benefits. Therefore it is not surprising that some of the scientists prominent in controversies, on a pro-industry side, have interests of this sort. But support for a cause can develop in other ways. In countries like Australia and the US where fluoridation is

widespread and long established, dentists are largely in support. They learn the arguments in favour of fluoridation in dental school and have them reinforced through dental journals, meetings of dental associations and peer pressure. The small minority of dentists who become pro-fluoridation campaigners often have no personal stake in their position, and sometimes they make sacrifices to maintain their efforts.

Interests are important in helping understand people's stands on issues, but interests do not determine positions and do not explain why only a few individuals become campaigners.

Usually, interests are most important for one side of a debate: the side supported by industry or government. In debates over nuclear weapons, many supporters have links to the government or military, whereas opponents have no financial stake in a world without nuclear weapons. So the motivation for anti-weapons campaigners is based on other factors, such as friendship or a concern for a better world. However, in some debates there are industry-linked interests on both sides, through seldom of the same scale. In the debate over nuclear power, supporters may have links through jobs or research grants in the nuclear industry. Most opponents have nothing to gain personally, but a few have stakes in renewable energy companies. It is important to be aware of interests because claims about the influence of interests can be used to attack opponents.

2.15 Commitment

Many campaigners are totally committed. They believe in their cause. They are passionate. They want to win.

Some campaigners live and breathe the issue. You could say they are dedicated or, if you want to be critical, you could say they are obsessed.

Both scientists and non-scientists can be committed to a cause. Scientists, contrary to the usual stereotype of calm, detached observers, can be just as emotional as anyone else. Scientists who are very good at their research are often passionately committed to their views.[48] They might appear objective in public but in private be scheming, ruthless and contemptuous of those with contrary ideas.

I say this not to denigrate scientists. They are, on average, no better or worse than anyone else. However, scientists have a reputation as being objective; they are often portrayed as detached observers of nature. It is important to realise that scientists, both privately and in public debates, can be just as subjective and driven as other campaigners. Sometimes they are able to get away with their biased stances more easily by coasting on the reputation of scientists as unemotional and uninvolved.

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48 Michael J. Mahoney, *Scientist as Subject: The Psychological Imperative* (Cambridge, MA: Ballinger, 1976); Ian I. Mitroff, *The Subjective Side of Science* (Amsterdam: Elsevier, 1974); David Lindsay Watson, *Scientists are Human* (London: Watts & Co., 1938).

If campaigners are highly committed, so what? The main thing is that they are willing to do a lot to advance the cause.

Being a committed campaigner often means putting in long hours to learn about the issues, give talks, write letters, organise meetings and support others in the campaign. It is astounding how much a single person can do by putting in exceptional efforts.

For some campaigners, being committed means being willing to do things that might be seen as disreputable or dishonest, such as hiding conflicts of interest, misrepresenting research findings, making false or deceptive statements in debates, misrepresenting credentials, subjecting opponents to personal abuse, trying to censor opponents, subverting peer review, fabricating materials about opponents, encouraging police to spy on or arrest opponents, setting up fake advocacy groups and inciting violence.

To opponents, such actions might seem unscrupulous or even criminal. It is important to remember that many who undertake or sponsor such actions feel justified because their cause is more important: the ends justify the means. See chapter 7 about responding to these sorts of unsavoury methods.

2.16 The media

In many controversies, the media play a crucial role. Types of media include television, radio, newspapers, magazines, leaflets, posters, graffiti, websites, email, SMS, blogs, Facebook and Twitter, among others. What

are traditionally called mass media — television, radio and newspapers — are essentially one-directional, with a small number of writers and speakers presenting material to a large audience. On the other hand, interactive media, for example telephones, email and Twitter, allow two-way or group communication. However, the distinction between mass and interactive media is breaking down. For example, many newspapers and radio stations have online presences allowing comment by audience members.

Traditionally, scientific investigations were reported in refereed journals, which then might be taken up by mass media. This is still a common pattern, but some journals now more actively promote their contents, for example through editorials, media releases and exposure through interactive media.

Chapter 4, on communicating, tells more about the media. Here it is worth making a few general points.

The media can be thought of as having three roles in controversies. The first is as an avenue for conveying information. Many members of the public get most of their information about controversies from the mass media, especially television. A growing proportion seek information from online sources.

If it were possible that the media could be a neutral means of providing information, then controversies might be reported fairly, but usually one or both sides in a controversy use active media-management strategies, such as putting out media releases, holding meetings to which journalists are invited, arranging newsworthy stunts, and much else.

The mass media have their own criteria for what counts as news. Journalists and editors use an implicit set of criteria to judge whether something is worth reporting. These criteria, called news values, include the prominence of individuals, whether the issue has local and current relevance and whether conflict is involved. Controversies are newsworthy because of the conflict factor. Journalists prefer to report on a conflict between individuals — the personality factor — rather than an abstract conflict between points of view. If the controversy affects readers in their everyday lives, for example screening for cancer, it will be more newsworthy than a remote issue like building an airport in Tokyo — unless you live in or regularly fly to Tokyo, of course.

The effect of news values and the influence of sources is that the mass media are not neutral in the way they report controversies: some issues get more attention, and newsworthy facets get more attention than ones judged less newsworthy. This can be frustrating to campaigners who find that trivial matters — such as comments by a leading figure, or media stunts — get more attention than substantive issues.

Other sorts of media, for example websites, graffiti and blogs, are not neutral either. They often have different sets of values as to what counts as worthy of comment.

Over the past few decades, major media companies have pushed for greater profits by cutting back on staff numbers, forcing journalists to produce more output to maintain their jobs. This means less time is available to investigate and check stories. The result is that many outlets rely more heavily on news services such as United

Press International — but they too have been squeezed, so stories are less carefully verified. The result is that mass media are more vulnerable to manipulation by sources. In a rush to produce stories, some journalists will take a media release, slightly rewrite it and put their name at the top, giving the release the appearance of genuine news coverage.

The mass media are thus increasingly vulnerable to having their agendas manipulated by groups able to afford major public relations operations. Governments and corporations are adept at using the media to serve their purposes, promoting desired stories and submerging undesired ones, and promoting favourable spin whenever possible. Some large activist groups, such as Greenpeace, also are able to manipulate the media, for example by designing spectacular stunts that mesh neatly with the news values used by harried journalists who are under incredible pressures to quickly produce stories to fill a space or time slot.

Many journalists have little time to pursue leads or seek contrary opinions, so public relations units are often able to prevent coverage of embarrassing events or keep coverage to a low level, or put their own perspective on events. People seeking history, context or careful analysis seldom find it in the mass media.

These changes in the mass media have an effect on coverage of some controversies, especially high-profile ones. What the effect is depends on circumstances, and needs to be assessed on a case-by-case basis. In general, the agendas of governments and large corporations are more likely to dominate, with the media serving as a

conduit for broadcasting their favoured views in the guise of independent reporting. As environmental and other campaigning groups become more adept at using the media, the result is a lack of independent investigation of controversial issues, so readers and viewers are subjected to pre-packaged partisan viewpoints.[49]

In summary, the media's first major role in controversies is as a conveyor of information. The sort of information conveyed is shaped by campaigners' media-management strategies and by the implicit values of the media about what is worth reporting, with journalists and editors operating under extreme time and resource constraints.

The media's second role is as an active player. Some media organisations take a stand on controversies, or even campaign on one side. Whether this occurs, and the extent to which it happens, depends a lot on the issue and the organisation. It is most common when a media organisation has direct links with, or an ideological affinity for, a particular view in a controversy.

> The dominant scientific view is that the ***climate*** is heating up and that this is occurring, at least in part, due to human activities, most notably the burning of fossil fuels. In some countries, this is the position most

49 For an examination of these developments, see Nick Davies, *Flat Earth News: An Award-winning Reporter Exposes Falsehood, Distortion and Propaganda in the Global Media* (London: Chatto & Windus, 2008); Tom Fenton, *Bad News: The Decline of Reporting, the Business of News, and the Danger to Us All* (New York: ReganBooks, 2005).

commonly reported by the mass media. However, fossil fuel industries, especially coal and oil companies, do not welcome standard climate change science: some of these companies sponsor sceptical viewpoints — and some media are responsive to company agendas. In Australia, where the influence of the fossil fuel lobby is strong, *The Australian,* a national daily newspaper, publishes extensively on the sceptical viewpoint, both through news reports and in features by regular columnists, giving less attention to the dominant scientific view than other mass media.[50]

Today, advertisements for ***smoking*** are illegal in many countries. Only a few decades ago, smoking was advertised on billboards, magazines, newspapers, films and television. Cigarette ads were so effective that slogans such as "I'd walk a mile for a Camel" and "Winston tastes good like a cigarette should" were widely recognised. As the evidence against smoking became more well known and opponents of smoking mobilised, there was increasing pressure on the media to curtail advertisements, but only a few publishers, for example *Reader's Digest,* refused to run cigarette ads. At that time, publishers that continued to run cigarette ads were less likely to report news or run significant stories critical of the tobacco industry.

50 Wendy Bacon, "A sceptical climate: media coverage of climate change in Australia, 2011: Part 1 — climate change policy" (Sydney: Australian Centre for Independent Journalism, University of Technology, Sydney, 2011).

Does ***violence in the mass media*** contribute to greater violence by readers and viewers? There is evidence that the availability of television leads to higher murder rates and that news reporting of suicides and murders leads to copycat behaviour.[51] It has also been argued that terrorism can be thought of as the use of violence as a means of communicating, and that mass media are crucial tools in making terrorism effective.[52] One implication is that if the mass media declined to report terrorist attacks, there would be fewer of them. These claims are controversial and socially significant, but they have received little or no coverage in most media outlets, for an obvious reason: publishers and editors do not like to report views that are potentially detrimental to their businesses.

In looking at the way a media organisation reports on a controversy, it is worth looking at links between the organisation and the controversy.

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51 See evidence cited in Dave Grossman and Gloria DeGaetano, *Stop Teaching Our Kids to Kill: A Call to Action against TV, Movie and Video Game Violence* (New York: Crown, 1999).

52 Alex P. Schmid and Janny de Graaf, *Violence as Communication: Insurgent Terrorism and the Western News Media* (London: Sage, 1982). See also Brigitte L. Nacos, *Mass-Mediated Terrorism: The Central Role of the Media in Terrorism and Counterterrorism* (Lanham, MD: Rowman & Littlefield, 2002); Joseph S. Tuman, *Communicating Terror: The Rhetorical Dimensions of Terrorism* (Thousand Oaks, CA: Sage, 2003).

- The publisher or editor may have an ideological commitment to a position, often due to general support for an industry, profession or government.
- Advertising income can influence treatment of a controversy.
- Positions critical of or threatening to the media itself are unlikely to receive as much coverage as positions that are neutral or favourable to the interests of the media.

The third main way in which media affect scientific controversies is by what is called agenda-setting.[53] The idea is that media do not necessarily determine what position people take on an issue but do influence what issues they think about. If mass media run a lot of stories about an issue, people will think it is more important; if there are no stories, people won't think it's so important. Sometimes coverage is out of step with popular sentiment. In the early 1980s, there was a big upsurge in protest against nuclear war, and before long media coverage followed. But after a few years, editors judged that the issue was old — there weren't new angles to report, and protests followed the same predictable pattern — so coverage declined, even though popular concern remained at a high level.

Media can also set the agenda for which issues are considered more important within wider controversies. In the climate change controversy, some media report the dispute between supporters and sceptics of the standard

53 There is a massive amount of research on this topic.

view, so the agenda is the question of whether human activities are contributing to global warming. When the media assume climate change science is solid and report disputes about how to respond, then the agenda is the question of prevention or adaptation. When media assume action on global warming is a matter for government, then the agenda is policy options — and the role of citizen action is not given much attention. When media report the policy debate as a disagreement between market mechanisms, such as emissions trading schemes, and government regulation, such as mandatory energy efficiency standards, then the agenda is the mode of government intervention. Climate change options that involve significant personal change — such as switching to a vegetarian diet to reduce carbon emissions — are normally off the agenda.

Some people and groups will pursue their own agendas despite lack of attention in the media: the media can influence but not determine people's views. Having favourable media coverage is an advantage in a controversy, but it does not necessarily convince or silence the opponents.

2.17 Understanding commentaries

Many people comment on controversies. Especially important are commentaries that are influential in people's understanding of the debate, for example opinion pieces in major newspapers, high-profile blogs, and articles and talks by prominent scientists, politicians and celebrities. These can reach a wide audience, especially when repro-

duced and circulated by campaigners and interested readers.

Some commentaries are obvious partisan pieces: they argue the case for one side. Others, though, seem more independent. They are *about* the controversy rather than seeming to argue one side or the other. There is no way to be truly neutral in writing about controversies, but, by seeming to be balanced, commentaries can sometimes be more persuasive.

To understand commentaries, it's useful to classify them into several types.[54]

Advocacy

Many treatments of controversies are obvious advocacy for one side. They present the arguments for the writer's preferred position and the case against the other side. They use evidence and examples to make points. This sort of treatment is easiest to recognise and understand: the author takes an explicit stand.

Play-by-play

Some commentaries about controversies mainly tell about what has happened: the government has done this, campaigners have done that, policies have been adopted, and so forth. This sort of commentary looks primarily at

54 Four of the five types here are based on ones presented in Brian Martin and Evelleen Richards, "Scientific knowledge, controversy, and public decision-making," in Sheila Jasanoff, Gerald E. Markle, James C. Petersen and Trevor Pinch (eds.), *Handbook of Science and Technology Studies* (Thousand Oaks, CA: Sage, 1995), pp. 506–526.

actions, not at arguments. It seldom says a whole lot about who is right or wrong. It is like a commentary on a sporting event, saying who's ahead and who's playing well, without being openly partisan.

> A play-by-play account of the climate change controversy might tell about mounting concern in the 1990s, the signing of the Kyoto protocol, the Al Gore film *An Inconvenient Truth,* the climategate scandal, failure of the Copenhagen conference in 2009, emissions trading schemes in Europe, increasing popular support for climate scepticism in the US, and much else. A play-by-play account will not say much about whether global warming due to human activities is actually occurring, though it might comment on whether scientists, government leaders or members of the public believe it is.

What does the author of play-by-play account really believe? That can be hard to tell. The author might have a partisan view or might not care who's right. Often others can't easily tell what stance is being taken.

News and current-affairs stories are most likely to adopt a play-by-play approach. They thus avoid buying into the core of the debate — the evidence, arguments and options — while still being informative.

Wrong belief

In this approach, the writer assumes that one side in the controversy is right and therefore sets out to explain why the other side persists in its folly. Only one side of the debate is addressed: the side assumed to be wrong.

> Numerous studies of the fluoridation controversy have focused on the opponents of fluoridation, proposing different explanations for why people oppose the measure. Some have said it is due to irrationality. Others have used a demographic treatment, linking opposition to lower education and income. Yet others have said members of the public are confused by the debate and hence decide that not fluoridating is the safer option.[55]

The assumptions underlying this approach to controversies operate like this. First, the facts of the issue are assumed to determine the correct position. Second, one side — the side backed by the majority of leading scientists — is said to be supported by the facts; it is the correct side. Third, anyone who disagrees is assumed to be wrong, so it is the task of a commentator to explain why. Those who don't agree are said to be misguided, afraid, ill informed, dupes or any of a number of descriptions, nearly all derogatory.

This approach is commonly used in debates over astrology, psychic phenomena, UFOs and homeopathy. Anyone who supports a position contrary to scientific orthodoxy is seen as irrational — so there must be something wrong with them.

Controversy campaigners often use the wrong-belief approach. It's common to hear campaigners say, "If only *they* [meaning the opponents] knew the facts, they couldn't possibly continue to believe what they do."

55 Brian Martin, "The sociology of the fluoridation controversy: a reexamination," *Sociological Quarterly*, Vol. 30, No. 1, 1989, pp. 59–76.

Whenever you hear someone trying to explain why one side in a debate persists in campaigning, you can guess that a wrong-belief approach is being used.

An analysis of beliefs can be insightful: it can point to reasons why people take stands on a position. But it is one-sided. It never tries to provide reasons for why people support the other side — the side of orthodoxy.

> Applied to the climate change controversy, a wrong-belief analysis assumes the correctness of the standard scientific position — global warming is occurring and human activities are most likely responsible — and seeks to explain why some people refuse to accept this view. A commentator might say they are persuaded or confused by the materials put out by sceptics, who are supported by the fossil fuel industry. Or say that perhaps, deep down, they don't want to accept any responsibility for causing the problem. Or say that maybe they are highly committed to their current lifestyle.[56]

Speculating about the psychology of the opponents can be seductive. This sort of commentary is rarely based on evidence or detailed analysis, but even when it is, there is one distinctive feature of wrong-belief analysis: only one side is analysed. A commentary on the reasons for climate change scepticism makes no attempt to explain why so many scientists and others believe in the orthodox position. Adherence to orthodoxy is assumed to be

56 An example is Haydn Washington and John Cook, *Climate Change Denial: Heads in the Sand* (London: Earthscan, 2011).

rational, based on the facts, and therefore doesn't need to be explained.

Only a few people in controversies actually read lots of original scientific papers and make a personal judgement based on the evidence. This applies to supporters of orthodoxy as well as critics. So why do people support the orthodoxy? Trust in experts? Joining the crowd? Those are the sorts of questions not asked in wrong-belief commentaries.

There can be wrong-belief commentaries on both sides of a debate. Climate change sceptics can and do speculate on what makes people accept the orthodoxy. This is a mirror image of the normal wrong-belief approach, sharing the same underlying assumption: one side is right, so we need to explain why people support the other side, but we don't need to explain why people support the side that's correct. This can occur because supporters of a minority position, being immersed in the evidence for their position, start thinking the evidence should be overwhelming to an outsider too — so there must be explanations, aside from the evidence, for why anyone has contrary views.

Ideological

Some people write about controversies from the point of view of a particular belief system.

> A Marxist analysis of the climate change controversy will look at class struggle between the ruling class and the proletariat, or working class. Such an analysis might point to the role of the fossil fuel industry in

> undermining support for reductions in carbon emissions. On the other hand, a different Marxist analysis might look at the role of the bourgeoisie — most prominently, Al Gore — in promoting concern about global warming and the impact of increased fuel prices on ordinary workers. A Marxist analysis does not automatically come down on one side or the other.

An ideology is just a framework for understanding the world — it may be useful or not so useful, depending on the purpose. It shouldn't be treated as necessarily wrong just because it comes at issues from a particular perspective.

> You don't have to be a Marxist to undertake a Marxist analysis of a controversy. Marxism is a sort of toolkit of ideas, to be applied, or not, depending on the circumstances. So just because you see a Marxist analysis, it's wise not to assume the author is a Marxist in other ways. The same applies to other ideologies.

There are many potential ideologies for analysing controversies.

- Religious beliefs. For example, Christianity is commonly used as a framework in discussions of abortion, contraception, euthanasia and evolutionary theory.
- Feminism. This is prominent in controversies of special relevance to women, for example debates about abortion, cervical cancer, contraception, and gender differences.

- Neoliberalism, the ideology of corporate capitalism, is relevant to debates over GMOs, nanotechnologies, pesticides and other products of industrial society.
- Libertarianism involves support for free markets with minimal government interference. Libertarians have distinctive positions on some controversies, for example opposing drug laws.

If you can figure out that someone is coming at a controversy from a particular ideology, this can help to understand their thinking. Although some ideologists make simplistic analyses, it would be a mistake to simply dismiss someone as ideological, because ideologies can be flexible and helpful, depending on the circumstances. It's quite possible for a religious thinker to develop a nuanced analysis of abortion and for a Marxist to have a sensitive, complex perspective on environmental protection.

Symmetrical

In a few treatments of controversies, each side is analysed using the same intellectual tools. An intellectual tool is just a concept or framework of ideas.

Suppose you want to analyse the climate change controversy using the concept of vested interest. In a symmetrical analysis, you analyse both sides using the concept: you assess the vested interests associated with scientific orthodoxy on global warming (for example, profits for renewable energy industries) and the vested interests involved with the sceptical position (for example, profits for fossil fuel industries).

Symmetrical analyses are most commonly undertaken by social scientists, especially those in the interdisciplinary field called science and technology studies. Most commonly, studies of controversies by social scientists end up in specialist academic journals that are only read by a few other social scientists. But sometimes social scientists write accessible articles or commentaries published in journals, magazines, newspapers or blogs.

On the surface, it might seem that a symmetrical analysis is fair: the analyst isn't favouring one side or the other. But usually such analyses are more useful to the side with less scientific support.[57]

A social analysis of a controversy typically looks at factors such as politics, economics, culture and communication for understanding what is going on. These can be called social explanations. Most people assume that if social factors are involved, this undermines the science, because they believe scientific knowledge is based solely on facts and is not affected by social factors. The upshot is that social analyses of controversies, even when they tackle both sides in the same way, are more likely to undermine the credibility of the position supported by the majority of scientists.

Social scientists usually undertake symmetrical analyses when they don't mind helping the side with less scientific support, such as when they don't really care

57 Pam Scott, Evelleen Richards and Brian Martin, "Captives of controversy: the myth of the neutral social researcher in contemporary scientific controversies," *Science, Technology, & Human Values*, Vol. 15, No. 4, Fall 1990, pp. 474–494.

which side is correct. This may help explain why there are no prominent symmetrical analyses of the climate change controversy: they would probably aid the sceptics.

What to look for

When reading or listening to someone discuss a controversy, it's useful to know where they are coming from, namely what stance they take and what assumptions they make. To do this, look for the telltale signs of different types of commentary.

Advocacy

Arguments and evidence all supporting one side and/or attacking the other side

Play-by-play

Descriptions of what has happened in the debate without much discussion of the evidence or arguments

Wrong belief

Explanations for why one side adopts misguided beliefs

Ideological

Analysis of what drives the debate

Symmetrical

Analysis of both sides of the debate, looking at how the same sorts of factors influence each side

2.18 Learning about an issue

If you care about an issue and want to learn more about it, there are several options, including reading, discussing and writing.

Reading

You can search for material in various places, including scientific journals, the mass media (including television, radio, magazines and newspapers — including regional newspapers), online forums (including websites, blogs and videos), and books.

For most people, reading is the most efficient way to acquire information, but audio and video sources are increasingly common. Some people learn best from listening and watching rather than reading.

Searching online can provide a good start for getting into an issue, but there are pitfalls. Wikipedia is highly convenient and often quite informative, but treatments on controversial issues may be unbalanced because partisans on one side constantly alter entries to support their position.[58] (Traditional encyclopaedias, such as Encyclopaedia Britannica, are sometimes no better. It depends on who writes the entry.)

Using Google, Yahoo or some other search engine, with the right keywords, can lead you to scientific papers,

58 Scholars seldom cite Wikipedia as an authoritative source. (They seldom cite any other encyclopaedia either.) However, many who refuse to cite Wikipedia read it for an introductory overview of an unfamiliar topic and use the references to find relevant readings.

news stories and much else.[59] But to get a more in-depth picture, you need to be more discriminating, or more comprehensive.

Scientific journals[60]

Most scientific journals are contained in databases with indexes that allow searching by keywords. Librarians can help you access relevant databases and interrogate them using a variety of techniques. Review articles are a good starting point: they provide overviews of a topic and have lengthy bibliographies. Many scientific articles, including review articles, are also available online due to the open access movement[61] and are discoverable using search engines such as Google and databases such as OAIster. From a journal publisher's website it is also possible to set up alerts, so you receive emails when journal issues are published or when an article is published containing your nominated keywords.

Some journals are prestigious and have a distinguished record of publishing high-quality papers. Others are lower status. In recent years, a host of new online for-profit journals have been established, some with virtually no screening for quality.

However, a journal's high status does not guarantee that every one of its articles is high quality. Some prestigious journals contain papers involving bias, misrepresen-

59 Be careful: interest groups can influence search engine results.

60 I thank Lucia Tome for valuable comments on this section.

61 The open access movement is pushing for all scientific publications to be freely accessible online.

tation or even fraud. Many papers published in lower-status journals are very high quality. While it is sensible to take notice of where a paper is published, there is no substitute for evaluating the paper itself.

Books

Reading books can be a good way to get on top of an issue, because authors usually give a more comprehensive picture than in a typical scientific article. Many authors are highly partisan; a few attempt to give a balanced picture. It's usually worthwhile trying to find treatments from both sides of an issue.

A good way to find books is by searching library catalogues or by searching online booksellers like Amazon.

Mass media

Some newspapers put their content online so you can search back issues. Many don't, so again it's useful to use databases. Radio and television are less likely to be online, so in many cases there is no substitute for monitoring broadcasts. For example, a topical issue might be debated on talkback radio. There is no substitute for listening. No one person can do this, so for comprehensive monitoring it is essential to have committed members who will report on what is being covered in the media.

Online forums

Some people involved in controversies write blogs. There are discussions on pages in Facebook, Google+ and other such forums. Many published articles allow for comments

afterwards. On Amazon, readers can write reviews, and rate them. Only some of this vast outpouring of commentary is useful for understanding an issue. Many comments are off-the-cuff and ill-informed.

If you trust the author of a blog, by all means check it regularly. But if you are new to an issue, online forums may not provide much insight. Looking at online forums is probably most useful for getting a sense of expressed opinion. If you are planning to contribute yourself, or to become a speaker or writer, then checking online comments can give you a sense of the sorts of arguments you need to be prepared to address.

For some new or little known controversies, it's possible to obtain most of the key publications about the issue. But for bigger controversies, especially those that have been going for some time or have a public profile, the amount of material is likely to be overwhelming. Where to begin?

Here's an approach I find useful. I first try to find an overview of the issue, or rather several overviews, to give me a sense of the arguments. Then, to go more deeply, I pick one facet of the debate — one argument or element — and try to learn more about it by reading some of the more technical treatments. Tackling one part of the debate is more achievable and can give a sense of accomplishment, avoiding the risk of feeling lost in a swamp of material. After getting a decent grasp of one facet, turning to another facet is the next step.

For example, in the nuclear power debate, you could start with reactor accidents or proliferation of nuclear weapons or the health effects of low-level ionising

radiation. In the vaccination debate, you could start with a particular vaccine like polio or chickenpox. In the genetic engineering debate, you might start with genetically modified soybeans. Often it's useful to start with a topic that you already know something about. After you consolidate your understanding of this particular topic, you can branch out into other dimensions of the debate.

Discussing

To better understand the issues, it's extremely valuable to talk about it with others. This could be a friend or colleague. It could be someone you've just met at a social occasion — when introduced and asked what you do, you say "I'm trying to learn more about cholesterol and health" and you may well get an opportunity to discuss the issue.

When you meet someone who knows nothing at all about the issue and is willing to listen to what you say, it is your chance to tell what you know — or at least a small portion of it. You've been reading various articles and now it's your turn to communicate a bit of that information to someone else. But this is more than regurgitating someone else's views, because by expressing the information, you are selecting, transforming and organising it. In other words, to tell about it, you are forced to think about it. So the more opportunities you have to explain the issue to someone else, the better you will understand it yourself, as in the familiar saying that the best way to learn something is to teach it.

As well as gaining from the experience of explaining the issues, you also learn how listeners respond. They will

nod when you present some arguments and examples, appear confused concerning others and react negatively to yet others. You are learning what arguments work well. This is invaluable for anyone campaigning on an issue.

For those who know the arguments backwards and have talked about them hundreds of times, explaining the basics to someone unfamiliar with the issues can be tedious. That's another matter. Right here I'm focusing on those in the initial learning stages.

When talking to someone about the issue, even to someone who doesn't know very much about it, they might well ask a question, even a basic question, that you can't readily answer: "When did nanotechnology get started?" "What's the biggest company?" "Are there military applications?" The safest answer is "I don't know" — but you should remember the question, or write it down, and find out the answer. If you see the same person again, you can tell them, but this is not the main reason. The value of learning answers to seemingly random questions is that you learn more about the issue, and furthermore you learn the information that is most relevant to discussing the issue. It turns out that many people ask the same sorts of questions, so if you take the trouble to learn answers to these questions, you will become quite knowledgeable for the purposes of casual conversations.

You might also have the opportunity to talk with an experienced campaigner or commentator — someone who knows a lot about the issue — who shares your perspective. This is a great opportunity to learn. Often all you need to do is ask a few questions and then listen. For

example, you could ask "What about the argument that the latest antipsychotics are much safer?" and then hear some good counter-arguments. If there's a question you've asked and couldn't answer easily, this is your chance to hear how someone more experienced addresses it. An experienced person can also guide you towards helpful sources of information, the latest relevant findings, and to others who can provide insight.

You need to be aware that prominent figures in a debate do not necessarily all agree, nor do they have the same knowledge and skills. For example, some leading individuals are entirely focused on a particular issue, be it pesticides or euthanasia, whereas others believe it is important but see it as part of a wider picture. One experienced campaigner might want pesticide use minimised to benefit human and environmental health; another might see pesticides as an abhorrent feature of industrialised agriculture; another might be driven by concerns about multiple chemical sensitivity.

Of course, you will have your own favourite topics and angles. To become really knowledgeable about the issue, you need to understand people's stances as well as the technical dimensions. It is possible to learn from others whose motivations or perspectives are different from yours, but with whom you share a common concern.

It is also possible to learn from opponents. I say "possible" because it is usually much more difficult to engage with them. This is easiest when talking with friends or acquaintances who take a different position than your own. A topic comes up — microwave hazards or population pressures — perhaps because you mentioned

your concern, and the other person states a position contrary to yours. This could be an opportunity to try out your own knowledge, by presenting the arguments from your point of view, and see how the other person responds. There's also another approach: try to draw out your conversation partner in order to learn what they know, how they think, what assumptions they make and what values they hold dearest.

If you have the opportunity to speak with a highly knowledgeable opponent, this can be informative, but it can also be more predictable, especially if this person has written and spoken widely on the topic, so articles and recordings are available. However, speaking one-on-one allows you to probe particular points.

A true engagement — a friendly conversation, with some degree of openness — is possible between two people with contrary positions, but it is not common. It is risky for both parties, because if you reveal knowledge gaps or reservations, some opponents may use them against you. Prominent campaigners are likely to be on guard, presenting their public persona, except perhaps when discussing matters with their friends and allies.

If you are in the unusual position of having an ongoing dialogue with someone who has well-developed contrary views, this is a great opportunity to test out ideas and arguments. If you are lucky enough to know such a person, it is worthwhile maintaining your relationship — perhaps friendship. A communicating opponent can help you check your facts, often by challenging them, can question your assumptions and thus help you clarify them, and can give you insight into how the other side thinks. Of

course, your friendly opponent may be seeking the same sorts of advantages by knowing you.

Writing

Another worthwhile way to learn about an issue is to write about it. This may seem to be a strange claim: surely writing is just putting one's thoughts into text. Actually writing is more than this. It requires taking your often vague and incoherent thoughts and putting them into a logical order. This requires thought. Indeed, writing is a process of thinking. By writing, you think more rigorously about the issues.

There are various ways to use writing to help you learn about the issues. An easy way to start is to write letters to friends who know nothing about the topic. Tell them what you've been reading, hearing and thinking, explaining the points as clearly as you can.

Another useful exercise is to write notes about books or articles you've read. What sorts of things should you write? There are lots of options. I find it useful to try to write a one-paragraph summary of the key ideas. I do this without looking at the book or article — especially when the article has an abstract. The point is to put the ideas in your own words, not to parrot the authors. Then I comment on the relevance of this source to the issues being debated, mention assumptions made by the author, comment on style and audience, and summarise points I think are worth noting, giving page references.

You can also take notes on meetings and conversations. If you attend a conference or public meeting, taking notes will help you understand better what is going on, by

forcing you to concentrate on the things that are most important for your purposes. Another possibility is to write a diary, which is like taking notes on your own thoughts and actions.

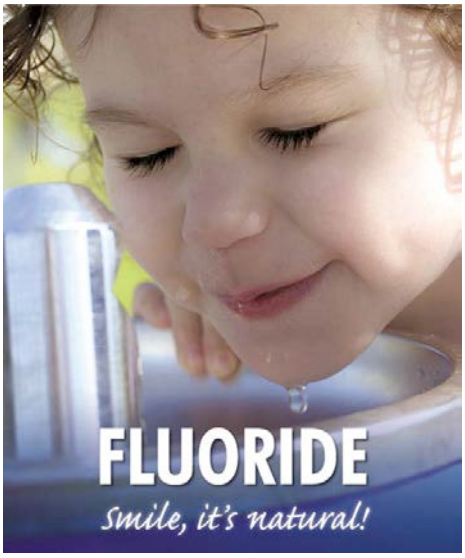
Notes like these are just for you — in two senses. As you compile notes on more and more sources, you develop a file of material that can be useful for looking up information or finding a citation. The notes are also tools for you to develop your understanding. By writing, you improve your memory of what you've written as well as exercising your writing skills.

There's another role for writing: making a contribution to the debate. Here my focus has been on writing as a method of learning, and you can do this by writing to friends, keeping a diary and taking notes on things you read and observe.

Fluoridation

What it is

Fluoridation is the addition of compounds containing the element fluoride to public water supplies, with the aim of reducing tooth decay, especially in children.



Arguments for

• Fluoridation greatly reduces tooth decay in children, by as much as 50%.
• Fluoridation has no documented harmful health effects.
• Fluoridation is a low-cost way of getting fluoride to nearly everyone's teeth, including those at greatest risk of tooth decay.

Arguments against

• The benefits of fluoridation are much smaller than claimed.
• The benefits of fluoride come mostly from its effect on the surface of teeth; swallowing it is unnecessary.
• Fluoridation is linked to various health problems, including dental fluorosis, skeletal fluorosis, hip fractures and intolerance reactions.
• Fluoridation involves individuals receiving an uncontrolled dose of medication, and hence is unethical.

Experts and authorities

Doctors, dentists and health authorities in most countries support fluoridation. A few doctors, dentists and scientists oppose fluoridation.

Groups with vested interests

Sugary food manufacturers benefit from the belief that tooth decay is due to a deficiency of fluoride. Companies causing fluoride pollution — such as aluminium manufacturers — benefit from the belief that fluoride is a beneficial substance. Dentists have gained status by promoting fluoridation as a public health measure.

State of play

In several countries, including Australia, Canada, New Zealand, Singapore and the United States, a significant proportion of the population drinks fluoridated water. There is little or no fluoridation in most of Europe, and little in Africa, Asia or South America.

Alternatives

Fluoride can be provided to individuals via tablets, mouthwashes, fluoridated salt, and fluoride treatments by dentists. More generally, dental health can be improved by dental hygiene (brushing teeth), good nutrition and limiting consumption of sugary foods.

3
Arguing

You meet someone at a social gathering and you're talking about various issues — and you bring up your interest in climate change, microwaves, ADHD or whatever. You've joined in the controversy! Even a casual conversation can be considered a strategic engagement, in which you present your ideas, maybe aiming to persuade the other person, trying to find out what they are thinking, or seeking to learn so you can help decide your own stance.

Arguing is at the core of controversies. It occurs via one-on-one encounters, public meetings and mass media treatments. This chapter focuses on the arguments themselves, including information, examples and logical organisation. Chapter 4 deals with the communication dimensions of controversies, though in practice there's a close connection between the choice of arguments and how they're communicated.

Discussing an issue typically involves several elements. One is information. Specific bits of information are sometimes called facts, though these may be contested. Information is often organised to support a sequence of logical steps, leading to a conclusion: this is called an argument. One important mode of presenting information is through examples, which are parcels of information that impart a particular lesson or conclusion. Underlying the use of information and deployment of arguments are various assumptions, often unstated, including assumptions

about values. All this takes place in the context of what people already know, including perspectives and attitudes that shape what they are likely to find relevant and important. Part of arguing is attempting to shift other people's perspectives so they attend to different sorts of information and think about the issue in a different way.

If you are the initiator of a controversy — the first person to ever raise an issue — then you might have free rein to decide about the most appropriate information and arguments to use, from your point of view. But in 99.99% of cases, people enter a controversy that has already started and in which there are standard packages of information, arguments, assumptions and perspectives. You can try to present arguments the way you'd like, but others are likely to draw you back to standard ideas.

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Imagine contributing to a controversy in the following way. You examine all the scientific evidence and prepare a summary highlighting the findings commonly agreed by the best researchers. You explain the findings in an accessible fashion but with faithfulness to the research. You also explain the way the research was carried out, so readers can judge for themselves, to a reasonable degree, the basis for the findings. In addition, you present alternative scientific viewpoints, in a depth proportional to their credibility, pointing out both strengths and weaknesses of the various positions.

In short, you've prepared a definitive review of research in the area. Surely, you might imagine, this will be seen as the authoritative treatment of the topic and will

be used by all rational people as the basis for forming their own views. Well, go ahead and keep dreaming.

A careful review of the evidence is indeed a useful contribution. There are many who are looking for such a review. But it probably won't do a lot to resolve the controversy, for several reasons.

• You examined only the scientific research that's been done. What about the research that hasn't been done? There could be political influences on research agendas. It's hard if not impossible to review undone research.

• You looked only at scientific research. In most public controversies, a key topic of debate is the social implications of the research. Assessing the social implications is a practical or policy matter, not easily addressed in a review of the science.

• There are values involved in the controversy, for example differences in ethics, politics and economics. Looking only at the research doesn't address value conflicts.

• You might be biased yourself — horrors! Of course you are the most independent, objective and sensible commentator in the world, but even so you can be accused of various forms of bias. In a highly polarised controversy, if your treatment is seen as assisting one side, the other side may ignore or attack you.

For these and other reasons, a careful analysis and exposition of scientific findings may do little to resolve the debate. This is a special case of the more general phenomenon that new evidence seldom makes much difference in controversies.

Do not despair. Evidence and careful, balanced arguments may not be definitive, but nevertheless they can be powerful tools in the struggle. Note that I use the word "tools." It is useful to think of evidence and arguments as tools, namely as methods in a struggle. Scientists often think of research findings as statements about reality. In a controversy, it is more useful to think of them as tools for waging the debate.

3.1 Arguing: factors to consider

To decide what evidence and arguments to use, there are many criteria. Experienced campaigners develop an intuitive grasp of what needs to be said. Here, I will try to spell out and illustrate some of the main factors worth considering. It can be useful to review these when presenting arguments.

Key issues

When you are writing or speaking, you get to choose what to say. So, to start at the beginning, what do you think are the important issues to be discussed? This might seem utterly obvious, but in practice campaigners often respond to the agendas of others, as we will see. It's important to keep your own agenda in mind.

> Critics of GMOs often focus on risks. You, though, might think that the issue of benefits needs more attention. You might want to question the scale of the benefits or even whether they exist, or perhaps criticise the distribution of benefits, claiming they

mostly go to large companies rather than farmers and consumers.

What works?

Some pieces of evidence or lines of argument resonate with the public; others fall flat. To be persuasive, it is vital to choose or restyle arguments so they tap into the concerns of the audience.

Campaigners against surveillance have learned that examples — such as individuals who are denied loans due to mistaken identity — are valuable for highlighting wider concerns, for example about the inability of people to correct false information on databases. These campaigners sometimes couch their arguments in terms of privacy even though surveillance might be a more accurate way to talk about their own concerns.

The standard agenda

Most debates follow a standard set of lines, with familiar evidence and arguments. When you contribute to the debate, you may wish to address these standard lines. This is straightforward. But if you prefer to emphasise some different matters — key issues that you think are important — usually you need to at least mention the standard lines too.

In the nuclear power debate, you might think proliferation of nuclear weapons is the most important issue. However, the issues most familiar to people are

reactor accidents and long-lived radioactive waste. So you may want to mention these at least in passing.

Links to values

Evidence and arguments are fine but values are also involved in every debate. You need to decide whether to mention values explicitly or to embed them in your choice and presentation of issues.

The climate change debate is often presented as a conflict between risks of climate disaster versus harm to the economy. A key value is intergenerational equity, namely benefits and harms to people today versus those affecting future generations: the benefits of doing nothing go mainly to people today whereas any benefits of climate change mitigation go mainly to people decades in the future. Do you want to mention this up-front? Or would it be better to keep it as an implicit theme?

Robustness

Some pieces of evidence and lines of argument are robust: they are difficult to challenge. Others are vulnerable to criticism and counter-examples: they are open to attack. If you have a monopoly of public debate, you may be able to get away with flimsy evidence, because no one has an opportunity to challenge it. But if the opposition is vigorous and attentive, it is risky to use weak evidence. It's better to set up camp with a more solid base.

In all sorts of debates, advocates make bold claims about an absence of hazards. "There is no health risk from X." X can be fluoridation, fracking, nanotechnology, EMF, sun screens, chlorination, or whatever. Sometimes the claims are more specific: "There is no risk of autism from MMR vaccines." Such sweeping claims are vulnerable to attack. All it takes is one plausible case to undermine the claim. It's far safer to say, "The health risks from X are extremely small."

Ease of explanation

Your evidence might be powerful, but you need to be able to communicate it. If a long and complicated explanation is needed to make a point, it may not be worth making, at least for some audiences. Some points can be reduced to a sound bite; others require several sentences to present; yet others need an elaborate exposition. The most complex sorts of evidence may need to be left unmentioned unless they can be compressed into something shorter, without mangling them in the process.

The evidence in support of global warming includes a combination of results from climate models and diverse sources of data. The models and the data each have an associated uncertainty: findings are typically presented as a figure with an error range, for example a temperature rise of 3.4 ± 1.2 degrees. For public discussions, the uncertainty is usually downplayed compared to the predicted figure: it's easier to communicate just one number. Then when it comes to the economic, health and other impacts of global

warming, the range of figures leads to a range of impacts. Explaining the precautionary principle in relation to a range of figures gets messy, so this complication is usually omitted from the public debate.

Who speaks?

It sometimes makes a difference who makes a claim. If you are an eminent scientist, you may be able to present different sorts of arguments — or present them in different ways — than a citizen with no credentials or formal affiliation. Those with more presumed authority often can get away with fewer facts and more generalisations, at least when audiences assume speakers know what they are talking about. Those without the same formal status may need to back up their statements with more facts and figures to display their knowledge.

In the 1980s during the debate over nuclear winter — the climatic consequences of nuclear war — atmospheric scientists such as Carl Sagan called for drastic reductions of nuclear arsenals. Sagan drew on his authority as a scientist with knowledge of the effects of nuclear war, whereas peace movement activists were more likely to emphasise moral arguments, namely that weapons of mass destruction are unethical. Sagan was implicitly using the same moral argument, but it was mediated through his technical expertise.

Putting it all together

In summary, several factors can be used to help choose evidence and arguments.

- Key issues: what you think is important
- What works with audiences
- The standard agenda for the issue
- Links to values
- Robustness against criticism
- Ease of explanation
- Who speaks?

This sounds complicated, and omits yet other factors. In practice, most campaigners have an intuitive grasp of what they want to say. The value of listing these factors is to reflect on the possibilities of doing things differently. For example, maybe you've made your message easy to explain but in doing so have jettisoned some key issues.

There are bound to be clashes between these factors. What works with audiences often differs from the issues you think are important. Maybe your favourite example is vulnerable to attack from critics, or your most authoritative speaker won't stick with the agreed line of argument. Developing an argument sounds simple but can contain all sorts of difficulties. It can even lead to serious clashes within a campaign.

The experimental approach

As well as trying to develop effective lines of argument based on your understanding of the issues, audience and the debate, it's also worth experimenting with different arguments and ways of presenting them. Anyone who

talks about an issue with friends and strangers, and pays attention to their reactions, soon learns what works and what doesn't work in casual conversation. You hear questions and concerns raised by others, whether about the hazards of mobile phones or the health benefits of vegetarianism.

Sometimes informal interactions are influential in shaping a group's agenda. Group members sit around to discuss what they think will be effective.

Corporations can do something more systematic: hire people with skills in semiotics and survey methods to test different pitches and see what works best. This is done all the time in market research, so why not in a public controversy? Activists seldom have the money to commission such research nor the time to do it themselves. The best prospect might be to find some sympathetic researchers or students who will help.

The key thing, though, is to experiment. Campaigners often develop a routine. They give lots of talks, always presenting the same information the same way. The standard delivery might seem effective — but would a different style or content be even more effective? The way to find out is to do things differently and keep a record of responses. The list of factors can be used to help decide what to experiment with.

Pathologies of arguing

Each of the factors in an argument can be pursued excessively, with potentially damaging consequences. Here are some typical pathologies.

• Key issues: what you think is important. When a group declares what it thinks is important to the exclusion of any other considerations, this runs the risk of appearing dogmatic and alienating audiences. This problem can occur with any sort of group, including ones adhering to a particular religious belief, Marxist tenets, free-market assumptions or scientific orthodoxy.

• What works with audiences? Continually adapting to the expectations of audiences might mean changing arguments used from year to year. This can come across as pandering to popular opinion without having any principles. This is especially a risk when popular tastes appear to change, perhaps due to the vagaries of media coverage or opinion polls, when actually many people are looking for anchors to understand the debate.

• The standard agenda for the issue. Sticking to the standard set of topics conventionally addressed in a controversy is normally fine but, if taken too rigidly, may lead to missing opportunities for introducing new angles or jettisoning old irrelevant ones.

• Links to values. Emphasising your values and how they link to the topics debated is part of being fair and open. The risk is over-emphasising values when actually some people want to know more about key issues, so they can decide for themselves based on their own values. They might agree with you even when coming from a different value position.

• Robustness against criticism. It is wise to choose arguments that can't be readily demolished by opponents,

but if arguments are chosen too defensively, this can limit the repertoire. Sometimes arguments are worth presenting even when they are apparently flawed and vulnerable to challenge, because they resonate with audiences.

• Ease of explanation. Choosing arguments that are the easiest to convey is fine much of the time, but it can be worthwhile presenting complex arguments. This is more challenging to do but may be appreciated by some people who might even be won over by concerns that are not usually articulated. Tackling complex arguments also can add the appearance of depth to a case.

• Who speaks? It is tempting to rely on the same speakers and writers, usually the ones with the highest status, best speaking and writing skills, or who have occupied key campaign roles the longest. But if the same few people do all the speaking, others don't have a chance to develop their skills, and a campaign can get stuck in a rut, or even be distorted by a speaker's personal agenda.

Sometimes several of these pathologies of arguing are present in a single organisation. Another possibility is that different organisations display different pathologies. In any case, it is worth reviewing the list of features to see whether it is worth making changes.

3.2 Framing

Evidence and arguments can make a difference in a debate, but framing is a more powerful tool. Framing refers to the angle or perspective from which a person

looks at an issue. This is easiest to see in the words used to describe positions.

Opponents of abortion commonly refer to themselves as "pro-life." They portray abortion as the killing of "unborn babies." The pro-life frame involves thinking of a foetus as a human whose life is just as valuable as that of any other human.

Supporters of abortion as an option commonly refer to themselves as "pro-choice." They support a mother's choice to have a baby or terminate a pregnancy. The pro-choice frame is oriented to the quality of life after birth, including potential mothers, and on ensuring that women are not forced into undesired motherhood. Abortion is treated as a type of contraception.

In the abortion debate, frames are central to the debate. Opponents of abortion use the words "killing" and "murder" that assume foetuses are humans. To understand the charge of "murder" requires adopting the pro-life frame. They also emphasise the "right to life," encouraging thinking from the point of view of the "unborn baby" and in terms of human rights.

Those on the other side use the word "choice" that encourages thinking about the matter from the point of view of a pregnant woman — not the foetus. It is incorrect to refer to "supporters of abortion" because they support the right to abortion, rather than advocating abortion itself. The frame is rights of women.

> Whereas the abortion debate involves the frames of life and choice, the euthanasia debate involves the frames of death and choice. Opponents of euthanasia label it "killing" or "murder," and try to equate the apparently neutral term "euthanasia" (literally meaning "peaceful death") with killing. Supporters previously referred to "voluntary euthanasia" — the word "voluntary" implies choice — but have largely switched to expressions such as "death with dignity." One voluntary euthanasia society changed its name to "Compassion and Choices."
>
> Opponents of euthanasia emphasise the preciousness of life, medical professionals' commitment to maintaining life, and the danger of allowing active measures to hasten death as this will open the door to involuntary euthanasia, namely killing. The anti-euthanasia frame is built around a contrast between killing and maintaining life.
>
> Supporters of voluntary euthanasia emphasise the need to allow people to be able to choose death to end their suffering. The voluntary-euthanasia frame is built around a contrast between peaceful death and a life with too much suffering to be worthwhile.
>
> The competing euthanasia frames involve looking at two different sorts of people. From the anti side, it is someone whose precious life is terminated without their consent. From the other side, it is someone who is suffering and desires to die peacefully.

Participants in controversies seek to frame their own positions in desirable ways and to frame their opponents'

positions in negative ways. The choice of words can assist in this process, but the meanings and connotations of words can change through the efforts of advocates. In the US in the 1960s, the word "black" was derogatory but was then transformed into a positive, with the phrase "black is beautiful" a tool in this transformation. It has been superseded by "African American" or the more inclusive "person of colour."

Fossil fuel corporations did not like the expression "global warming" because it builds in a particular outcome and therefore promoted the more neutral expression "climate change."[1] However, due to the massive attention to the issue, "climate change" soon acquired negative connotations similar to those associated with "global warming."

Groups concerned about government and corporate collection of information about individuals, for example through security cameras and databases with personal information, can refer either to something that needs protecting, "privacy," or something that needs to be challenged, "surveillance." The concept of privacy is more nebulous, but it is the way a lot of people conceive the issue. How should campaigners describe their concerns: as privacy advocates or surveillance critics?

Likewise, campaigners concerned about war can refer to themselves as supporting peace or opposing war.

Some campaigners seem to have little choice about how to label their position. When a technology is proposed or introduced, its name many define the proponent

1 Steven Poole, *Unspeak*™ (London: Little, Brown, 2006), p. 46.

position. Think of nanotechnology, genetic modification, nuclear power and fluoridation. Those challenging these innovations usually end up being labelled opponents or critics, for example anti-fluoridationists. It is difficult to create a positive image. Critics of vaccination can say they are pro-choice. However, critics of GM, nuclear power and fluoridation don't just want choice: most of them oppose the technology completely.

The so-called anti-globalisation movement is actually opposed to corporate globalisation, not other sorts of globalisation. There are various terms presenting the movement in a positive perspective, for example the "global social justice movement," the "alter-globalisation movement" or the "movement of movements," but none of these is widely used outside the movement itself.

Names of issues and organisations are important, but are just one aspect of framing. Every issue dealt with can be presented from several different angles. In other words, it can be framed in different ways. Astute campaigners will promote the most favourable framing on separate issues, aiming for an integrated image overall, while attempting to counter frames imposed by the other side. Sometimes it may be worth dropping a frame when it no longer becomes tenable, and taking up a new one.

> Tobacco companies, when first faced by claims about health hazards from smoking, adopted a defensive mode of saying the claims had not been proven. The key issue was hazards. Over the years, as the companies comprehensively lost the argument about

> hazards, they shifted to a different argument, individual freedom: people should have the right to choose to smoke. Opponents of smoking countered with a different argument about freedom: freedom from smoking, or the right to a smoke-free environment.

The choice of words affects the way people think about issues, because all words have connotations. Scientists sometimes use words that mean one thing to them but have different meanings to non-scientists. Using such words can cause misunderstandings and create misleading associations. Table 4 lists some examples from the climate debate, from the point of view of climate scientists.

Table 4. Terms with different meanings for scientists and non-scientists[2]

Scientific term	Public meaning	Better choice
aerosol	spray can	tiny atmospheric particle
manipulation	illicit tampering	scientific data processing
positive feedback	praise; favourable response	self-reinforcing cycle
theory	hunch; speculation	scientific understanding
uncertainty	ignorance	range of possibilities
values	principles; ethics	numbers; quantity

2 Adapted from Richard C. J. Somerville and Susan Joy Hassol, "Communicating the science of climate change," *Physics Today,* Vol. 64, No. 10, October 2011, pp. 48–53, at p. 51; available at http://richardsomerville.com.

Framing is incredibly important in controversies. The side that can convince people to adopt its frame has a great advantage, because evidence and arguments are interpreted from within the frame. Campaigners may think evidence supporting their position is conclusive, but actually it only makes a difference for those who adopt the campaigners' frame: others may ignore or dismiss the evidence because it doesn't fit *their* frame, which is different. Dedicated campaigners can study framing and use insights to improve their efforts.[3]

3.3 Responding

It can be infuriating when the other side uses poor evidence, faulty logic, misleading claims and various other sins against rational discussion. You may encounter this anywhere, for example in media stories, blogs, everyday conversations and campaigning materials. Here are some common types of poor argument.

1. Evidence is picked to make a point, ignoring a large quantity of contrary evidence.
2. An entire body of evidence is dismissed as unsound, irrelevant or anecdotal.
3. Some point you've made is misinterpreted: you are claimed to have said something you actually didn't.

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3 Valuable activist-oriented treatments include Doyle Canning and Patrick Reinsborough, *Re:imagining Change: An Introduction to Story-based Strategy* (smartMeme, 2009); George Lakoff, *Don't Think of an Elephant! Know Your Values and Frame the Debate* (White River Junction, VT: Chelsea Green, 2004).

4. Claims are made that Dr X has been discredited. Actually, Dr X's flaws have been exaggerated. Meanwhile, Dr X's contributions have been ignored.
5. There is said to be no contrary evidence, when actually there is some.
6. False statements are made.
7. Discussion of the role of vested interests is dismissed as "conspiracy theories."
8. Scientists are assumed to be objective and incorruptible.
9. Scientists are assumed to have a vested interest, even when there is no evidence they do.
10. Facts are assumed to speak for themselves. This usually means there is an implicit value assumption.
11. Facts, taken in isolation, are assumed to be unassailable: the possibility of errors or different interpretations is ignored.
12. A single error is assumed to discredit an entire argument.
13. Poor logic is used to derive a false conclusion from a fact accepted by both sides.

Exercise Consider the following examples. Into which category of poor argument might each one be assigned? (Climate sceptics can propose a contrary list of examples!)

- Climate sceptics refer to the medieval warm period, implying that global warming is nothing new or special.
- Climate scientists are accused of supporting the dominant view on global warming so they will receive more funding.

• A mistake about melting of Himalayan glaciers in the 4th IPCC report is mentioned as if it discredits the IPCC entirely.
• Climate sceptics argue that, because natural flows of the greenhouse gas carbon dioxide are much bigger than human-made flows, human activities cannot be the cause of global warming.

Another problem is when some people on your side do these sorts of things. Perhaps, sometimes, you do them yourself!

It can be a useful exercise to analyse the opponent's arguments and pick out logical flaws and misuse of evidence, and then to work out ways to respond. I'm not going to deal with every one of these poor arguments. Too much depends on the context to give strong recommendations about how to respond. What is important is to understand the context, think through what you are trying to achieve, consider options, practise and learn from experience.

Know the context

Arguments can be used in a variety of situations. The circumstances make a big difference in how to respond.

• Personal conversation — just you and one other person. This normally allows you an opportunity to both initiate and respond to points. If there's plenty of time, you can probe into issues and test the other person's knowledge and values. You don't need to worry about others hearing what you say (unless there's a covert recording).

• Conversation in a group. The main ones talking might be you and one other person, but there's an audience.

• Lecture. You might give a talk, in a public meeting or to a group such as a class or club. Typically there is time for questions.

• Public debate. There might be a formal debate organised by a group, or on radio or television, or a de facto debate when people with different views are invited onto a show.

• Email exchange with one person. Occasionally you may be able to establish a dialogue with someone on the other side. Email is more formal than a conversation. Furthermore, what you write could be circulated more widely.

• Blogs. Someone writes an online article or comment and various others add their comments. If the blog is moderated, this can be a well-informed discussion. If not, it can become a free-for-all. Sometimes a persistent and dogmatic disrupter will reply to every comment, taking the discussion away from its original topic.

• Mass media articles. If there's an article in a newspaper, you can write a letter to the editor responding or commenting. (Sometimes you can do this online, so it becomes like a blog.) Compared to a blog, the chance of being published is greatly reduced, but readership is much greater.

• Websites. You can put material on your website; opponents can put material on theirs. Sometimes website material responds to claims made elsewhere. This can generate a type of slow-moving dialogue.

• Advertisements

• Scientific articles. You write a scientific article. Another scientist writes an article in reply, and so forth.

It should be obvious that there are considerable differences in context, which can greatly affect how the debate proceeds. If you want to engage in different types of forums, you need to learn how they operate. There are several characteristics worth noting.

• Speed. Some forums allow immediate response; others are very slow. In a conversation, you can reply the next time you speak. Scientific articles typically take months to be published, sometimes years.

• Certainty. With some forums, you can be pretty sure you'll have an opportunity to respond whereas with others there's a good chance that an attempt at responding won't be successful — at least not in that forum.

In a two-person conversation, you can be reasonably confident of being able to respond, unless the other person suddenly leaves (or hangs up the phone). However, in sending a letter to the editor of a popular magazine, you may have only a small chance of being published. In talkback radio, you can be cut off at any time, especially if the host doesn't like your viewpoint. Many scientific journals don't publish replies to articles, only fully-fledged new articles.

• Length. You may be able to reply with just as many words or minutes as the original statement, or be far more restricted in the length of your response.

If you're having a balanced conversation with one other person, you can reasonably expect to have equal time to comment on a topic. In writing a letter to a major newspaper responding to a feature article, you'll have only a few words compared to the original.

• Visibility. Your reply might be seen or heard by a significant audience, just as large as the original statement you're replying to, or perhaps by only a small, restricted number of individuals.

If you're among a group of friends discussing an issue, and you respond to someone's comment, your response will probably be heard by just as many people as heard the original comment. (That's assuming it's a balanced discussion and everyone is paying attention and you have as much status as others.)

On the other hand, if you write a response to a popular blog, your comment may be just one of dozens or hundreds of other comments, so only dedicated readers will come across your response.

For making an effective response, the ideal is that it is timely, reliable, of sufficient length and highly visible. That can occur in conversations but not often in many other forums. If there's an article that receives a lot of attention and the best that you can do is have a low chance that your response will appear weeks later in an obscure location, you need to decide whether it's worth bothering.

More generally, it's helpful to assess what is worth doing by looking at the likely payoff. If you are meticulous is preparing your comments, then think about where they're going. Your effort may not be worth it — or you may want to rethink where you send your comments.

Responding to an article

An article appears in a major media outlet giving a one-sided treatment of an issue — your perspective has been seriously misrepresented.

Option 1 You could contact the editor proposing an article of your own, or by someone on your side. If accepted and published, this would be a valuable counter to the original article. However, it's possible that you might be given the go-ahead and yet the article never appears or is only published in abridged form.

If your proposal is not accepted, you may waste valuable time when you could have been undertaking other options. Some editors seldom send rejection letters, so you could be left hanging for days without knowing whether your proposal was accepted.

Option 2 You and your supporters write letters to the editor responding to the article. The acceptance rate for letters in major newspapers is quite low. Therefore, writing letters involves a lot of work with a low return.

Option 3 If the article is available online and allows comments, you and your supporters can reply. This is more reliable but the readership will be much smaller.

Option 4 You prepare a point-by-point refutation of the article and put it on your side's website. This will mainly be read by your supporters. It will be useful in informing them about how to demolish a contrary viewpoint.

Option 5 You prepare a refutation of the article and email it to your list of subscribers. This might be a version of the website refutation, and could give a link to it.

You can add other options to this list. In choosing between them — or choosing more than one of them — you should draw on collective knowledge about what has happened previously. For example, if a news outlet has a track record of ignoring or denigrating your viewpoint, then putting effort into getting articles or letters published may not be worthwhile.

To aid your assessment of options, you can draw up a table rating each option in terms of the criteria. Here's an example.

Option	**Speed**	**Certainty**	**Length**	**Visibility**
1. Article	medium	low	long	high
2. Letters	medium to high	low to medium	short	high
3. Online comments	high	medium to high	short	low to medium
4. Web refutation	medium	high	long	medium
5. Email refutation	medium	high	long	medium

Once you've set up a table like this, you may have other thoughts. For example, another criterion might be durabil-

ity, namely how long your response remains available to be read, and by whom. Is the news article available free online? What about letters to the editor and online comments? You could add a column to your table listing durability. Then you may think, do we want to give the original article — the one you think is one-sided — ongoing credibility by putting so much effort into discrediting it?

There's another factor: how much does the effort put into responding help to inform and mobilise your supporters? Writing a response article is most commonly done by a highly experienced campaigner. Likewise with preparing a careful web or email refutation of the original article. So these options probably do little to involve your members.

You might want to add columns to your table, like this:

Option	**Durability**	**Supporter involvement**
1. Article	medium to high	low
2. Letters	medium?	medium
3. Online comments	medium?	medium to high
4. Web refutation	high	low
5. Email refutation	low	low

This is getting complicated. There are so many criteria that it's not so clear what's important. So you need to make some decisions about what is most important for you and

your group. Is rapid high-profile response most important, or maybe developing greater member involvement? The key point is that something seemingly as straightforward as responding to an article in a newspaper has all sorts of dimensions. Thinking about options is a good way to become more aware of what's at stake.

Then there are implications. More members might feel able to write letters to the editor, and even more to post online comments. But perhaps you worry that the quality of such contributions might not be up to scratch. In that case, maybe it would be a good idea to organise a letter-writing workshop, giving interested members practise in responding, with feedback from experienced members. On the other hand, imagine that writing a response article seems like a good idea, but there's no one who feels capable or has the time. What are you going to do about that?

Conclusion

The other side is bound to make lots of arguments, some of which you will think are seriously flawed. Rather than immediately responding to the latest provocation, it can be productive to pause and consider options. You can figure out what sort of challenge you're facing, carefully consider the context, and assess options for responding.

3.4 Deconstruction

The other side has presented its arguments, in an article, talk or comment. You can counter by analysing the

arguments carefully, showing weaknesses, inaccuracies, assumptions and value judgements.

This sort of critical analysis is sometimes called deconstruction. Imagine the opponent's argument as a solidly constructed object, perhaps a building or even a fortress. What you are doing is taking this object apart bit by bit, revealing what's on the inside or in the different parts. The other side constructed this object — its arguments — and now you're breaking it into pieces, inspecting each piece carefully. Instead of constructing it, you're deconstructing it.

How to go about this? There are various aspects to deconstruction, best learned by practising and watching others go about it. Here I'll discuss various elements.

What's missing?

You know the important arguments on your side. You know the evidence that's crucial. So what you do is carefully examine the opponent's article or text and see whether these vital arguments and evidence are mentioned at all. If not, then you've found a weakness. They are ignoring or skirting around centrally important issues.

> Imagine you're a critic of vaccination and one of your chief concerns is adverse reactions, such as when children suffer serious convulsions, disability or death from vaccinations. You read an article in a newspaper about two pro-vaccination books.[4] It lists five "myths" about vaccination: "vaccines cause autism … too

4 Liz Szabo, "Books get to the truth about vaccines," *USA Today,* 11 January 2011, p. 6D. Subsequent quotes are from this article.

many vaccines overwhelm children's immune systems … it's safe to 'space out' vaccinations … vaccines contain toxic chemicals … vaccine-preventable diseases aren't that dangerous."

Just checking through the headings suggests that adverse reactions aren't mentioned. But you need to read the article carefully to make sure. For example, the discussion of the "myth" that "too many vaccines overwhelm children's immune systems" might include something about adverse reactions. However, you find nothing.

In this way, you discover a significant weakness in the article: it doesn't even mention the single most important concern many parents have about vaccination. You can use this point in writing a letter to the editor or talking to someone who has read the article — or you can keep it in reserve for when you encounter other pro-vaccination arguments.

What's wrong?

Sometimes there are statements that are factually wrong. They can be completely and utterly wrong, wrong in significant ways, or wrong in some small detail. If you're dealing with a careful exposition of arguments, you probably won't find much that is completely wrong, but you might find some incorrect details.

One of the statements in the article is that "ethyl mercury, which is safe, is very different from methyl mercury, which is toxic." However, ethyl mercury is not entirely safe — there are documented cases of

toxic effects.[5] It might be true that ethyl mercury is much safer than methyl mercury, but to say without qualification that ethyl mercury is safe is incorrect.

What's misleading?

Statements can be factually correct but quite misleading. You need to examine the article or text looking for words, statements, evidence, pictures or anything else that gives the reader an impression that isn't correct — from your perspective.

When searching for and exposing misleading statements, it helps to know the evidence and arguments quite well. You can examine every argument presented in an article and assess whether there is contrary information that suggests a different conclusion.

The pro-vaccination article says, "Some parents are also concerned about aluminum, used in small amounts in some vaccines to stimulate a better immune response. Yet babies get far more aluminum in their diets than from vaccines." The article includes a table showing that babies might receive 4 milligrams of aluminium in the first six months of life from all recommended vaccines, 10 milligrams from breast milk and 30 milligrams from breast milk formula. You might want to question the figures, but let's take them at face value here.

5 I. Cinca et al., "Accidental ethyl mercury poisoning with nervous system, skeletal muscle, and myocardium injury," *Journal of Neurology, Neurosurgery, and Psychiatry,* Vol. 43, 1979, pp. 143–149.

What's potentially misleading is the assumption that the mode of receiving aluminium is irrelevant: aluminium from vaccines is injected into flesh, whereas aluminium from milk is taken orally. It's well known that the mode of ingestion makes a big difference in the impact of some toxic substances, such as plutonium. So where's the evidence that injected and orally ingested aluminium are comparable?

In the article, myth 4 is "Vaccines contain toxic chemicals." But the information about myth 4 mentions two toxic chemicals found in vaccines, mercury and aluminium. To call the statement "Vaccines contain toxic chemicals" a myth is misleading, because the text admits that vaccines do contain some toxic chemicals — and then argues that they are not dangerous.

The article says the author of a scientific study (Andrew Wakefield, though he is not named) was found guilty of "accepting $800,000 from a lawyer trying to sue vaccine makers." This misleadingly suggests Wakefield accepted a $800,000 bribe to get the results the lawyers wanted, whereas according to Wakefield none of the money was used for the cases the lawyers were working on.[6]

6 You need a source for this, such as Andrew J. Wakefield, *Callous Disregard: Autism and Vaccines — The Truth Behind a Tragedy* (New York: Skyhorse, 2010). Of course Wakefield's account can be challenged, but this example is a deconstruction of a pro-vaccination article.

Are there double standards?

In controversies, it is common to accuse the other side of shortcomings, such as hiding evidence, personal abuse or conflict of interest. The other side might be guilty as charged but sometimes the accuser is just as guilty. The accuser is setting a higher standard for the other side than for themselves. This is called a double standard: the standard or expectation for one side (the opponent) is different from the standard for the other.

Articles and talks can be searched for examples of double standards. Basically, what you do is look for any accusation or claim of a shortcoming — in logic, evidence, behaviour or whatever — and see whether the accuser is just as guilty. You often need to know the arguments pretty well, because double standards may not be obvious from texts themselves.

> The article about vaccines refers to a scientist (Andrew Wakefield) as having been found guilty of serious misconduct. What's not mentioned is that Wakefield's chief accuser in the hearings before the General Medical Council in Britain, Professor Sir Michael Rutter, had received money from pharmaceutical companies and failed to declare this in publications he authored.[7] Rutter was guilty of exactly the same sin that Wakefield was accused of — but no charges were brought against Rutter.
>
> There is also a more general double standard. Critics of vaccines seldom receive significant financial

7 Wakefield, pp. 169–180.

support for their research; Wakefield was an exception. However, pharmaceutical companies regularly fund research by supporters of vaccines. Vaccination advocates are quick to condemn Wakefield but hardly ever even mention conflicts of interest due to pharmaceutical company funding. Vaccination advocates thus use a different standard when judging scientists whose work questions vaccination than when judging scientists whose work supports vaccination.

What assumptions are made?

Arguments are usually based on various assumptions. Here are some examples of general assumptions.

- Technology is a good thing
- New technology is progress.
- Human life is important.
- Economic growth is beneficial to everyone.
- There is only one right answer.
- Professional scientists know better than non-scientists.
- Jobs must be protected at any cost.
- Animal suffering is irrelevant.

If both sides in a debate agree about an assumption, then it isn't all that important. But when the other side makes an assumption you think is dubious, you can challenge their argument by exposing and questioning the assumption.

Sometimes assumptions are stated explicitly. If so, they are part of the overt argument and you can tackle them. But, more commonly, assumptions aren't stated. They're implicit, namely taken for granted. That makes

them more powerful. It can be effective to discover these implicit assumptions, articulate them and question them.

Analysing assumptions is often more difficult than dealing with false or misleading statements. The statements are sitting there, out in the open, available for scrutiny. Assumptions, though, can be subtle, covert and masked. They are smuggled in so it's hard to see their effect. Some arguments are inconsistent, so assumptions underlie parts of the argument but not other parts. Sometimes different assumptions contradict each other.

How should you expose and challenge assumptions? You can do this by using a general argument. Often, though, it's more powerful to use counter-examples, which are examples that challenge the assumption or expose its weaknesses.

- Technology is a good thing. *Nuclear weapons aren't good things.*
- New technology is progress. *Only some new technology is progress. New torture technologies are not.*
- Human life is important. *Yes, but so are other things like the quality of life, the environment and freedom.*
- Economic growth is beneficial to everyone. *Data show most of the benefits go to the wealthiest people. Average happiness levels in rich countries haven't increased in decades despite enormous economic growth.*
- There is only one right answer. *Wise researchers know there is always more to learn and no truth is final.*

- Professional scientists know better than non-scientists. *Bloggers found mistakes in a climate-change research paper that the authors and peer reviewers did not.*[8]
- Jobs must be protected at any cost. *Other jobs can be created at lower cost to the community.*
- Animal suffering is irrelevant. *Animals shouldn't have to suffer just so people can have cheaper meat or cosmetics.*

You can see from these examples that you can challenge assumptions in different ways. Sometimes just exposing the assumption is enough. Most people do care about animal suffering, so exposing an assumption that animal suffering is not important will damage an argument. In other cases, assumptions may seem plausible at first glance, such as that new technology is progress. Using counter-examples is a good way to expose and challenge the assumption.

In the case for vaccination, one assumption is that vaccination was responsible for much or all of the reduction in mortality from infectious diseases such as whooping cough. This could be countered by citing the decline in whooping cough mortality before mass

8 Retraction Watch, "Paper claiming hottest 60-year-span in 1,000 years put on hold after being published online," http://retractionwatch.wordpress.com/2012/06/11/paper-claiming-hottest-60-year-span-in-1000-years-put-on-hold-after-being-published-online/.

vaccination was introduced or, better yet, presenting a graph showing this decline.

What value judgements are involved?

Value judgements are judgements about what is worthwhile, such as life or economic growth. In some debates, partisans — usually on the side of scientific orthodoxy — say or imply that the issue is entirely about science: if the facts support a position, then that should be conclusive and no further discussion is needed; anyone who disagrees with the facts is ignorant and obstructionist.

However, in just about every public debate, scientific findings are only part of the issue. Differences in values are important. The way to deconstruct arguments claiming or implying that the science is conclusive is to expose the values, especially differences in values.

- Those arguing for action to limit global warming usually assume that the welfare of future generations needs to be taken into account. They often adopt or assume the precautionary principle, which is that action should be taken to prevent the possibility of future damage even if the evidence is not conclusive.
- Those arguing against abortion (or euthanasia) usually assume that human life is inherently valuable, and sometimes that any life, even one with a lot of suffering, is better than no life.
- Proponents of vaccination often assume that the collective benefit from vaccination, namely reduction in disease, overrides risks to individuals from being vaccinated. Vaccination critics may put a higher prior-

ity on risks to individuals. Proponents often assume that experts know best and people should do what the experts recommend. Critics argue for personal choice.

What is unquestioned?

In many debates, there are things that are not questioned, such as authorities, facts, assumptions and claims. Questioning what is taken for granted is the essence of deconstruction.

A "black box" is something that is not open for inspection. People can't see inside it, so it is treated according to its exterior — which might be a false front. "Opening up the black box" is a metaphor for examining something that is seldom questioned. It might be a leading figure in the debate, whose motives have never been questioned. It might be a classic experiment that has never been scrutinised. It might be an assumption that economics doesn't matter. The implication is that it's worth searching for black boxes — things not usually questioned — and opening them up.

Conclusion

In a controversy, one or both sides present a set of arguments. On the surface, to an uninformed observer, these arguments might seem compelling. The idea of deconstruction is to probe into the arguments, take them apart and show their weaknesses. The arguments seem compelling, but some important evidence isn't mentioned, some alleged facts are wrong or misleading, and the whole viewpoint is based on questionable assumptions and

unstated value judgements. What seemed a solid edifice is revealed as a facade filled with holes and built on sand.

3.5 Countering deconstruction

When faced with deconstruction — a critical analysis of one's viewpoint — the most common response is to defend. That means responding to every bit of the critique by citing evidence and providing arguments.

Another response — mainly by establishments with a near-monopoly on scientific credibility — is to say "we are right because all credible scientists support our position." Yet another response is to attack the credibility of the critics by saying they are unscientific losers.

Each of these responses can be effective, but they have limitations.

- Defending against a critique gives credibility to the critique and makes it seem like the points might be valid.
- Responding by citing overwhelming authority can sound arrogant and leaves the critique unanswered.
- Attacking critics can seem heavy-handed and make them seem like a persecuted minority.

To find other ways to respond, it's useful to understand a bit more about deconstruction. It is a widely used technique, perhaps increasingly so.

Some background on deconstruction

Partisans have challenged and undermined each other's arguments since the earliest controversies. The term

"deconstruction," though, dates from the rise of postmodernism and poststructuralism, two related approaches used in the humanities to analyse things taken-for-granted as "real" and show they are actually human constructions.[9] For example, the concepts of nature and culture are often treated as opposites, with nature being superior. Deconstruction involves exposing and questioning the assumptions underlying these two concepts. Similarly, concepts such as race, crime, emotions, nationality, environment, sexuality and the economy have been probed and exposed as containing arbitrary assumptions. The codes built into television shows, celebrities and national ceremonies have been exposed. Nothing is treated as sacred, namely immune from critical examination.

One of the goals of postmodernist analysis is to show the inadequacy of "grand narratives," which are comprehensive accounts of how the world works. Grand narratives include:

- the rise of western civilisation as a triumph of superior culture
- Marxism, an explanation of the economy and society in terms of class struggle
- neoliberalism, based on the superiority of corporate capitalism
- science as a rational means to the truth.

In most scientific controversies, there's no need to analyse grand narratives about western civilisation, Marxism or

9 I thank Chris Barker for helpful comments about postmodernism and poststructuralism.

neoliberalism — but science is quite relevant. Science is commonly presented in textbooks as a logical process that systematically sweeps away false beliefs and replaces them with testable theories based on hard facts. This idea about science is regularly invoked in controversies. Its implication is that if scientists agree something is correct, then it is. The grand narrative is that truth is what scientists say it is.

Postmodernists say grand narratives are fictions. Furthermore, grand narratives can be pernicious fictions, because they hide or sugar-coat unpleasant aspects of the way the world works. For example, the narrative of western civilisation puts a false gloss on colonial exploitation, including slavery and mass extermination of indigenous peoples such as in the Belgian Congo where millions died.

Science as a grand narrative has similarly come under attack. There are two main angles from within the field of science and technology studies.[10] The first is called the sociology of scientific knowledge, sometimes abbreviated SSK.[11] It says that social factors are always involved in

10 David J. Hess, *Science Studies: An Advanced Introduction* (New York: New York University Press, 1997); Sergio Sismondo, *An Introduction to Science and Technology Studies,* 2nd edition (Chichester: Wiley-Blackwell, 2010).

11 Classic treatments include Barry Barnes, *Scientific Knowledge and Sociological Theory* (London: Routledge and Kegan Paul, 1974); David Bloor, *Knowledge and Social Imagery* (London: Routledge and Kegan Paul, 1976); Michael Mulkay, *Science and the Sociology of Knowledge* (London: Allen and Unwin, 1979).

the creation of facts and theories. "Social factors" include dominant ideologies. For example, ideas about competition in human society, taken from Thomas Malthus, may have influenced the way Darwin formulated evolutionary theory.[12] Social factors also include the interaction of scientists in the lab as they design pieces of apparatus, evaluate data, develop concepts and write papers.[13] From the point of view of SSK, facts and theories are "socially constructed," which means they are created by humans rather than being taken directly from nature.

SSK is a way of thinking about scientific knowledge. It does not say that "reality" — such as trees and rocks — is socially constructed, only that knowledge about reality is created by humans.

On the surface, the idea of social construction seems to discredit scientific knowledge. Instead of the traditional idea that scientists *discover* facts and theories, like finding diamonds in a pile of stones, social construction means scientists create facts and theories, collectively agreeing about how to describe the world. Actually, this doesn't automatically discredit scientific knowledge, which can still be valid and useful, but provides a different way of thinking about it. Instead of finding a perfectly formed

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12 Robert M. Young, *Darwin's Metaphor* (Cambridge: Cambridge University Press, 1985).

13 Daniel Lee Kleinman, *Impure Cultures: University Biology and the World of Commerce* (Madison, WI: University of Wisconsin Press, 2003); Bruno Latour and Steve Woolgar, *Laboratory Life: The Construction of Scientific Facts* (Princeton, NJ: Princeton University Press, 1986).

diamond, actually it was created from coal in a lab — but it's still a good quality diamond.

The second angle from within science and technology studies is political economy.[14] This refers to political and economic influences on science, for example funding from companies. This can result in biases in research done due to suppression of findings — as done by the tobacco companies — or due to research that remains undone. It's like looking only for blue diamonds and ignoring or hiding red diamonds, because there's more money and power to be obtained from blue diamonds.

Based on the general approaches of social construction and political economy, there are two main ways to challenge scientific findings.

1. Analyse facts and theories to find weaknesses.
2. Show the role of vested interests.

Both of these can be used against any viewpoint. What can you do when they are being used against what you think is a valid viewpoint? In other words, how can you counter deconstruction out of control?

There are no easy answers, but there are some ways to turn the issue around.

1. Change the discussion from deconstruction to construction.

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14 Works on the political economy of science include David Dickson, *The New Politics of Science* (New York: Pantheon, 1984); Hilary Rose and Steven Rose (eds.), *The Political Economy of Science: Ideology of/in the Natural Sciences* (London: Macmillan, 1976).

2. Show double standards in discussions of vested interests.

Conspiracy theories

To learn more about the role of deconstruction in scientific controversies, it is useful to examine what are called conspiracy theories. Examples are:

- The 9/11 terrorist attacks were organised by the US government.
- Princess Diana's death was orchestrated by the British royal family.
- The 1933 burning of the Reichstag (parliament building) in Berlin was done by the Nazis.
- HIV, the virus responsible for AIDS, was designed in a US biological weapons laboratory.
- The world is ruled by reptilian aliens in the guise of humans.

There are hundreds of other conspiracy theories involving all sorts of issues, from World War II to Kentucky Fried Chicken. There are some common features.

- They seek to explain a significant, often shocking event.
- Powerful groups, often governments, are said to be responsible.
- The conspiracy involves groups that apparently have something to gain.

9/11 was one of the most shocking events in recent history. The most prominent 9/11 conspiracy theories say the US government was involved, either by letting the attacks

happen or by causing them directly. The reason: the US government gained worldwide sympathy, and President George W. Bush's popularity soared. Meanwhile, US military might was unleashed against Afghanistan and security and military expenditures greatly expanded under the guise of the war on terror.

Conspiracy theories have existed for many decades but have become more widely touted through the Internet. Indeed, it's possible to find websites that allow you to create your own conspiracy theory by using the standard elements of events and conspirators.

Some conspiracy theories take the form of rumours, without much evidence to back them up. Others, though, are quite elaborate.

Some authors have examined conspiracy theories as social phenomena, attributing their popularity to increasing distrust of governments and official sources of information, as well as to a search for meaning in a world with fewer anchors of stability, among other explanations.[15] However, for the purposes here, the value of looking at conspiracy theories is to see how evidence and arguments are deployed.

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15 Mark Fenster, *Conspiracy Theories: Secrecy and Power in American Culture,* revised and updated edition (Minneapolis, MN: University of Minnesota Press, 2008); Brian L. Keeley, "Of conspiracy theories," *Journal of Philosophy,* Vol. 96, No. 3, March 1999, pp. 109–126; Cass R. Sunstein and Adrian Vermeule, "Conspiracy theories: causes and cures," *Journal of Political Philosophy,* Vol. 17, No. 2, 2009, pp. 202–227.

The dominant mode of conspiracy-theory argument is deconstruction: the standard account of events is scrutinised for flaws; lists of anomalies are highlighted to show that something more must be involved. The underlying assumption is that if there is a flaw in the standard account, there must be a conspiracy.

For example, some 9/11 conspiracy theorists claim that if an aeroplane flies into a building, it will fall over rather than collapse on itself. The World Trade Towers collapsed on themselves as if demolition experts had planned it — so the conspiracy theorists say explosives must have been planted in the towers.

On the surface, many of the claims by 9/11 conspiracy theorists sound plausible. How to counter them? One way is by carefully and patiently mustering the evidence against the critique, for example by explaining how the fires started in the twin towers burnt at a very high temperature from jet fuel, eventually melting the frames of the building and causing them to collapse.

Another way to respond is to put the onus of proof on the conspiracy theorists, which in practice can be done by applying deconstruction to their own claims. What about the claim that explosives were planted in the World Trade Towers? Why didn't anyone notice the explosives being planted? Why haven't there been any whistleblowers from among the crew that planted the explosives? And why, if these conspirators were so cunning, didn't they plant the explosives in an asymmetrical manner so the towers would fall over in the expected way?

It's worth noting that calling something a conspiracy theory can be a way to dismiss a dissenting view.

Conspiracies do exist, after all. One of the most famous involves the justifications for invading Iraq in 2003. Members of the George W. Bush administration claimed that Iraqi dictator Saddam Hussein had an active nuclear weapons programme as well as chemical and biological weapons, and that there were links between the Iraqi regime and al Qaeda. Due to deceptive language by Bush and others, many US citizens believed that Saddam Hussein was responsible for 9/11.[16]

Consider the controversy over whether the moon landings occurred. Critics say no one landed on the moon: the broadcasts were faked, actually being staged in a movie studio. They use deconstruction to undermine the standard account, for example saying that the flag planted on the moon was blowing in the wind, which was impossible because there's no wind on the moon. The critics can bring up a host of points throwing doubt on the standard viewpoint.

Those who believe the moon landings occurred can answer every single point raised by the critics, and indeed have done so. However, this is a defensive strategy: it allows the critics to use the tools of deconstruction and thereby gain a significant advantage. This is equivalent to allowing the critics to assign the onus of proof to believers.

16 Sheldon Rampton and John Stauber, *Weapons of Mass Deception: The Uses of Propaganda in Bush's War on Iraq* (New York: Tarcher/Penguin, 2003)

An alternative or supplementary strategy is to demand the critics to defend their own explanation.

- Where is the studio where the filming took place?
- Where are the whistleblowers from the fake moon landing conspiracy?

Anyone familiar with the moon landings could provide dozens of difficult questions for the critics.

The basic approach here is to change the discussion from deconstruction of the moon landings to construction of the fake moon landing conspiracy.

In the climate change debate, the sceptics have used deconstruction quite effectively, raising all sorts of criticisms of standard climate science. For example, the sceptics point to the limitations of computer models, to earlier warm periods, to the heat island effect, to mistakes in IPCC reports, to the University of East Anglia emails and a host of other issues that undermine the authority and solidity of climate science and its predictions. Climate scientists can and have responded to each of these criticisms, but this has the limitation of being a defensive strategy.

An offensive strategy is to put the onus of proof on the sceptics and to deconstruct their arguments. For example, climate scientists could ask for the sceptics to produce their own computer models showing an absence of warming. (Apparently there aren't any such models.) Climate scientists could demand the sceptics to produce evidence that the heat island effect explains

data on warming or to produce reports by large groups of experts that disagree with the IPCC.

Sceptics have claimed that climate scientists have a vested interest in their findings, because more research money is available for those who support the standard position. It is tempting to reply that more money is available when there's disagreement: if everyone agreed about global warming, there would be less need to research the details. Another strategy is to point to the vested interests of fossil fuel companies that fund some of the sceptic organisations. This is the strategy of pointing to double standards in relation to vested interests. Climate scientists might have an interest in standard climate science, but climate sceptics are backed by much wealthier and more powerful groups with vested interests. Oil and coal companies could easily fund climate research, including the most expensive climate models. If even a single scientist was able to develop a climate model showing little or no warming, fossil fuels companies would jump at the opportunity to fund this research and tout the findings through all sorts of media.

To summarise: climate science has been challenged by sceptics who are adept at using deconstruction techniques and allegations of vested interests. To counter this, climate scientists and campaigners can turn the spotlight on the position of the sceptics, either highlighting flaws in the sceptics' position or an absence of any solid position. The idea is to show that sceptics only pick holes, implying there is no substance behind their critique.

To counter climate sceptics' claims about climate science vested interests, climate campaigners can point to the much more powerful groups with vested interests, especially fossil fuel companies, supporting the sceptics. The charge: a double standard.

Debunking

If all the evidence is on your side, yet the opponents keep raising a criticism as if it has some validity, you may want to make a special effort to counter the criticism, namely to debunk it. However, there's a risk in debunking: by mentioning the opponent's claim, you may actually reinforce it in some people's minds, a process called backfire.[17]

One of the factors involved is that people are more likely to trust familiar information, so the more they hear something, the more likely they are to think it's true. This is one reason propaganda needs to be repeated often. Even when people are exposed to information refuting falsehoods, later on they may only remember the original falsehood, and continue to believe it.

When people are strongly committed to a viewpoint, it is very hard to shift their beliefs. Challenges may only cause them to think of reasons to support their views, and thinking of these reasons can make them more committed. So, ironically, challenging their views can make them believe them more firmly.

17 This is different from the backfire model used in chapters 6 and 7.

Here are the rules for challenging a mistaken belief.[18]

- Emphasise correct information rather than focusing on the mistaken belief.
- Give a warning before mentioning the mistaken belief.
- Provide an alternative explanation.
- Use graphics, which are more influential than words, when possible.

The figure gives an illustration of how to apply these rules.[19] However, debunking is not the end of the story, as the other side can persist with its claims and try to debunk your attempt at debunking.

18 See John Cook and Stephan Lewandowsky, *The Debunking Handbook* (St. Lucia, Australia: University of Queensland, 23 January 2012), http://sks.to/debunk. This is a short, practical and user-friendly text on which I've drawn heavily in this section.

19 Ibid. Reproduced with permission of the authors.

97 out of 100 climate experts agree humans are causing global warming.

Several independent surveys find 97% of climate scientists who are actively publishing peer-reviewed climate research agree that humans are causing global warming.

On top of this overwhelming consensus, National Academies of Science from all over the world also endorse the consensus view of human caused global warming, as expressed by the Intergovernmental Panel on Climate Change (IPCC).

However, movements that deny a scientific consensus have always sought to cast doubt on the fact that a consensus exists. One technique is the use of fake experts, citing scientists who have little to no expertise in the particular field of science.

For example, the OISM Petition Project claims 31,000 scientists disagree with the scientific consensus on global warming.

However, around 99.9% of the scientists listed in the Petition Project are not climate scientists. The petition is open to anyone with a Bachelor of Science or higher and includes medical doctors, mechanical engineers and computer scientists.

Core fact communicated in headline

Core fact reinforced in opening paragraph, fleshed out with additional details.

Core fact reinforced with infographic

Explicit warning cueing reader that misinformation is coming and indicating the nature of the misinformation.

The myth

The gap created by this debunking is how can there be a consensus if 31,000 scientists dissent? This gap is filled by explaining that almost all the 31,000 scientists are not climate scientists.

3.6 Claiming scientific status

In arguing, it is advantageous to be able to say that science is on your side. So it is predictable that campaigners will say that their own position is scientific, but the opponent's position is not.

Two sociologists, Nigel Gilbert and Michael Mulkay, studied the way scientists talk about their own research — and about the research of scientists they disagreed with.[20] When talking about their own research, scientists use language implying that their findings derive from nature. In other words, they are in touch with scientific truth. Gilbert and Mulkay call this language the "empiricist repertoire." The repertoire is the collection of types of language deployed; "empiricist" refers to the language of empirical research or tests, typically laboratory work. When scientists say their ideas about protein synthesis or fossil records are based on the evidence, on experiments, on rigorous testing, on nature, they are drawing on the empiricist repertoire. This makes the ideas sound solid, stable, well founded — in short, scientific.

On the other hand, when referring to research findings they disagree with — research by scientists with

20 G. Nigel Gilbert and Michael Mulkay, "Warranting scientific belief," *Social Studies of Science,* Vol. 12, 1982, pp. 383–408; Michael Mulkay and G. Nigel Gilbert, "Accounting for error: how scientists construct their social world when they account for correct and incorrect belief," *Sociology,* Vol. 16, 1982, pp. 165–183; G. Nigel Gilbert and Michael Mulkay, *Opening Pandora's Box: A Sociological Analysis of Scientists' Discourse* (Cambridge: Cambridge University Press, 1984).

different theories or findings — scientists typically use a different sort of language. They refer to personalities, motivations and contingencies. Gilbert and Mulkay call this the "contingent repertoire." These descriptions suggest that the results are not due to the imperatives of nature but to human foibles: the results are contingent, namely dependent on circumstances.

In public controversies, these two repertoires are deployed in a predictable fashion. Campaigners refer to research supporting their preferred view using the empiricist repertoire: linguistically, they align their view with nature and scientific fact. The same campaigners refer to their opponents' views using the contingent repertoire, linguistically relegating it to a lesser status.

This difference in language is most obvious when used by the side with greatest scientific backing. Research cited by opponents is commonly dismissed as due to partisan commitments, poor quality control, selective use of evidence or any number of human failings. Defenders of orthodoxy typically assume that studies supporting their views are objective and factual (empiricist repertoire), but may refer to studies by critics as being driven by personal agendas and biases, or sometimes conflicts of interest (contingent repertoire).

Challengers to orthodoxy sometimes dismiss entire bodies of research using the contingent repertoire, referring to vested interests, bias and the personal agendas of researchers who support the orthodox view. For example, climate change scientists may be dismissed as biased due to their alleged interest in obtaining more funding, achieved by adhering to the party line.

People who are not scientists also use the two repertoires. Partisans typically refer to their own views as backed by science (empiricist repertoire) but attribute the beliefs of those on the other side as due to ignorance, gullibility, prejudice or venality (contingent repertoire).

When Gilbert and Mulkay pointed out to scientists the discrepancy between the ways they referred to their own and opponents' beliefs — namely the convenient ways the repertoires were deployed — the scientists came up with another argument: "the truth will win out in the end." The scientists assumed they were on the side of truth, so it was legitimate to explain their own views differently from those on the other side, the side of error. Of course, this assumes what needs to be proved, namely that the scientists are correct. It also assumes there are no rational reasons to believe something different.

Another way to claim superior scientific status is to say or imply that the opponents are outside the realm of what counts as science. Is astrology a science? What about parapsychology or the study of UFOs? Claims about fields being science, or not science, are common in controversies. The boundary between science and non-science is not fixed in nature or decided by some supreme authority. Instead, according to sociologists, scientists use language to distinguish between science and non-science, in a process called "boundary work."[21] In other words, scientists have to convince themselves and others that some sorts of knowledge are scientific and some are not. Use of

21 Thomas Gieryn, *Cultural Boundaries of Science: Credibility on the Line* (Chicago: University of Chicago Press, 1999).

empiricist and contingent repertoires is one way of accomplishing this task.

Relegating certain phenomena, fields and methods of study to the realm of "non-science" or "pseudoscience" can be a convenient ploy in controversies. Precognition — knowledge of the future — is an example, with critics commonly saying that it violates causality, one of the fundamental principles of physics. If precognition is impossible in principle, then studying it may be seen as a form of fake science or pseudoscience. Mainstream scientists commonly exclude certain fields and phenomena from acceptable science, such as cold fusion, homeopathy, astrology, psychic phenomena, alien abductions and faith healing. (There's a related question: is studying these phenomena unscientific in itself, or only finding evidence that challenges orthodox views about reality?)

The term "junk science," used to refer to research allegedly of inferior quality, implicitly makes a contrast with real science based on hard evidence and unimpeachable methods. The term "junk science" can be interpreted as a form of boundary work, and as a term in the contingent repertoire.

In many controversies, you will come up against language from the empiricist and contingent repertoires, and perhaps encounter boundary work, in particular an attempt to cast out challenges as unscientific. Most commonly, your allies will use the contingent repertoire only against opponents — and your opponents might use it against you.

The first point here is to pay attention to the language used in describing scientific findings. Be on the alert for

language from the contingent repertoire. If you encounter it, you can probably figure out that there's a double standard involved: *they* are using the empiricist repertoire to talk about the research on their side but using the contingent repertoire to talk about the research on your side. So point this out. If they point to biases or vested interests on your side, point them out on their side. Use the techniques of deconstruction.

If the other side tries to dismiss phenomena or research fields by saying they are not science, pseudo-science or junk science, you can counter by asking for their definitions of science and non-science. If you get a response, examine it carefully and you can probably poke holes in it.

3.7 Dealing with experts

When experts are on the other side

Suppose there's a prestigious scientist on the other side, with lots of publications, a high-status position, membership in scientific academies, and awards — maybe even a Nobel Prize. Such an opponent can be formidable, because many people believe that scientists are knowledgeable and objective and hence that a prominent scientist is bound to be especially knowledgeable and objective.

Even just having a PhD can make a difference in people's perceptions: it signifies credibility and authority compared to someone without this degree. Likewise, a university affiliation adds status, especially when it is a prestigious university like Harvard or Oxford.

The challenge is acute when there's no one comparable on your side. Maybe your side is made up of citizen campaigners, self-taught and knowledgeable but without a relevant PhD or university affiliation in sight. In debating against a prestigious scientist or even against one with a freshly minted PhD, you might know the arguments but you are at a distinct disadvantage in terms of credibility. What can you do?

Don't despair! Scientists don't know nearly as much about controversial issues as people imagine. Most scientists get ahead by working in a very narrow field, producing solid findings or even breakthroughs — but all within the narrow field.[22]

• A biologist might work on the way brain-eye connections operate in flies. It's fascinating, but hardly the basis for deep insight into GMOs or evolution.

• A nuclear physicist might work on the scattering cross sections of rare earth elements. This may be an important area, but does not give any special insight into nuclear power.

If you are up against a particular scientist (especially an objectionably arrogant one), it is worth investigating the scientist's publications.[23] There are likely to be dozens, or even hundreds for a high-profile scientist. The publications are also likely to have many authors, because most

22 See also the discussion in section 2.10.

23 Some scientists list all their publications on their websites. You can also track them down using Google Scholar or other databases, or you could write to the scientist and ask for their curriculum vitae.

scientists work in teams, sometimes with numerous contributors to a single article. So don't be over-awed by the number of publications. Here's how to assess productivity.

1. Divide the scientist's total number of articles published in scientific journals by the average number of authors. (If you want to be more accurate, divide each article by the number of its authors, and add up the figures.)
2. If the total is one per year or less, this productivity level is average or less than average. If the total is two per year or more, this is good productivity.
3. Senior scientists commonly put their names on articles resulting from work by their research students. Try to assess how much of the work is done by the scientist's students.

While you're checking out the scientist's productivity, have a look at the actual research. You should be able to get a general idea about the topics covered. In 99% of cases, the research is highly specialised.

So here's the situation. A scientist might enter a controversy, but is unlikely to have any special insight resulting from their own research. Instead, what the scientist knows relevant to the controversy mostly comes from reading about the issues, aided by the scientist's training.

- Biologists learn about evolution as undergraduates. They learn about species, natural selection, genetics, inheritance and other such topics. This means they

understand technical issues relevant to the creationism debate.

• Physicists learn about nuclear physics as undergraduates. They learn about protons, neutrons, radioactive decay, scattering and various other such topics. This means they can understand chain reactions, radioisotopes and other technical topics relevant to the nuclear power debate.

What scientists learn as undergraduates is important, and some spend many hours trying to understand the topics. But other conscientious students can learn as much. Scientists are not super-humans when it comes to general topics.

The other way that scientists learn about controversial issues is by reading about them and discussing them — just like anyone else.

Ted Ringwood was a prominent earth scientist who worked at the Australian National University. He developed a method for disposing of radioactive waste by embedding it in a synthetic rock, called Synroc, designed to mimic natural rocks that remain stable for millions of years.[24] (It sounds good, except that natural rocks seldom have significant levels of radioisotopes as part of their structure.) Ringwood, as well as touting his solution to the problem of radioactive waste, also

24 A. E. Ringwood, *Safe Disposal of High Level Nuclear Reactor Wastes: A New Strategy* (Canberra: Australian National University Press, 1978).

joined the debate over nuclear power. What special expertise did he bring to the debate?

• His undoubted earth-science knowledge was relevant to Synroc and, to a lesser extent, the issue of radioactive waste repositories. (Re Synroc, it could be argued that he was biased because of his personal interest in his creation.)
• His general science knowledge was relevant to understanding — or learning about — nuclear hazards.
• He had no specialist knowledge about reactor accidents, proliferation of nuclear weapons (largely a political issue), economics of nuclear power, alternative energy options, criminal and terrorist use of nuclear materials, and other facets of the debate.

Ringwood's expertise was very narrow, and directly relevant to only one aspect of the debate — and on this aspect, he could be challenged as self-interested. He had no special relevant expertise on other aspects of the debate.

Yet Ringwood was a formidable opponent because of his status as a professor at a leading university in a seemingly relevant field. He spoke and wrote with confidence, as if his opinions were definitive. He went further, identifying nuclear accidents and long-lived radioactive waste as the only two significant shortcomings of nuclear power and claiming to have resolved one of them with Synroc.

Ringwood, by virtue of his standing, was able to obtain a lot of media coverage. Yet on closer scrutiny, his expertise had limited relevance to most of the

issues involved with nuclear power. Anti-nuclear campaigners needed to confront Ringwood.[25] How could they do this? There were several options.

• Challenging Ringwood's claims about Synroc, for example by pointing to technical critiques by other scientists and by noting that Synroc was only a proposal, not a tested product — and testing would take years or decades.[26] The problem of long-lived nuclear waste had not been suddenly solved.

• Challenging Ringwood's claims about other facets of the nuclear power debate, including his claim that nuclear accidents and long-lived radioactive waste were the only significant shortcomings of nuclear power.

• Questioning the relevance of Ringwood's expertise to other facets of the nuclear power debate.

• Pointing out that many aspects of the debate involved social and political choices and that ordinary citizens need to be involved in decision-making: these are not matters on which scientific experts should have the final word, or perhaps even a special voice.

The problem of the opponent expert is especially acute in the case of Nobel Prizes. Winners are suddenly elevated from the ranks of hard-working, productive scientists into

25 For my own critique, see "Cracks in the Ringwood solution," *Chain Reaction,* No. 40, December 1984 – January 1985, pp. 32–36, http://www.bmartin.cc/pubs/84cr.html.

26 Decades later, Synroc has not become the preferred method for disposal of high-level radioactive waste.

celebrities, who are treated as superhuman geniuses and invited to pronounce on all sorts of issues, from science education to technology policy. Some Nobel Prize winners are thoughtful, concerned citizens whose opinions are worth seeking out; others are ambitious and self-serving. In either case, they should not be treated as fundamentally different from others. They are scientists whose specialised work has been recognised as highly significant. They should not be treated as gurus whose every opinion is exceptionally deep. Their achievements did not change the day they received the prize. It is useful to remember that the prize acknowledges achievement, and does not confer greater powers or wisdom on the recipient.

It's useful to distinguish between two concepts: expert performance and expertise.[27] Expert performance is when someone does something at a high level, in which the level can be clearly and definitively measured. The best examples are in competitive games with unambiguous criteria for winning. Expert performance in chess means being able to defeat other players. The chess ranking system gives a very good indication of recent levels of performance. Expert performance in running means achieving particular times or being able to win races. Expert performance of classical music can be assessed with the player performing behind a screen before several experienced judges. In all these areas, it is impossible for a beginner or an occasional performer to fake their way to greatness. They simply will not measure up.

27 See also the discussion of expert performance in section 2.10.

Expertise is when others say someone is an expert. Physicians are normally thought to be experts in dealing with health problems, but there is little checking. Physicians go through rigorous training, but once they begin their practices, there is hardly any monitoring to identify superior performers. Patient outcomes are inherently uncertain: some patients of even the best surgeon may die whereas some will survive despite poor treatment. For surgery, statistics on survival or success rates provide an indication of skill — but often such statistics are not collected or not published. For many types of physicians, there are no relevant statistics. Often, only immediate peers are in a position to make judgements about performance, but there is a strong professional restraint against informing on poorly performing peers.

The case of physicians illustrates how it can be virtually impossible for outsiders to assess how skilled someone is, because outcomes are too uncertain and there is no clear-cut benchmark for success. Only in the more extreme cases of incompetence might something be done.

For most of those involved in scientific controversies who are assumed or claimed to be experts, there is no easy way to determine the level of expert performance relevant. When someone is said to be an expert, this is seldom based on hard evidence of expert performance, but is rather a label bestowed on a person in recognition of certain achievements. A physician who is licensed to practise medicine has some credibility as a practitioner — but the licence might have been granted years or decades ago and is no guarantee of current skills. A scientist's PhD is likely to be similarly dated. Current skills are partly

indicated by recent publications. Some prominent scientists, however, become less active as researchers — some become administrators, or spend more time running their labs than doing research themselves.

The point here is the label "expert" is based on an assumption about performance. The so-called expert may or may not display high levels of performance in their field. Expertise is an attribution: "expert" is a label granted or bestowed on someone.

For most scientists and other professionals involved in scientific controversies, there are two key points.

1. They might be called or assumed to be experts, but they may or may not display expert performance.
2. Even if they are expert performers, their skills may have only a marginal relevance of the full gamut of issues in the controversy.

There's a more sweeping way to challenge opponent experts: you can question the relevance of any sort of expertise. For example, when choice is a central issue (whether to have an abortion or whether to be vaccinated), then experts don't have a special role. The only exception might be an expert on making choices, but even this sort of expert wouldn't have the definitive say on which choice is better.

To question the relevance of expertise altogether is to say that values are more fundamental than facts. This does not rule out the relevance of facts, but makes them subordinate to values. In the climate change debate, a key value is equity between different generations. It is possible to argue that if there is even the tiniest risk of catastrophic

global warming, then greenhouse gas emissions should be reduced now, just in case.

Questioning the value or relevance of any expertise might sound attractive when most of the experts are on the other side. If most experts are on your side, then it's a different story — see below.

Summing up, if you want to challenge opponent experts, you can

1. Highlight their mistakes, misunderstandings, exaggerated claims or other apparent flaws to undermine their credibility
2. Avoid referring to them or thinking of them as experts
3. Question the relevance of their skills to the controversy
4. Question the relevance of any expertise to the controversy

These methods sound straightforward, but may not be easy to bring off. You might find an apparent mistake in an expert's calculations or methods, raise this in a debate and discover it's you who made a mistake. You might end up looking foolish and the expert would gain credibility. Climate sceptics have regularly pointed out that world temperatures have been declining since 1998, so therefore claims about global warming are false. But anyone with a modest understanding of statistics knows that a noisy time series will have points above and below the trend line, so comparisons should be made between means, not using a single point: picking 1998 for a comparison is a misuse of statistics.

To challenge experts, you need to do your homework.[28] You can't just roll up to a debate with a few simple refutations of the other side's arguments. For example, if there is a scientist on the other side who is having a big impact, you might:

- Look up the scientist's publications — especially to see how narrow they are
- Study the scientist's arguments on the controversy, to see what evidence is used, what topics aren't addressed, what assumptions are made
- Consult with anyone who has engaged in public debate with the scientist, face-to-face, on radio or in a blog — or listen to recordings and check out blog texts
- Find out whether the scientist has a conflict of interest, for example obtaining funding from groups with vested interests

Using these and other methods, you might find that the scientist has vulnerabilities, for example not addressing some crucial arguments, not being familiar with some dimensions of the debate, having a conflict of interest or being prone to angry outbursts. On the other hand, you might find the scientist is a powerful opponent, being well-read, articulate, knowledgeable, balanced, independent, experienced and sensible, coming across as authoritative but with a common touch. You need to know who you're up against, otherwise your tactics may be ineffective or even counterproductive.

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28 See section 2.18 on learning about an issue.

When experts are on your side

With all these methods for challenging experts, it might sound like expertise is not all that important. Actually, it is. Despite increasing public scepticism about authorities, it is still a great advantage for advocates on your side to have degrees, positions at well-known institutions, memberships in prestigious academies, and awards. If you give a talk to a group and can be introduced as Dr Smith, author of 15 publications and member of the Society of Engineers, that may not sound like much compared to having a Nobel Prize but seems far more impressive than being Chris Smith, a farmer who has been studying the issues recently — even though Chris may know far more about the issues than the credentialed expert.

So — credentialed experts have lots of advantages, but they are not invulnerable. They can come under attack, for example with claims of making mistakes, of having expertise that is irrelevant, of having vested interests.

Imagine being one of these experts. If you are attacked, you have three main options.

1. Ignore the attack. If the attackers have little credibility (maybe they don't have any credentials), or if they seem too extreme and shrill, most people will ignore them or treat them as non-credible. So you may be able to ignore them too.

2. Counterattack. You can attack your critics.

   • Point out mistakes they've made.
   • Point out their vested interests, especially if they are paid by an industry.

- Point out the limitations of their credentials and area of study.

Counterattack can be effective, but it may leave some witnesses to the debate wondering whether the claims by your critics have some substance. Therefore, you may need to defend as well.

3. Defend against the attack. For many people under attack, the most obvious response is to defend. But before going down this path, think about alternatives. As soon as you defend, you have allowed the critics to set the agenda, namely the credibility of what you are saying. The debate becomes focused on whether you are right or wrong. The critics fade into the background: all the attention is on you.

> In the climate change debate, the critics have been effective to the degree that people debate the standard view, looking at both its strengths and weaknesses. This is far better for the climate sceptics than if they are ignored (as happens in some countries) or if the central issue is the sceptics' own mistakes and vested interests.

In defending — especially when most experts are on your side — your aim should be to broaden the terms of the debate, so they are not just about your flaws.

The gotcha attack

Suppose you're an expert and someone wants to attack your credibility. A common method is to pick out one statement you made that is allegedly wrong or misleading, publicise this mistake and keep hammering away at it,

with the implication that it undermines the credibility of your entire argument. This is the gotcha ("got you") attack. It's like finding out that someone told a lie, then calling this person a liar, with the implication that they always tell lies.

Dealing with gotcha attacks

1. Don't make mistakes. This is fundamental. If your opponents regularly use the gotcha attack, then you need to be extra careful about what you say, and try to use formulations that are harder to misrepresent.

However, everyone makes mistakes (except you, of course), and can be subject to gotcha attacks. Even if you never make a mistake, opponents may misunderstand or misrepresent your statements and then attack them on the basis of the incorrect interpretation. This is especially likely when values differ and when evidence is interpreted using different assumptions — namely in most public controversies.

So you should do what you can to minimise obvious mistakes or misinterpretations, but be prepared for gotcha attacks regardless.

2. Ignore mistakes and focus on key issues. You might have made a mistake — or someone on your side has made a mistake — but it's insignificant and doesn't affect the overall argument. So just ignore the mistake and keep returning to the main game: the bulk of evidence, scientific consensus, benefits to society or whatever. Your opponents want to frame the dispute as being about your

flaws; you want to frame it as the bigger issues at stake. So keep using your framing.

If your opponents keep hammering away at the mistake, ignoring it has a risk: you may be seen as avoiding the issue. So monitor the effect of their attacks.

3. Admit the mistake and put it in context. You agree that you made a mistake — or that someone on your side made a mistake — but say it's insignificant and doesn't affect the overall argument. The advantage of admitting the mistake is that you are seen as more open and honest; you're not avoiding the issues or claiming perfection. Admitting the mistake is often best when it is widely accepted that a mistake has been made.

Your opponents may use your admission to keep hammering you. You can counter by saying something like, "If that's the most serious problem they've found, our argument must be pretty good. They haven't any problem with X, Y and Z." This is again reframing around the strengths of your argument.

Another approach is to admit the mistake and then say that there are other mistakes — that help your argument. For example, the IPCC made a mistake about glacial melting in the Himalayas, thereby overestimating the impact of global warming. You can refer to the devastation of forests in British Columbia by the pine beetle as indicating that the impact of global warming is much more rapid and serious than indicated by the IPCC. In this way you show that the critics are one-sided: they are looking only at a few flaws but ignoring the big picture.

The double-standard test

Sometimes your opponents, who lack credentials, use the argument that the issues are clear to any ordinary person: training and in-depth expertise are not needed, and anyway the experts are all compromised by their psychological commitments and ties to vested interests. This is a coherent argument in its own terms. You can probe it by asking whether your opponents use it consistently.

Suppose you are involved in the climate change debate and the climate sceptics use this argument against you. You can ask: do they similarly reject expert opinion on other issues such as vaccination, pesticides and nuclear power? And if not, why aren't they vociferous in their challenges to the experts in these and other areas? You imply that the climate-change sceptics are quite selective in their scepticism: they apply it only to one issue, but are happy to support expertise when the experts support a position they agree with.

They can respond that climate change is the topic they care about, and anyway they make up their own minds first and then see whether the experts agree. You can then ask whether, when the experts are on their side, they mention the experts' psychological commitments and ties to vested interests. The arguments and counter-arguments never end!

Conclusion

Experts play an important role in controversies. Their knowledge and experience enable them to offer judgements and insights with greater credibility. However,

experts are commonly used to give unwarranted authority to a position. Expertise is usually in a narrow domain and has limited relevance to much of what is being disputed.

There are various ways to challenge and undermine experts on the other side, and ways to defend against unfair attacks on experts on your own side. It is wise to use these with care, because the other side might use these same methods against you.

3.8 Endorsements

A common technique in controversies is to say, "The authorities support our position." The authorities might be governments, health departments, professional associations, expert panels, courts and various other official bodies. Endorsements can also come from movie stars, politicians, religious leaders, sporting figures and prominent intellectuals, among others.

In 1950, fluoridation received an enormous boost when it was endorsed by the United States Public Health Service. Not long after, the American Dental Association and the American Medical Association endorsed fluoridation. All sorts of other bodies then followed suit, for example the American Federation of Labor and Congress of Industrial Organizations. Endorsements became one of the prime tools used by pro-fluoridationists.

Supporters of nuclear power have cited the building of nuclear power plants in various countries as an endorsement of nuclear power. The fact that nuclear

power provides much of the electricity used in France, for example, is presented as an argument for nuclear power in other countries.

Al Gore campaigned for years on climate change. In the early 2000s, his visibility and stature as former US vice president helped turn climate change into the highest profile environmental issue, especially via the 2006 film *An Inconvenient Truth.*

An endorsement is a powerful tool. What it means is that someone else — someone with knowledge, status, legitimacy and/or power — supports a position. The implication is that this position is, consequently, better. It is more credible. If PPA (Prestigious and Powerful Authority) supports a position, then who are you to disagree?

• Individuals can provide endorsements. The value of this depends on the status and fame of the person. Prestigious scientists, such as Nobel Prize winners, provide scientific validation. Leading politicians can provide political legitimacy.

• Professional bodies, such as a scientific academy or a medical association, provide collective scientific authority. Often this has a greater impact than the support of a few individual professionals. Endorsement of a position by a professional organisation implies that it is the carefully considered stance of numerous professionals.

• Government bodies, such as environmental or food safety agencies, also provide collective scientific authority, usually with a policy orientation.

• Courts can be influential when decisions are made about controversial issues. Courts carry the status of justice, of making judgements based on the evidence.

• Celebrities, such as movie stars, sporting figures and famous intellectuals, sometimes take positions in controversies and thereby influence followers and audiences. This effect can be important even though celebrities may not have any relevant expertise.

• Various other organisations can provide endorsements, including churches, corporations, trade unions, charities and human rights organisations. Their impact depends on their status and relevance to the debate.

Endorsements by prestigious, powerful individuals and organisations are welcome or unwelcome, depending on whether they are on your side or the opponent's. Usually, endorsements are touted as reasons for believing or supporting a position. But strictly speaking, an endorsement is not a reason at all — it's not an argument, though it is sometimes said to be an "argument from authority." How does this work?

Endorsements do not provide evidence or logic in support of a position. They instead invite a sort of unconscious acquiescence or conformity. This can take various forms, such as "Well, if they (Prestigious and Powerful Authority) support it, then it must be a sound position. They must have examined all the evidence and reached a consensus about what's the best option. If I go along with PPA, I align myself with the authorities, and they know what they are talking about. And if anyone criticises my views, PPA will be there to defend me."

Note that endorsements are usually presented as definitive, sometimes as a fait accompli: PPA has made an endorsement, so don't think any further. Those who rely on endorsements seldom invite questioning of authorities or of how authorities come to make endorsements.

It's a different story if endorsements are against your position. What can you do to counteract or undermine their influence? There are several potential approaches.

Obtain counter-endorsements

If the other side has a prestigious scientist willing to openly support its position, then you can try to find a scientist willing to openly support yours. Many members of the public are not too discriminating when it comes to scientific credentials and expertise, so having support from a lower-status scientist can be effective. The key thing is to turn a situation in which all the experts endorse the other side to one in which there is an apparent division: at least some are on your side.

News and current affairs media like to report conflict. If there is a division between experts, many journalists will report on the disagreement, even when most experts are on one side.

Obtaining counter-endorsements is easiest at the level of individuals. Finding a few scientists or celebrities is typically less difficult than getting scientific organisations or government agencies to endorse a minority position. However, sometimes there are professional bodies of alternative practitioners that will take a stand. When government agencies in some countries adopt a different view from the mainstream, they can be cited.

The key to counter-endorsements is being able to say, "The experts do not agree" or "The authorities do not agree." However, this approach has a weakness: it affirms and encourages reliance on authorities. So even if you can find a few scientists to speak out on your side, your position may take a beating if more scientists or agencies support the other side. Furthermore, the minority of scientists on your side may be subject to attack aimed at discrediting or silencing them. So it's worth considering other strategies.

Deconstruct endorsements

The word "deconstruct," as an intellectual process, means to analyse something, showing its inner workings.[29] To deconstruct endorsements means to probe them and, if possible, show aspects that weaken or discredit them.

This is usually easier with organisational endorsements. The World Health Organisation in 1969 passed a resolution supporting fluoridation. This sounds authoritative, but not so much when you learn that the resolution was strongly opposed by some delegations, but:

> … during the final hours of the session, when only 55 to 60 of the 1,000 delegates from 131 countries were still present, all bills that had not been accepted were collected into one and voted upon, including a statement on fluoridation.[30]

29 See section 3.4 on deconstruction for more about this.

30 George L. Waldbott in collaboration with Albert W. Burgstahler and H. Lewis McKinney, *Fluoridation: The Great Dilemma* (Lawrence, KS: Coronado Press, 1978), p. 285.

This example is typical. When a professional association or government agency passes a resolution or makes a statement, it relies on relatively few people with relevant expertise — or perhaps even none. Consider a medical association. Few doctors are specialists on cholesterol, radiotherapy, megavitamin supplements, prostate cancer screening or anything else. So when the association makes a statement on an issue, only a tiny minority of members will actually know a lot about it. Most will learn what they know through standard material provided through medical education or journals, sometimes funded by industry.

So the sequence usually goes like this. A minority of committed individuals pushes to put an issue on the organisation's agenda. If they succeed, the organisation takes a stand. Then standard materials in support of that position can be circulated to members so that they all have evidence and arguments at hand. In this way, just a few campaigners inside the profession or agency can lead to an endorsement and to acceptance of the position by most members.

When you stop to think about it, this applies to most organisations: only a few members have in-depth knowledge about the issues. Is this a problem? Not if those members are reliable and credible. But if the organisation is making a formal stand on an issue not central to its function — such as a trade union endorsing fluoridation — then if people knew how much the stand relied on just a few individuals, this would weaken the endorsement.

Deconstructing organisational endorsements can open the eyes of those who have the interest and time to

examine the issue carefully. However, most members of the public, not knowing much about an issue, are likely to take organisational endorsements at face value and not care enough to study a deconstruction. So, if possible, turn to a more powerful technique.

Discredit endorsements

A good way to discredit an endorsement is to show a conflict of interest. Sometimes the conflict of interest is obvious, as when a tobacco company association opposes restrictions on smoking. Other times the conflict of interest needs to be pointed out, for example when members of an expert panel on drugs are receiving funding from pharmaceutical companies.

Another approach is to discredit the individual or group making the endorsement. Discrediting is a broader topic,[31] so here I'll just mention one specific method: highlighting other positions endorsed by the same organisation or individual, usually positions widely seen as extreme. For example, in 1971, atmospheric physicist James McDonald testified to the US Congress about the possible consequences due to exhausts from the supersonic transport aircraft (SST) affecting the upper atmosphere. However, McDonald's testimony was dismissed by some members of Congress because he took the study of UFOs seriously — even though, logically, his claims

31 See chapter 7.

about SSTs should have been evaluated on their own merits.[32]

Some endorsements come from front groups, which are set up by industry to give the appearance of independence. So when the Environment Preservation Society says that an endangered species is not threatened by a development, it is powerful to expose that this society is a front for developers.

Discredit authority in general

Rather than trying to play the game of endorsements, another approach is to question the relevance of expert authority to the debate. This can be done in various ways. One line is to question the relevance of expertise to the issue.

> "Nuclear engineers may know a lot about radioactive processes, but they are not experts on nuclear proliferation or energy policy."
>
> "Pilots know how to fly planes but they are not experts on transport policy."
>
> "Doctors know a lot about disease but they aren't experts in public health policy."

The basic strategy here is to emphasise that experts are specialists who know a lot about some narrow topic but are not specially qualified to pass judgement about the wider social, ethical or policy dimensions of the issue.

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32 Lydia Dotto and Harold Schiff, *The Ozone War* (Garden City, NY: Doubleday, 1978), pp. 39–40.

Another approach is to emphasise the role of values in the debate, such as freedom, choice, equality or autonomy. Experts are knowledgeable about factual matters but seldom can speak authoritatively about values — and even those who do, such as bioethicists, have no warrant to speak about other people's values.

> In the debate about screening for prostate cancer, one of the issues involved is quality of life versus survival rate. Medical authorities may have the expertise to make informed judgements about the figures for survival and about the adverse effects of treatment but are not qualified to comment definitively about balancing them.

Promote citizen participation

The effectiveness of endorsements rests on an unstated assumption: that decisions should be made by experts and authoritative bodies, or in accordance with their views. This is an undemocratic assumption. In its extreme version, it becomes a recommendation for technocracy, namely rule by the experts.

A democratic alternative is citizen participation in decision-making, especially decisions about controversial matters. There are various ways in which participation can be organised, such as through referenda, consensus conferences and citizen juries (discussed in section 8.5). For the purpose here — countering endorsements by experts or formal authorities — the argument is that citizens need to be involved in decisions.

This argument can be justified by pointing to the role of values in controversies: experts may know the facts but are not authorities on the values of citizens. It can be justified through a critique of experts, for example their vulnerability to conflicts of interest. Or it can be justified by support for citizen participation as a goal in itself, as something that builds the knowledge and political capacity of a society and protects against injustice and tyranny.

Dealing with endorsements: how?

I've outlined several ways to deal with endorsements for the opponent's position, ranging from counter-endorsements to citizen participation. What's the best option? This depends on the controversy and the circumstances, but it's possible to make some general comments.

In the face of endorsements, often the first thought is to bring out counter-endorsements. This sometimes can be effective, but it buys into the assumption that the views of experts are the determining factor in controversies. That's okay if there's a good mix of views among experts and they are freely expressed. But in many polarised controversies, one side — usually but not always the side backed by groups with vested interests — has a near-monopoly on endorsements by expert bodies and governments. In this situation, it may be more effective to question the neutrality or relevance of endorsements and to advocate citizen participation in decision making.

Unwelcome endorsements

Sometimes your side receives support that is unwelcome: endorsement from an individual or group with an unsavoury reputation.

> In the 1950s the Ku Klux Klan, a notorious US racist group, took a stand against fluoridation. Proponents of fluoridation compiled a list of opponents of fluoridation, putting the Ku Klux Klan in the list along with scientists, thus implying guilt by association.
>
> Scientologists have criticised drug treatments for mental illness. Defenders of psychiatric orthodoxy sometimes imply that other critics are in the same category as Scientologists.

Potentially unwelcome supporters include criminals, terrorists, political extremists, foreign governments, unpopular politicians and believers in alien abductions. Who is unwelcome depends quite a lot on the issue and the circumstances. Here are some options for dealing with unwelcome endorsements.

Option 1. Simply ignore them and keep the focus on the issues and the most credible supporters, such as scientists.

This option is easiest if your opponent doesn't mention the endorsement. However, if commentators keep bringing up the unwelcome endorsement as a means of discrediting your views, this option is harder to maintain. Another possibility is that the group making the unwelcome endorsement insists on campaigning visibly and announcing its support for you.

Option 2. Distinguish yourself from the other group by choice of issues or arguments.

Some right-wing US opponents of fluoridation said it was a communist plot.[33] Scientist opponents never mentioned this claim, but instead concentrated on the health hazards of fluoridation.

This approach is most useful when the unwelcome allies take a specific, easily identifiable angle on the issues. It is less useful when they advocate the standard arguments.

Option 3. Actively distance yourself from the group.

Critics of conventional psychiatry — for example, critics of the use of drugs for treating conditions such as schizophrenia — may be embarrassed by having Scientologists as allies. They can say they are not Scientologists and refuse to join campaigns or sign statements in which Scientologists are involved.

Saying that you are independent of the unwelcome ally, or even denouncing the group, can potentially give more credibility to your own group, at least among some audiences. On the other hand, it can cause difficulties in campaigning. In the worst scenario, the unwelcome ally can take over core elements of the issue.

Option 4. Welcome diversity.

In this approach, you say something like "People from all different perspectives — political, religious and

33 This was famously portrayed in the film *Dr. Strangelove,* in which the lunatic General Ripper referred to fluoridation as a communist plot targeting "precious bodily fluids."

so forth — are involved in our campaign." The idea is to give the sense that extremists are nothing special, because there are so many sensible people involved. A variant on this approach is to point to the involvement of members of stigmatised groups in other facets of society.[34]

Option 5. Question the assumption that an unwelcome endorsement undermines your position.

You might do this in an aggressive way, by asking "What about the child molesters who endorse *your* position?" (Any sizeable group of people probably includes some child molesters.) More politely, you could ask "Are you implying guilt by association?" Or, when someone mentions the endorsement, you could just ask "So what?"

3.9 Inoculation?

When you're inoculated against a contagious disease like polio or measles, you receive a vaccine intended to prime your immune system so you become resistant to the full-blown disease. People can also be inoculated against dangerous or undesired ideas. They are exposed to brief, carefully prepared versions of unwelcome ideas and shown why they are wrong. The idea is that when these people are subsequently exposed to virulent forms of these ideas, they will be more resistant.

There is evidence that inoculation can work. For example, a group of social researchers at the University of Oklahoma studied stealth campaigns by corporate front

34 I don't know of an example where this option has been used.

groups, which involve corporations sponsoring groups with misleading names to promote a corporation-friendly point of view. The researchers found such campaigns were often effective in influencing audiences, in other words deceiving them. However, audiences told in advance about front-group tactics were less affected.[35]

> If you are opposed to smoking, and a well-informed smoking advocate tells you about evidence that smoking is actually beneficial to some people's health, you may be able to dismiss this as tobacco company propaganda, because no health authorities ever support the claim. So you can maintain your view about smoking. If, on the other hand, you support smoking, you will be bombarded with claims that smoking is harmful. To maintain a contrary view, you need to know how to counter the claims against smoking. Inoculation against these anti-smoking arguments could make a difference.

> Supporters of creationism can expect to encounter arguments and evidence in favour of evolution. To maintain belief in creation, they need to be prepared. Inoculation can make a difference.

The practical issue for most campaigners is how to address the opponent's main arguments. Is it better to ignore them

35 Michael Pfau, Michel M. Haigh, Jeanetta Sims and Shelley Wigley, "The influence of corporate front-group stealth campaigns," *Communication Research,* Vol. 34, No. 1, February 2007, pp. 73–99. The authors cite many other studies of inoculating against arguments.

entirely or address them comprehensively? In other words, when should inoculation be considered? It's worth considering the pros and cons of each option.

Ignoring contrary arguments has the advantage of keeping the focus on your own claims. Mentioning contrary arguments runs the risk of supporters thinking there might be something in those arguments. This approach works best when most authorities are fully supportive of your position, and contrary views are stigmatised.

> Vaccination proponents may decide not to address the critics' claim that because deaths from infectious diseases were declining steadily for decades before vaccines were introduced, mass vaccination made little or no difference to the continuing decline. If the vaccination orthodoxy is sufficiently powerful, then most people will ignore this claim and trust the authorities. Nevertheless, proponents need to be prepared for this claim, otherwise they could be caught out in an interview or debate.

Mentioning contrary arguments, along with a short rebuttal, has the advantage of preparing people for the contrary argument. This is most relevant when the contrary argument is widely used, so people are likely to encounter it.

> Climate sceptics may claim that carbon capture and storage (CCS) will be available soon, so there is less need to cut carbon emissions today. So climate campaigners may decide to say that CCS is not close

to being technically and economically viable, or they might allude to this by saying that several renewable energy technologies are technically proven and economically viable now, unlike CCS.

Mentioning contrary arguments runs the risk of allowing the argument to be framed by the opponent's agenda. Opponents of urgent action to reduce carbon emissions are most likely to cite CCS as a solution. It is sensible to point to weaknesses in CCS when it is raised, but not obvious whether to raise CCS if it is not on the main debate agenda.

Comprehensively analysing and rebutting contrary arguments is a task for experienced campaigners, especially those engaging in formal debates with opponents. Experienced campaigners are highly committed to the cause and therefore at little risk of being swayed by a close study of contrary arguments. It is valuable for some people to undertake detailed critiques, because there is an important audience for them: individuals who are both undecided or open-minded about the issue and receptive to careful argumentation. These individuals will want to study both sides of the argument and will be on the alert for unanswered claims. So, for them, a detailed critique must include rebuttal of contrary arguments. Such individuals are potentially important because, if they are persuaded, they may decide to intervene in the debate. With their prior credibility, their support can be influential with certain audiences.

In the debate over evolution, some biologists treat supporters of intelligent design as simply ill-informed and do not address their arguments in detail. However, supporters of evolution can benefit from the availability of comprehensive rebuttals of intelligent design.[36] Some credentialed supporters of evolution, after reading such treatments, will feel more confident about the arguments and be willing to enter the debate.

3.10 Values

Positions taken in controversies nearly always involve values, such as caring about human life, economic growth, privacy, equality, autonomy and the welfare of future generations. Typically, opposing sides subscribe to different values, or sometimes to the same value interpreted in different ways. In arguing, is it a good idea to openly discuss values, or is it better to stick to other sorts of arguments?

The climate change controversy involves two contrary sets of values. Those who want urgent action to mitigate global warming put a priority on the future, in particular on human life and the environment decades and centuries from now. Climate sceptics, on the other hand, put a greater priority on the economy in the present, not wanting to make sacrifices now for only a possible future benefit to others.

36 An example is Jerry A. Coyne, *Why Evolution is True* (New York: Viking, 2009).

Should climate change debaters be open about their values? Those advocating action typically refer to increases in temperature, sea level, storms and the like that need to be avoided: they refer to an impending human and environmental catastrophe. That mitigation measures will mainly benefit future generations is sometimes highlighted, but not often. Probably it is advantageous to suggest that most people alive today will also benefit.

Climate sceptics seldom say that they are prioritising economic growth today over risks to future generations, because they are sceptical about the scale of future risks and about the benefits to be gained from taking action today. So they are even less likely to refer to intergenerational equity.

Each side accuses the other of having inappropriate values. Climate sceptics sometimes accuse their opponents of putting the environment above the economy and even of trying to destroy the western way of life. Those advocating immediate action sometimes accuse sceptics of serving interest groups, especially fossil fuel corporations.

Some climate activists believe massive changes are needed in society, for example cutting back on fossil fuel use by a major reorientation to walking and cycling, more local food production, setting up community energy systems, and less meat production. Others want life to continue much as it does today, but with more efficient energy systems, electric cars, solar electric systems and the like. Should these two groups, with differing visions of how a low-carbon society

would be organised, be explicit about their contrasting values? Or should they join together on a common platform?

In the vaccination debate, both sides have a common goal: protecting lives, especially the lives of children. Proponents support near-universal vaccination so that the entire community benefits from herd immunity, which occurs when viruses cannot easily spread because there are not enough susceptible individuals. Critics favour parental choice and highlight the dangers of multiple vaccinations for small children, some of whom have a higher-than-average susceptibility to adverse reactions.

Proponents emphasise the collective benefits of vaccination, whereas critics emphasise risks to individuals. Neither side spends much time discussing their opponents' values. Only brave proponents say, "Some children will die or be disabled from adverse reactions, but this is a price worth paying for the collective benefits of herd immunity." Instead, proponents typically deny, downplay or ignore adverse reactions. Likewise, only brave critics say, "Some children will die or be disabled from measles, whooping cough and other infectious diseases, but this is a price worth paying to protect children at heightened risk from adverse reactions." Instead, opponents typically discount the value of herd immunity in reducing the risk from infectious disease. Each side highlights its own values and seldom acknowledges the opponent's values.

These examples raise several questions that campaigners should consider.

- What are our own values? Which ones are most important?
- How explicit do we want to be about our values?
- What are the opponent's values? Which ones do they think are most important?
- Do we want to highlight, explain, criticise or sympathise with the opponent's values?

3.11 Emotions

Scientific controversies can be emotional. This is an understatement: they predictably involve strong emotions. To understand the dynamics of controversies and to be a more effective campaigner, it is valuable to understand the way emotions are generated and manipulated.

It's useful to divide sources of emotions into several categories, including the issue, images, campaigning and winning/losing. (Though the sources are different, the resulting emotions are often the same.)

The issue

Public controversies deal with issues that people care about, including health, life and death, the environment, human rights and valued behaviours.

Health controversies include smoking, cancer treatments, microwaves, and numerous matters of diet, such as cholesterol, pesticides and food additives. Many people

get excited if their health, or the health of loved ones, might be affected.

Abortion and euthanasia involve questions of life and death. These are among the most passionately felt issues.

Before the 1960s, environmental concerns were not on the agenda. The environment was often treated as a dumping ground of no consequence. Belching smoke stacks were a symbol of prosperity. The rise of environmental consciousness changed attitudes profoundly. Many people today see the environment as an extension of themselves: cutting down a forest becomes a scar on the mind as well as on the landscape.

Some people have strong emotional responses to matters of health, life, death or the environment due to personal experiences. For example, a close relative might have smoked and died from lung cancer, which could lead to a stronger emotional response to smoking as an issue. Or a relative might have used a mobile phone heavily and died of a brain tumour, enabling a stronger response to microwaves as an issue.

Images

Sometimes images can be used to generate emotion and trigger action. Pictures of aborted foetuses or animals being experimented on can cause outrage and lead to participation in action groups.[37]

Many issues do not lend themselves to powerful visuals. Global warming is not visually dramatic, for the

37 This was discussed in section 2.14, "Why people get involved."

most part. It's difficult to dramatise a temperature rise of a few degrees. One potent image is of polar bears adrift on ice floes.

Sometimes images can be turned into symbols of concern or dread. The mushroom cloud from a nuclear explosion is a symbol of nuclear war. The movement against nuclear power, to symbolise danger, has used the radiation symbol. It has also used the cooling tower from a nuclear power plant as an icon, even though cooling towers are among the least dangerous aspects of nuclear power. However, it is difficult to visually dramatise the hazards of ionising radiation.

Campaigning

Anyone who puts hours, days or years into campaigning is bound to have emotional responses, often linked to but conceptually separate from the issue itself.

Campaigners are exposed to an enormous amount of information about issues. They read horror stories, attend inspirational talks and see numerous pictures and videos. The casual television viewer might know something about GMOs; a campaigner knows vastly more. This can lead to a stronger emotional response.

On the other hand, experienced campaigners can become jaded. They've seen so much that they are not so often upset or surprised. They are more likely to be driven by commitment, habit and relationships with other activists. Even so, fresh information can still stimulate powerful emotions — it depends on the person.

Winning and losing

Quite apart from the issues, campaigners can become passionate about winning the debate. At an interpersonal level, this comes out as a desire to have the last word and to demolish the claims of opponents, even in a casual conversation. In such circumstances, the emotional stake in winning the argument may overwhelm a strategic calculation about the best way to encourage someone to reconsider their views, which often involves fostering reflection rather than being able to rebut every claim.

Commitment to winning can lead to highly emotional responses to developments in the controversy, for example to a government policy decision about forestry or labelling of GM foods, or to the success of organising efforts, for example attendance at a public meeting or the questions asked on talkback radio.

Emotional responses to losing can be powerful. Some campaigners are spurred into even greater efforts, but demoralisation is more common.

Emotional responses to winning sometimes can be even more damaging. Entire movements can lose momentum when they seem to have won. In the late 1950s, the movement against nuclear weapons burgeoned, with much of the focus around the health impacts of fallout from atmospheric testing of nuclear weapons. After the partial nuclear test ban treaty in 1963, the movement seemed to have won: above-ground tests were banned. But the nuclear arms race continued much the same as before, with underground tests replacing above-ground ones. The apparent success of the movement was its undoing.

A strong commitment to winning can prevent the possibility of dialogue with opponents. Sometimes there are ways to sidestep a controversy by agreeing on common goals. For example, the incidence of abortion might be reduced through sex education and better birth control, but campaigners might care more about winning the abortion debate.

Emotions in public

On many controversial matters, people expect that emotions will run high, so it is no surprise to observe this. On the other hand, many people assume that being emotional means lacking objectivity, for example responding to the evidence in a way that is unbalanced (emotional, subjective) rather than rational (non-emotional, objective). Being scientific is commonly assumed to be non-emotional, so that evidence can be judged in a neutral, rational, balanced, objective way — perhaps even with serene indifference.

These common assumptions are mistaken on several accounts. Scientists can be just as emotional as anyone else,[38] and those who join controversies are likely to have especially strong feelings about an issue. Furthermore, the very idea of non-emotional objectivity is suspect. Cognition (thinking) nearly always involves emotions. Indeed, totally unemotional thinking is likely to be seriously distorted.[39] Finally, controversies involve values,

38 This was discussed in section 2.15, "Commitment."

39 Ronald de Sousa, *The Rationality of Emotion* (Cambridge, MA: MIT Press, 1987).

not just facts, and there is no objective way to assess values.

Although common assumptions about emotions and rationality are mistaken, they influence the way controversies are waged. It is common to attack opponents by saying they are emotional. This draws on the implicit assumptions that emotional means unscientific and unscientific means wrong. On the other hand, scientists are often assumed to be unemotional and objective simply because they are scientists. The consequence, paradoxically, is that scientists can get away with more overtly emotional positions.

The upshot is that public participants in controversies often manage appearances of their emotions, depending on the audience. Campaigners may try to mask their emotional reactions in order to appear more credible. At the same time, they want to gain support by appealing to the emotions of current supporters and possible recruits. The result is a complex mixture of styles that depends on people's natural emotional responses to issues and strategically chosen ways of presenting oneself.

A few possibilities:

- An objective-sounding scientist, who avoids overt emotion, is useful for gaining credibility among scientists and others, but is unlikely to be inspiring.
- A passionate scientist can win new recruits through a combination of credibility (attributed to being a scientist), commitment and concern, but may not be taken seriously by those who expect scientists to be

less emotional. A prime example is Helen Caldicott, a doctor who has campaigned for decades against nuclear power and nuclear weapons.

• An objective-sounding campaigner — without scientific credentials — relies on coming across as knowledgeable, even authoritative, and may need to hide the more overt signs of commitment.

• A passionate campaigner — without scientific credentials — is open about having concern and commitment.

These or other roles may be chosen strategically or simply be the way that campaigners present themselves. Sometimes opponents push campaigners into roles and sometimes audiences encourage adopting particular roles.

Some lessons

• Emotions matter.
• Everyone has emotions — including scientists. Only some display their emotions openly.
• The expression of emotions can be used strategically or spontaneously in campaigning.
• Behind-the-scenes emotions, such as frustration, anger and satisfaction, are vitally important for campaigners.

3.12 Lying

"That bastard! He lies through his teeth. If I had a dollar for every lie he's told, I'd be rich."

"She's a con artist, to be sure. I wouldn't trust a thing she says. It's all designed to deceive."

These comments are about opponents, of course. Often they are just thoughts; sometimes they are spoken to trusted allies. Very occasionally they are voiced in public.

Do campaigners tell lies? Even if they do, is it wise to claim they've lied? These are important questions. Saying that someone has lied is a powerful accusation, emotionally charged.

Many campaigners believe opponents lie. They hear opponents repeating claims that have been comprehensively refuted. They catch out opponents in blatant contradictions. If this doesn't involve lying, what does?

To address this important issue, I'm going to discuss lying in general before looking at lying in scientific controversies.

Aspects of lying

There's been quite a bit of research into lying. Prominent researcher Paul Ekman defines lying as "a deliberate choice to mislead a target without giving any notification of the intent to do so."[40] Note that this includes both telling falsehoods and hiding the truth, which is sometimes called lying by omission. In certain domains, deception is expected, so it's not considered lying. In a soccer match, a player will pretend to move in one direction, then move the ball in another. Such skills in feinting are regarded highly. A novelist may deceive the reader, all in the service of entertainment or art.

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40 Paul Ekman, *Telling Lies: Clues to Deceit in the Marketplace, Politics, and Marriage* (New York: Norton, 1985), p. 41.

The German philosopher Immanuel Kant (1724–1804) is the most famous advocate of the view that lying is wrong and that telling the truth is a moral imperative. Supporters of this view refer to the damage caused by lies, including discrediting the liar.[41]

However, some contemporary commentators take a more pragmatic view.[42] They note that lying is commonplace. In fact, most people deceive others several times every day. The pragmatists say some lies are functional for social interaction.

When your friend says, "This looks great on me, don't you think?" you can tell from the tone of her voice whether she wants to be told the truth. For the sake of your relationship, you say "Yes, you look great" unless there is some higher risk, for example a fashion calamity at a major social function.

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41 Sissela Bok, *Lying: Moral Choices in Public and Private Life* (Hassocks: Harvester, 1978).

42 F. G. Bailey, *The Prevalence of Deceit* (Ithaca, NY: Cornell University Press, 1991); J. A. Barnes, *A Pack of Lies: Towards a Sociology of Lying* (Cambridge: Cambridge University Press, 1994); Charles V. Ford, 1996. *Lies! Lies!! Lies!!! The Psychology of Deceit* (Washington, DC: American Psychiatric Press, 1996); David Nyberg, *The Varnished Truth: Truth Telling and Deceiving in Ordinary Life* (Chicago: University of Chicago Press, 1993); W. Peter Robinson, *Deceit, Delusion and Detection* (London: Sage, 1996); David Shulman, *From Hire to Liar: The Role of Deception in the Workplace* (Ithaca, NY: Cornell University Press, 2007); Robert L. Wolk and Arthur Henley, *The Right to Lie: A Psychological Guide to the Uses of Deceit in Everyday Life* (New York: Peter H. Wyden, 1970).

It's useful to distinguish benign lies, that usually harm no one and often serve to lubricate social interactions, from malicious lies intended to harm. It's also useful to distinguish personal lies, told to one or a few people, from institutional lies, for example the pronouncements of government or industry spokespeople. The most damaging lies are malicious institutional lies, for example "We know Saddam Hussein has weapons of mass destruction."[43]

The pragmatists accept that lying can be damaging, including by providing false information and hurting one's credibility. However, lying is not the worst thing one can do. Sometimes it is the lesser of two evils. A classic example: imagine you live in Nazi-occupied Europe and soldiers come to your door asking, "Are there any Jews here?" If you falsely say "No," your lie is a trivial offence compared to the value of protecting lives.

Lying in controversies: the role of paradigms

You might think opponents are lying, but how can you be sure? A person is lying only when they intend to deceive. If the person actually believes what they are saying, they aren't lying — though you might say they are misinformed, misguided or deluded.

In polarised controversies, participants on each side adhere to standard packages of ideas, which can be called paradigms. From within a paradigm, discrepant observations are treated as anomalies. They don't fit into the

43 On this and other such deceptions, see John J. Mearsheimer, *Why Leaders Lie: The Truth about Lying in International Politics* (New York: Oxford University Press, 2011).

standard framework and are assumed to be wrong or as eventually explainable through development of standard ideas.[44]

In physics, the standard set of ideas includes the assumption that present events can affect the future but future events cannot affect the present. In other words, causality is one-directional in time. Findings in parapsychology, for example that subjects can predict future random events (quantum decays) at a rate greater than chance, conflict with the physics paradigm. Because they cannot find any obvious flaws in the research methods used in these studies, some scientists assume the parapsychology subjects or researchers must be cheating: they must be frauds and liars, for otherwise how can the results be explained?[45]

A similar sort of logic prevails in other controversies. Because the other side is so obviously wrong, they must be lying. An alternative explanation is that their observations are sound, and there is a clash of paradigms, in other words a clash between the sets of ideas used to select and judge the observations.

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44 See section 2.2.

45 For an example of this approach to parapsychology, see C. E. M. Hansel, *ESP: A Scientific Evaluation* (London: MacGibbon & Kee, 1966).

Confirmation bias

People have a strong tendency to look for evidence that supports their views and to ignore contrary evidence.[46] Furthermore, evidence will be judged entirely differently depending on whether it supports or clashes with a person's beliefs.

Confirmation bias creates an ongoing affirmation of one's position, so that it seems ever stronger. This makes it easy to reject contrary evidence, indeed to prevent it entering one's consciousness. Partisans caught up in this self-reinforcing cycle may appear to be lying, because they seem to reject what appear to be blatantly obvious facts. Actually, though, they aren't trying to deceive anyone. They just have a strongly slanted view of the evidence, so much so that something that seems completely obvious to others simply bounces off them with no impact.

Lying by omission

A lot of people — politicians especially — think it's only a lie if you say something you know is false: if you can avoid saying something technically wrong, then you haven't lied. In such situations, if you don't want to use the word "lying," you can say "deceiving."

A proponent of nuclear power might say "No member of the public has died from the routine operation

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46 Carol Tavris and Elliot Aronson, *Mistakes were Made (but not by* Me*): Why We Justify Foolish Beliefs, Bad Decisions, and Hurtful Acts* (Orlando, FL: Harcourt, 2007). See also section 2.13, the subsection "Why controversies continue."

of a nuclear power plant." This avoids saying that "routine operation" doesn't include meltdown accidents such as at Chernobyl and Fukushima. It also avoids saying that many people may have died from cancers from radioactive emissions from routine power plant operations — but no one knows exactly how many, so theoretically it might be none.

When campaigners only mention evidence supporting their side and neglect contrary evidence, this might be lying by omission: they might realise there is damaging evidence but think it's okay not to mention it, because everything they say is true. However, no conscious deception might be involved, due to confirmation bias and adherence to a paradigm.

Cynical operators and true believers

Some campaigners don't mind lying. They can be called cynical operators. For them, a scientific controversy is a type of game. The aim is to win. In a game, deception is acceptable: it's just a tactic to gain an advantage.

True believers are committed to a cause, and supporting the cause takes precedence over other considerations, including telling the truth. The ends justify the means, so if lying is necessary, it's justified.

You might imagine that there are hordes of cynical operators and true believers polluting people's minds with their confident but misleading claims. However, it is actually hard to determine how many people fit these categories. When cynical people repeat claims over and over, they begin to believe them. Studies of the mind show that entirely false memories can be created through

suggestion and repetition.[47] No matter how contradictory or outlandish someone's claims, it's quite possible they are sincere.

Dealing with deception

Accusing someone of lying is risky. It raises the stakes by moving the discussion from the evidence to someone's psychological state. Furthermore, because of paradigm effects and confirmation bias, it's possible the person is not lying at all: they may believe what they are saying.

It's far safer to challenge statements than to make claims about lying. You can:

- Raise evidence and arguments not mentioned by the other side
- Show contradictions between their claims and the evidence, or contradictions between their claims at different times
- Point out the assumptions underlying their position.

Prudently, you might decide not to overtly call someone a liar, but instead provide evidence that shows up their mistakes and deceptions. Do you *think* they are lying, even if you don't say it? If so, it is worth reviewing studies of paradigms and confirmation bias. To be an effective campaigner, you need to understand your opponents, and this includes knowing whether they are being consciously

47 A highly cited article on this is Henry L. Roediger III and Kathleen B. McDermott, "Creating false memories: remembering words not presented in lists," *Journal of Experimental Psychology,* Vol. 21, No. 4, 1995, pp. 803–814.

deceptive. The easiest working hypothesis is that they believe exactly what they say. And if that's what they believe, you then need to figure out how they think.

In other words, rather than judging and dismissing opponents, you can study what they say (and don't say) and thereby learn about their assumptions, ways of thinking and styles of arguing — and use the resulting insights to improve your own approach. It might be emotionally satisfying to condemn opponents as liars, but understanding how they operate can be more productive.

Genetically modified organisms

What they are

Genetically modified organisms (GMOs) are bacteria, plants, fish, mammals and other living things whose genetic material has been changed through laboratory techniques called genetic engineering or biotechnology.

Arguments for

• GM crops are more productive and reliable, being designed to be more resistant to pests, to survive drought or to thrive in other adverse conditions.

• GM techniques can be used to create pharmaceutical drugs, improve animal health, produce animals used in disease research, and serve many other valuable purposes.

• The risks due to GMOs are minimal; genetic modification is not fundamentally different from conventional breeding techniques and may even occur in nature.

Arguments against

• GMOs pose unacceptable risks of disease and adverse environmental impact.
• GMOs have not been adequately tested before their commercial use.
• The benefits of GMOs go mainly to their manufacturers, not to farmers or consumers.
• Consumers are not given an informed choice when purchasing GM products.

Experts and authorities

Most GMO researchers support GMOs; a few are critical. Governments ban or restrict some GM products, while approving others.

Vested interests

Biotechnology companies that produce GM products can obtain large profits.

State of play

A few GM crops dominate production in some countries. GM products are contained in many purchased goods. An active citizens movement has led many governments to place restrictions on GMOs.

Alternatives

Conventionally produced crops and other traditional products are one alternative to GM products. There are also non-traditional, non-GM agricultural strategies such as tree cropping and ecofarming.

4
Communicating

You might know what you want to say, but who do you say it to, and how? There are all sorts of methods: talks, articles, blogs, leaflets, posters, websites, tweets, texts. What are the most appropriate forms of media, and how should you use them? This is a big topic, and covered in more detail in some manuals for activists.[1] Here I focus on elements that seem especially relevant to scientific controversies.

There are several audiences worth paying attention to:

- the general public
- opponents
- supporters.

An email message to your membership is mostly for your supporters, and will have a different style than an article in a newspaper aimed at a more general readership. That's obvious enough, except that these days it's easier for opponents to get hold of your internal messages, so it is wise to assume your messages can be seen by anyone. The most dramatic example is Climategate: the emails of climate scientists at the University of East Anglia, which they assumed were confidential, were illicitly obtained and

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1 One of the best is Charlotte Ryan, *Prime Time Activism: Media Strategies for Grassroots Organizing* (Boston: South End Press, 1991).

published, with damaging consequences for the reputation of the scientists and their work.[2]

In planning your communication strategies, it's useful to think of several dimensions. You can ask whether a message is

- visible
- understandable
- informative
- credible
- interesting
- persuasive
- honest
- thought-provoking
- cost-effective

You might think, "Yes, our message will satisfy all these criteria!" but usually there's a trade-off between different criteria.[3]

4.1 Scientific papers

A scientific paper usually has high credibility, especially if it's in a prestigious journal. However, it's seldom visible to anyone except specialist readers. Few scientific journals sit on newsstands. Visibility for the research findings

2 Fred Pearce, *The Climate Files: The Battle for the Truth about Global Warming* (London: Guardian Books, 2010).

3 For insights about developing memorable messages, see the stimulating treatment by Chip Heath and Dan Heath, *Made to Stick: Why Some Ideas Survive and Others Die* (New York: Random House, 2008).

requires additional efforts, for example news stories or summaries in newsletters or blogs. The paper, despite containing lots of information, may not be very informative to general readers, because it is geared to a narrow issue, relies on presumed knowledge and is filled with specialist terminology. For example, a paper about cancer in a species of whale may have detailed information about epidemiology or pathology and say little about its relevance to ocean pollution. In addition, the paper may not be very persuasive because it's filled with all sorts of qualifications. Interpretation is needed to put it in the context of a debate.

The conclusion from this short assessment is that a scientific paper is unlikely to be a potent communication form on its own. But it can be a valuable contribution if accompanied by additional communication to make the findings known to non-specialists, to interpret the findings in an understandable way and to put them in the wider context of the issue. Furthermore, publishing a paper in a peer-reviewed scientific journal gives the authors credibility that can be used for obtaining media interviews and stories in high-profile media outlets.

Publicising a scientific paper, for example through media releases, news stories, emails and blogs, involves translating the ideas into other forms of expression. Several processes can occur along the way: simplifying, uncertainty-reducing, distorting and misrepresenting.

Simplifying occurs when the paper is explained for non-specialists, with everyday language, examples and analogies. This is almost inevitable and is not necessarily a cause for concern. The question is how the simplification

is done. Does it capture the essence of the paper? If not, one of the other processes may be occurring.

Uncertainty-reducing occurs when the core results apparently become stronger and less subject to uncertainty, typically by lack of mention of limitations and possibilities of error. An article's abstract, which is a summary of the paper, is the first occasion for reducing uncertainty, because it can be written giving a stronger conclusion than a detailed examination of the results would indicate. News stories usually omit limitations of data, methods, analysis and results. If campaigners want to discredit the results, they may mention such limitations.[4]

Distorting occurs when discussions of a scientific paper give an exaggerated or mistaken understanding of what the paper is all about. For example, a study of some obscure biological mechanism might be claimed to be an important advance for curing cancer, though the application to cancer is only a hypothetical future possibility. To assess distortion, you need to read the paper and assess what is a fair representation of its findings. Campaigners commonly distort findings by exaggerating how much they support their position or minimising how much they undermine it.

Misrepresenting is giving an incorrect or seriously misleading interpretation of the research, for example saying it supports one position when actually it doesn't at all, or even supports the other side. If distorting is like seeing your image in a warped mirror, misrepresenting is

4 See also section 2.6 on bias in research.

like looking in a mirror and seeing someone else — maybe your worst enemy.

Most of the these processes will happen without your control, because they are the result of journalistic practices, public relations by scientists' employers, or enthusiastic promotion by advocates. Normally there's no great need to worry about the processes of simplifying and uncertainty-reducing, as they clarify and focus the message of the paper. However, distorting and misrepresenting are more serious.

If the paper has been misrepresented to support your position, that might seem gratifying, but it's risky: if other side can expose it, this might be worse than a fair account of the paper in the first place. Likewise, if the paper has been misrepresented to support your opponent's position, you can try to expose this.

4.2 Advertisements

If your side has sufficient money, you can produce paid advertisements in newspapers, radio and television, and use advertising strategies on social media. Ads can make a difference with some audiences. The practical issue is what to say: what evidence to mention, what arguments to make, what images to show, what sort of speakers to use. There is a vast body of research on advertising effective-

ness,[5] though little of it deals specifically with scientific controversies.

A large advertisement in a major newspaper certainly is visible to many readers. But is it informative, credible or persuasive? This depends a lot on what's covered in the ad and who sponsors it.

Some readers will see it is an ad, and turn the page. An immediate disadvantage of ads is that they are seen as self-interested. They are perceived as different from news items, which are seen as more objective (though often are biased in their own ways). This is the reason why some ads are written to look like news stories. When you use a web search engine, ads may appear designed to look similar to unsponsored links.

Any group can pay for ads, but this method of communicating is especially helpful to groups with lots of money: energy companies can pay for ads on climate change, pharmaceutical companies on antidepressants, timber companies on forest policy, and so on. The connection with money and advertising is so strong that when there are major ads — especially on television — it is a sure sign that the ad sponsors have far more money than their opponents. It is unusual for both sides to have enough money for major advertising campaigns.

For groups with not so much money, such as most environmental groups, it can be tempting to use ads. However, when the other side has more money, this is

5 The definitive treatment is J. Scott Armstrong, *Persuasive Advertising: Evidence-based Principles* (New York: Palgrave-Macmillan, 2010).

usually a losing strategy. In a battle between ads, the poorer side will be defeated: their ads will not be as big or frequent or as professionally produced.

Hence, for those without deep pockets, it may be better to avoid ads altogether and use other methods of getting the message out, such as:

- Using blogs, Twitter and other social media to spread messages
- Doing stunts that gain mass media attention
- Personally calling or meeting people.

Sometimes campaigners, even when they don't have much money, organise ads in the form of endorsements: a short statement about an issue followed by a list of people who support the statement. To raise money for such an ad, contributions are solicited from members and supporters, sometimes from those listed on the ad.

These ads are often used as a counter to a hostile media environment: mainstream media do not cover one side in a dispute, but will publish an ad. Is this effective communication? These endorsement ads are strong in indicating the existence of a point of view and support for it, but are seldom very interesting. They can be beneficial in getting signatories to make a stand. On the other hand, if they require a substantial amount of money from a movement, they may not be cost-effective compared to other options.

The use of ads can affect the media environment. Ongoing expensive ads provide an income flow to media organisations, which then may become more sympathetic, in news stories, to the viewpoint being advertised.

However, an occasional modest ad, such as an endorsement ad, may only cement a viewpoint as marginal: it is of marginal financial value to the media organisation and might even foster a sense that there's no need to cover this viewpoint: proponents can run an ad if they want visibility.

4.3 Talks

Talks still play an important role in many debates. Despite the proliferation of other media, a face-to-face presentation of information and viewpoints can be influential for audiences.

Many talks are to relatively small audiences, anywhere from a handful of people up to hundreds, though a few audiences number in the thousands. Even with a small audience, a talk can be quite influential, because of personal presence. Often the speaker answers questions and may stay behind to chat with audience members, which can motivate participation in campaigns. Organising a speech by a visiting figure can provide a focus for local campaigners, with publicity about the event getting the message out to many who do not attend.

Sometimes media organisations run stories about visiting speakers. Although the speaker may be covering often-repeated views, the speech provides a hook for a story. It is a media opportunity. Sometimes a speech can become a basis for electronic discussion, as audience members send comments through Twitter and other means.

A talk can be recorded and, for example, put on YouTube for others to watch. In a few cases, a film about a speech can become an organising tool on its own. The most famous example is *An Inconvenient Truth,* the film of Al Gore's standard speech about climate change.

Speakers, after they've gained some experience, usually develop their own distinctive styles. Is there an ideal style? Scientists often present lots of facts and results of research. This might be okay for an audience of other scientists, and it can give credibility to the message, but for general audiences it may lack interest, and hence not be very persuasive. Even scientists who are not specialists in the topic usually want to know more about the implications of research than about the data, methods and uncertainties.

Someone who is articulate and passionate, like physician Helen Caldicott on nuclear power, can generate enormous interest. Some audience members are so moved that they want to support the campaign. The down side of this approach can be a loss of credibility. The stereotypical image of a scientist or doctor is of caution, care and balanced judgement. Giving a rousing speech challenges this stereotype.

So what should you do to stimulate interest and convey authoritativeness? A few speakers can accomplish both. Some are able to adapt their style for different audiences. Generally, though, it's useful to have several speakers with different approaches, who can handle different sorts of speaking engagements. At big events, multiple speakers, with different styles, can be effective.

4.4 Mass media coverage

Television, radio and newspapers still play a big role in controversies, despite the rising importance of online and social media. Campaigners like to obtain favourable mass media coverage, naturally enough. There are several ways to do this.

- Media releases, using the "hook" of a new scientific study, a talk, a policy development, a comment on some current development, etc.
- Direct contact with journalists, telling them about something worth reporting
- Events or stunts that are distinctive enough to be newsworthy
- Being available and helpful when journalists make contact.

There's a lot of information available about how to write media releases and more generally to run a media strategy. If your side has plenty of money, it will probably have units with experienced staff to manage the media. For others, without such backing, it's worth learning from written accounts and by talking to sympathetic journalists. There are a few basic things worth knowing.

News values

Journalists and editors use an implicit set of criteria to judge whether a story is newsworthy, namely whether they think it is interesting enough to commit resources to covering it. The criteria are called news values and include, for example, local relevance, conflict, negativity (bad news has priority over good news), personalities and

involvement of prominent individuals and powerful countries. A story about a prominent politician who is personally affected by some problem — Alzheimer's, cancer, depression — is likely to be more newsworthy than a story about hundreds of people maimed or killed in some other country years ago. The politician brings in personality and the issue is current and local.

For stories about controversies and about science more generally, a common problem is complexity and abstractness. Few journalists want to know about positron trajectories or chromosome abnormalities, because they know readers will switch off. In addition, complex science requires a large commitment of resources — especially journalists' time — to adequately understand the issues. Some specialist science journalists can tackle such issues confidently and accurately, but news and current affairs journalists are less likely to touch them. So to make the issues more attractive to the media, campaigners can choose to bring in personal or topical angles. Global warming might be a potential disaster for millions of people in Bangladesh decades from now, but that has low news value compared to declines in beachside property values for local celebrities right now.

The one great advantage for controversy stories is that they involve conflict, a key news value. Editors are not interested in a story about scientists agreeing, but will report on a disagreement. The key task for the side with less credibility is to make sure the media accept there is *credible* disagreement. That brings up the issue of balance.

Balance

Journalists and media owners commonly subscribe to the ideal of balance. The idea here is that journalists, in reporting the news, don't take sides, but give each side fair and honest treatment. This ideal is violated so often in so many ways that many books have been written about it,[6] but the ideal still has sway and is worth taking into account in thinking through how to gain media coverage.

6 On biases in news coverage, see for example David L. Altheide, *Creating Fear: News and the Construction of Crisis* (New York: Aldine de Gruyter, 2002); W. Lance Bennett, *News: The Politics of Illusion,* 3rd edition (New York: Longman, 1996); Kristina Borjesson (ed.), *Into the Buzzsaw: Leading Journalists Expose the Myth of the Free Press* (Amherst, NY: Prometheus Books, 2002); Nick Davies, *Flat Earth News: An Award-winning Reporter Exposes Falsehood, Distortion and Propaganda in the Global Media* (London: Chatto & Windus, 2008); Tom Fenton, *Bad News: The Decline of Reporting, the Business of News, and the Danger to Us All* (New York: ReganBooks, 2005); Edward S. Herman and Noam Chomsky, *Manufacturing Consent: The Political Economy of the Mass Media* (New York: Pantheon, 1988); Alexandra Kitty, *Don't Believe It! How Lies Become News* (New York: Disinformation Company, 2005); Martin A. Lee and Norman Solomon, *Unreliable Sources: A Guide to Detecting Bias in News Media* (New York: Carol, 1990); Bartholomew H. Sparrow, *Uncertain Guardians: The News Media as a Political Institution* (Baltimore: Johns Hopkins University Press, 1999); Paul H. Weaver, *News and the Culture of Lying* (New York: Free Press, 1994). Most of these books treat US news media; experiences in other countries will differ. Furthermore, news media have changed since these books were published. Nevertheless, treatments like these provide useful ideas for understanding media dynamics.

Although a journalist might seem entirely sympathetic to you, to achieve balance the journalist may seek comment from people on the other side. Sometimes this is tokenistic, sometimes more substantive. So the story might be about a new warning from a group of researchers about brain-tumour hazards from mobile phones, but it is likely to include a statement from authorities or other researchers saying there's no danger.

One good way to check for the semblance of balance is to see whether each side in the controversy gets a mention in a story. If not, then you may want to try to get some coverage for your view, in the interests of balance. However, in some controversies the media give only one side: the other side is seldom mentioned at all. If it's your side that's never mentioned, you have a problem! One reason for this is that your side is not seen as credible.

If you're arguing that the earth is hollow and that we all live on the inside, your problem is that nearly everyone will think you're delusional. You will have no credibility with the media, so although you're disagreeing with scientific orthodoxy, and thus trying to stir up controversy, journalists will dismiss you instantly. This is the fate of numerous challengers to orthodoxy, some of whom are highly qualified and develop sophisticated critiques published in scientific journals. Another refutation of Einstein's theory of relativity is not newsworthy, except perhaps if you have personal influence with the editor or you have some other notable accomplishments.[7]

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7 On how challengers to dominant physics theories can proceed, see Juan Miguel Campanario and Brian Martin, "Challenging

Whole issues can be sidelined by some media, whereas other issues are blown up into major news events. When journalists aim for their stories to achieve balance between contrary viewpoints, the reference point for balance can vary depending on the country and the media outlet. In Australia and the US, the midpoint in the climate change debate is whether global warming due to human activities is occurring. When journalists cover both sides of this midpoint, a small number of climate sceptics receive more attention than they would in scientific journals. In some other countries, such as France and Germany, the principle of balance is less important and the dispute over the existence and cause of climate change is less of an issue than other concerns.[8]

It is also possible to imagine the principle of balance being applied with a different midpoint, for example treating the view of the IPCC — namely that human activity is almost certainly contributing to global warming, which warrants significant urgent action — as the midpoint. The two sides, from a media viewpoint, then

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dominant physics paradigms," *Journal of Scientific Exploration,* Vol. 18, No. 3, Fall 2004, pp. 421–438.

8 See, for example, Dominique Brossard, James Shanahan and Katherine McComas, "Are issue-cycles culturally constructed? A comparison of French and American coverage of global climate change," *Mass Communication and Society,* Vol. 7, No. 3, 2004, pp. 359–377. For citations to numerous other studies, see Liisa Antilla, "Self-censorship and science: a geographical review of media coverage of climate tipping points," *Public Understanding of Science,* Vol. 19, No. 2, 2010, pp. 240–256, at p. 243.

would be those who think the IPCC estimates are too conservative, namely that global warming is even more serious and urgent, and those who think the IPCC has over-estimated the problem. In the light of this alternative basis for balance, climate sceptics might be considered so far from the norm as to be treated as a fringe perspective and given little or no attention.

Vested interests

Groups with vested interests, like pharmaceutical, tobacco and oil companies, can influence media coverage, including via advertising, media releases, sponsoring individuals to write opinion pieces, and personal connections with journalists and editors. There's a feedback loop here: public opinion influences media coverage and media coverage influences what issues people think are worth thinking about — and groups with vested interests usually have the resources to push the loop in desired directions. It's a complicated process, but it's possible to pick out a few key types of influence.

Advertising is vital to commercial media, so companies that spend regularly and lavishly on advertising can shift editorial policy. Decades ago, most newspapers and magazines accepted cigarette advertisements and — surprise — rarely ran critical articles about smoking. One of the few major magazines to run anti-smoking stories was *Reader's Digest,* which also refused to accept cigarette advertising. So if you want to see a potential source of media bias, look at the advertising.

Sometimes, news stories will go against the interests of companies that advertise. Revenues from advertising don't necessarily determine decisions.

Media ownership is a key influence. Media seldom will take strong stands against the interests of their owners. Consider the debate about violence in the media, especially television. There's research showing that this contributes to more violence among viewers, but don't expect to see it getting much media attention — especially on television.

Don't expect to see media owned by Rupert Murdoch criticising Murdoch and his business practices, or even reporting scandals that might damage Murdoch's reputation. There's little balance in reporting when the reputation of owners is at stake.

Friendships and personal connections sometimes influence media coverage. If the editor is friends with a doctor or business executive, then the views of the doctor or business executive might affect some editorial decisions. This is more likely with smaller, local media. If you and fellow campaigners get to know journalists, editors and owners, this might help your cause. However, inside influence can be seen as unfair, so it might be better to push for fairness rather than preferential treatment.

Public opinion can influence media coverage. If "everyone" — all sorts of people in all walks of life — thinks an issue is important, then it will come up in conversations involving journalists and editors, for example through family, friends, letters to the editor, mentions in other media and a host of other ways. Getting lots of people concerned about an issue is exactly what

campaigners try to do. This can lead to greater and more sympathetic media coverage.

In summary, groups with vested interests can influence media organisations in various ways, often leading to favourable coverage and sometimes silencing contrary perspectives. However, the role of vested interests varies from issue to issue and also depends on circumstances. Journalists and editors, in search of a good story, can and sometimes do go against the interests of powerful groups.

Defamation

Media organisations can be sued — and sometimes are. If someone is mentioned in a news story or opinion column and doesn't like it, they can sue for defamation. The risk of being sued for defamation or on other grounds can influence media coverage of an issue.

Suppose some leading figures on the other side — outspoken doctors — are being sponsored by large companies, let's say by pharmaceutical companies. You want to expose this conflict of interest and therefore try to get media organisations to do stories on it. Journalists might think it's a good story, and maybe the editor does too, but a large media organisation will send the story to its legal department first. Lawyers know there's a potential for being sued by the doctors or perhaps even the pharmaceutical companies. So they might recommend spiking (not publishing) the story, or perhaps making deletions and changes to lower the risk of legal action. Journalists and editors gradually learn what is likely to be approved by the lawyers, and become more cautious. After

all, why put lots of energy into researching and writing a story if it's going to be spiked?

The result is a "chilling effect": the risk of being sued makes media less eager to investigate and publish in certain areas.[9] Nevertheless, they will run a story if they think it is accurate and sufficiently newsworthy to outweigh the cost of a legal action. You can get around this chilling effect of defamation law by publishing the information yourself on websites. You might be sued too, but perhaps not — you might be too low profile to be worth bothering with.

4.5 Online

Websites

Just about every organisation has a website. Do websites make a difference? The short answer is yes. When people hear about an issue, maybe from a news story or via a comment from a friend, they may put a few words into a search engine and check out what they find. If your website is visible on the first page of links, you'll receive a lot of hits. If your organisation is known, people will search for it and find it.

You might have a static website with lots of information, or an interactive one with lots of pictures, videos and flashing lights. What's the best design? There's no simple answer. It's useful again to look at the criteria: visible,

9 Eric Barendt, Laurence Lustgarten, Kenneth Norrie and Hugh Stephenson, *Libel and the Media: The Chilling Effect* (Oxford: Clarendon Press, 1997).

understandable, informative, credible, interesting, persuasive, honest, thought-provoking and cost-effective.

The way to proceed depends a lot on your group and what you are trying to achieve. Being provocative and funny might appeal to some audiences, but repel those looking for authoritative comment. Lots of fancy effects on the site might look superficially attractive but make it harder for readers to navigate.

Skilled web designers can help make your site look the way you'd like. Here I mention only a few things relevant to controversies.

• Scientific content. It can be worthwhile providing links to important research findings, or even hosting them on the site. This helps demonstrate the credibility of your case. However, most scientific papers need, in addition, some interpretation for non-specialists, for example an accessible summary or an outline of implications.

• Navigation. As your site grows larger, it can be harder for readers to find their way around. Many will arrive at some internal page as a result of a search, rather than entering via the home page. A clear structure can aid readers. A clear website structure ideally will reflect a clear understanding of the issues. For example, you might want to break down the arguments into benefits, risks, ethics, politics and other relevant categories.

• Links. Most likely, your site will be one of several or many on the topic. Links to other sites are important for supporting each other.

• Interactivity. Do you want to allow members or anyone to comment on blogs, or contribute on the site in

some way? If so, you will probably need more resources, to moderate discussions. Opponents may comment.

• Contacts. Many who visit websites want to contact an individual, to ask questions or possibly to support the cause. If your site has email addresses or phone numbers, make sure enquiries are promptly answered.

Website conflicts

You can control your own website, to a fair extent. But your digital presence extends further: your group might be mentioned on other websites, and your issue and your perspective could be discussed all over the place.

Wikipedia has become the first stop for many people who want an introduction to a topic. So if they hear about an issue — fracking, cholesterol or deforestation — they may look first at the Wikipedia entry. When using search engines such as Google, Wikipedia entries often rate highly.

Wikipedia is an amazing creation, produced by volunteers, and is by far the largest and most dynamic encyclopaedia available. According to some assessments, it is roughly as accurate as conventional encyclopaedias in which the entries are written by experts.[10] The strength of Wikipedia is openness to revision by any interested person, but this makes controversial issues subject to battles over the content of entries. Furthermore, some individuals, governments and corporations employ staff to

10 A good place to start investigating this issue is Wikipedia's own entry on "Reliability of Wikipedia."

edit Wikipedia entries.[11] The stronger the vested interests involved, the more scrutiny is needed.

If you are championing a minority position, with relatively few supporters, you may find the Wikipedia entry on your issue to be one-sided. Those on the other side, either with dozens of enthusiastic volunteers or some paid staff, monitor the entry and, whenever you make a change, immediately reverse it. What should you do?

One option is to organise lots of volunteers on your own side to make the entry more balanced. This might seem like a lot of work for a minor gain, because all your changes could be overturned later. It might be worthwhile if the volunteers, through their engagement with Wikipedia battles, become more knowledgeable and committed.

Another option is to not worry about Wikipedia but instead seek to promote your views in other ways. If you gain greater support, then some sympathisers — quite unknown to you — may edit the Wikipedia entry.

Overall, you need to decide how important Wikipedia is in the wider context of your web presence and your overall strategy.

Social media

Some activists see their goal as to get their views into the mass media, preferably television. However, there are all sorts of other ways to communicate, through email, blogs, texting, Facebook, Twitter and others existing and to be introduced. Often it's good to have a solid reference base,

11 See "Conflict of interest editing on Wikipedia," http://en.wikipedia.org/wiki/Conflict_of_interest_editing_on_Wikipedia

typically accessible by a web link, and disseminate the key ideas and the link through various media.

Social media provide a convenient way to communicate within groups, to organise meetings and events, especially to bring people together at short notice. If an important item appears, in the news media or on a blog, supporters can be contacted immediately and perhaps encouraged to add their comments.

Social media add a new dimension to communication. They are unlike old media of newspapers, television and radio, which are mostly non-interactive and communicate from a small group (owners, editors and journalists) to a much larger audience. Social media are in the tradition of the face-to-face conversation and the telephone: interactive and instantaneous. What they add to face-to-face interactions is the capacity to communicate at a distance at low cost, with multiple participants. What they may lack are the subtleties of voice-to-voice interaction.

Social media are having a huge impact on the way people, especially young people, interact with each other and the world. What special implications are there for scientific controversies?

In a face-to-face conversation, you can say something and there's no permanent record. In contrast, an email or text creates a record that can be saved. That means it has become much more risky to say or do anything that can be used to discredit you. If you tweet "we don't worry about the hazards," and the other side gets hold of it, you might have undermined the credibility of your claim to be carefully considering the hazards (which you think are

negligible). The same risk sometimes applies even with public lectures and telephone calls, because recording is so easy and recorders can be hidden.

The behaviour of News Corporation journalists in hacking into people's telephones is notorious, so does that mean you should be wary of using your telephone? If it is any consolation, News Corporation journalists apparently didn't bother hacking the phones of participants in scientific controversies — not newsworthy! It is also worth remembering that when the hacking was exposed, it triggered a massive backlash against Rupert Murdoch's media empire.

It is wise to be careful when writing emails, texts or tweets. Pause and imagine the words being read by your worst enemies.[12] However, when communicating with friends, it is also wise not to be too inhibited. Even if the other side is listening, paranoia can be more debilitating than revealing messages.

Open online forums

If your group runs a blog or email list or Facebook page, it is potentially vulnerable to disruption by opponents. If anyone can contribute to the blog or join your organisation and get on the email list or join the Facebook page and post comments, they can behave in various ways.

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12 For an informative treatment of online legal issues, see Mark Pearson, *Blogging & Tweeting without Getting Sued: A Global Guide to the Law for Anyone Writing Online* (Sydney: Allen & Unwin, 2012).

• They might just monitor what's going on, taking note of who says what. These are lurkers, and are not disruptive.

• They might post polite questions, comments or corrections. They might do this out of genuine interest, or to see how people respond, or to push the discussion in a preferred direction. This could be valuable, making the discussion more stimulating, or a distraction.

• They might post aggressive challenges to the core views of your group. They might do this simply because this is their style and their views, or to cause disruption. One risk is that members of your group will respond in kind, causing an escalation of rhetoric that is neither informative nor helpful in developing arguments.

• They might use abusive language and make contemptuous comments about members. Against, this could be their style or it could be part of a calculated campaign of disruption.

• They might pose as members of your group — for example by setting up fake email addresses or Facebook pages — and make outrageous or derogatory or abusive comments about your opponents, in order to discredit your side. In other words, they pretend to be on your side, behave badly, and hope it will reflect badly on you.

• They capture images from your discussions and post them on their own discussion forums, making fun of them. If done in a public way, this might discourage some of your less confident members from contributing.

In summary: an open forum seems like a good way to have a discussion, but if opponents have the numbers and

inclination, they can be highly disruptive. One obvious solution is careful moderating of discussions, with rules designed to discourage abuses and to keep the discussion on track. Be prepared for allegations of censorship![13]

4.6 The opponents' communication

The counterpart to communication among those on your side is communication among those on the other side. Should you do anything about it? It can be frustrating witnessing exaggerations, misleading claims and outright lies. It can be annoying when the other side accuses you of having vested interests when actually their own vested interests are far greater.

Is it ever wise to try to block or interrupt communication by the other side? There are a number of possibilities.

- Heckle at talks
- Join discussion lists and make numerous contributions, overwhelming their normal topics with your own agendas
- Lobby to have venues withdraw their hosting of talks or conferences
- Picket talks by opponent speakers
- Steal computers and phones
- Make complaints about their website to downgrade its rating

13 Brian Martin, "Online onslaught: Internet-based methods for attacking and defending citizens' organisations. *First Monday: Peer-Reviewed Journal on the Internet,* Vol. 17, No. 12, 3 December 2012.

- Hack into opponent communication systems and redirect messages
- Take over opponent web domains
- Sue for defamation
- Throw objects, such as eggs and pies, at speakers

These sorts of methods have a potential to disrupt opponents' internal communications, prevent their message getting to audiences, or perhaps even inhibit them from speaking at all. Just to be clear, I do not endorse any of these methods.[14]

Monckton and free speech

Christopher Monckton is a prominent climate change sceptic. Many climate scientists think his views have no credibility. Nevertheless, he is able to obtain considerable publicity for his views, helped by sponsorship from greenhouse-gas-intensive industries.

Monckton was invited by Notre Dame University in Fremantle, Western Australia, to speak on 30 June 2011. A climate activist organised an open letter to the university to withdraw its speaking invitation; the letter was signed by many academics, including climate scientists. Was this a good strategy?

The rationale of Monckton's critics was that he had plenty of opportunities to present his views elsewhere, but that a university shouldn't be giving him credibility. Whatever the rationale — or rationalisation — it was easy for the open letter to be portrayed as censorship.

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14 For responding, see "Censorship backfire" below, and chapter 7. On ethical considerations, see chapter 8.

Rather than trying to have Monckton's invitation to speak withdrawn, some other options would have been to ignore it, to use it as an opportunity to present information about climate change, or to host a different speaker at the same time.

Censorship backfire

Censorship is widely seen as unfair. Therefore, being involved in attempted censorship, or what can readily be labelled censorship, is not a good idea. Attempts to block or interrupt the speech of opponents can be risky.

Powerful censors, like governments, can use several methods to reduce outrage over their actions.[15]

- Hide their actions, for example when politicians use influence behind the scenes to block publication of unwelcome stories
- Denigrate targets of censorship, or opponents of censorship,
- Reinterpret actions as being something other than censorship, or as not serious, or as someone else's responsibility
- Use courts or agencies to give an official stamp of approval for policies
- Intimidate opponents

The Australian government intervened in the euthanasia debate by trying to prevent access to information on methods for peaceful death, by

15 Sue Curry Jansen and Brian Martin, "Making censorship backfire," *Counterpoise,* Vol. 7, No. 3, July 2003, pp. 5–15.

banning books, criminalising providing information by telephone and putting euthanasia websites on a list of websites to be blocked in a proposed Internet filter. It used all five of the methods to reduce outrage over its censorship.

- It hid the list of sites to be blocked by the Internet filter.
- It denigrated opponents by putting them in the same category as others on the filter list, most of which involved pornography.
- Without any good evidence, it justified censorship as being necessary to prevent suicide by young healthy people.
- It passed laws to present circulation of information about methods for peaceful death.
- It threatened legal action.[16]

To challenge censorship, each of the five methods for reducing outrage can be challenged:

- Expose the censorship
- Behave well and provide evidence of being a valued member of the community
- Describe the actions as censorship
- Mobilise support; don't rely on formal channels such as courts or government agencies
- Resist intimidation

16 Brian Martin, "Techniques to pass on: technology and euthanasia," *Bulletin of Science, Technology & Society,* Vol. 30, No. 1, February 2010, pp. 54–59.

The classic case is called McLibel. In the 1980s, anarchist activists in the group London Greenpeace — not related to the environmental organisation Greenpeace International — produced a leaflet, "What's wrong with McDonald's?" The leaflet presented information about the health effects of McDonald's food, bad treatment of workers and environmental impacts of beef production, among other topics. McDonald's, notorious for being intolerant of criticism, infiltrated the group, collected evidence and sued five members for defamation. Three members gave in to the threat, but two — Helen Steel and Dave Morris — resisted. Their resistance helped turn the defamation action into a massive public relations disaster for McDonald's.[17]

Steel and Morris and their supporters used all five methods to promote outrage.

- They publicised the actions by McDonald's. When McDonald's offered a settlement of the case, with a condition that they cease their criticisms, Steel and Morris refused.
- Steel and Morris behaved impeccably. As ordinary workers (gardener and postman) on modest incomes, they could not be attacked for being involved for the money.
- McLibel campaigners successfully labelled the defamation action as censorship.

17 John Vidal, *McLibel* (London: Macmillan, 1997); see also Fiona J. L. Donson, *Legal Intimidation: A SLAPP in the Face of Democracy* (London: Free Association Books, 2000).

• They organised rallies, set up a website and distributed thousands of copies of the leaflet, using publicity rather than relying only on a legal defence.
• They refused to give up.

If opponents try to disrupt your communication, you need to decide what to do. There are no automatic answers, because so much depends on the circumstances. It's always worth thinking about options.

Query Our website on the risks of vaccination is attractive and persuasive. It's a primary tool for getting our message out. On the web, there's a service called the Web of Trust that rates websites. It's primarily designed to warn parents against sites they wouldn't want their young children visiting. However, our energetic opponents have filed numerous complaints about our site to the Web of Trust, so anyone who uses the service receives a warning that our site is not to be trusted. What should we do?
Response Consider these options.
Option 1. Do nothing. People who care about the issue won't take any notice. This is the easiest option, and is attractive if your members are fully engaged on more important tasks.
Option 2. Make a complaint to the Web of Trust about the organised campaign. This might be worthwhile, but the Web of Trust is likely to say it won't intervene.
Option 3. Mobilise your members to put in favourable ratings on the Web of Trust. This could be worthwhile if you have members who would like to help. It could get them reading your website!

Option 4. Encourage your members to make bad ratings of the opponent's website on the Web of Trust. However, this could contribute to a downward spiral of bad behaviour.
Option 5. Put information about the opponents' campaign on your website, and notify your members. This exposes the unfair tactics used by the opponents.

The key point is to consider a range of options in the light of the capacities and goals of your organisation, your allies and your opponents.

Replying to Lomborg

In 2001, Danish economist Bjørn Lomborg published *The Skeptical Environmentalist,* a frontal attack on conventional scientific views about species loss, climate change and other issues. In essence, Lomborg said things are not nearly so bad as claimed by "alarmist" environmentalists, and that priorities for fixing the world's problems should be different. In 2007, Lomborg published *Cool It,* a much shorter book focusing on climate change.

What should scientists and campaigners have done in response to Lomborg? Many were inclined to ignore him, because his claims seemed outrageous and had not been subject to peer review: they lacked expert credibility. The trouble was that Lomborg appeared credible — *The Skeptical Environmentalist* had nearly 3000 footnotes and was published by Cambridge University Press — and was given massive attention by business lobbies that stood to gain by acceptance of Lomborg's message.

In 2010, Howard Friel's book *The Lomborg Deception* was published by Yale University Press.[18] Friel noted that scientists had challenged Lomborg's claims soon after publication of *The Skeptical Environmentalist* was published, but no one had systematically gone through Lomborg's use of evidence. After all, 3000 footnotes are a lot to check!

The Lomborg case illustrates a more general dilemma. What is the most effective way to respond to an opponent who, by producing work that uses scholarly methods of mustering and citing evidence, seems superficially credible but you believe is actually misleading due to selective use of evidence and sources and other forms of bias? The average reader might be taken in by the appearance of scholarship and not be able to probe more deeply into the content.

One option is to try to make derogatory comments about the author — Lomborg in this case — or try to prevent him being given opportunities to present his views in talks or articles. This is risky: it can be interpreted as censorship and give Lomborg extra status as a persecuted dissident.

Another option is to ignore him. Most scientists ignored Lomborg and went about their business. But this essentially gave the floor to him.

Friel used the approach of a careful deconstruction of Lomborg's arguments. This is potentially powerful, but

18 Howard Friel, *The Lomborg Deception: Setting the Record Straight about Global Warming* (New Haven, CT: Yale University Press, 2010).

who is going to read it? Friel's *The Lomborg Deception* is virtually unknown compared to *The Skeptical Environmentalist.*

To have a chance of countering Lomborg in a timely fashion, it would be necessary to combine a careful critique like Friel's with campaigning techniques, to communicate shortcomings in a punchy, accessible way.

The lesson is to take people like Lomborg seriously and to counter them in both detail and in publicity. Not easy. The easier route is personal attack, but it can be counterproductive.

Finally, it would be possible to directly engage with Lomborg, writing to him and raising questions about his methods and conclusions.[19] This direct approach is always worth considering. Some won't respond, but for those who do, it may be possible to develop a fruitful dialogue. Sometimes people like Lomborg modify their views. You might decide to change yours too!

4.7 To debate or not to debate?

You've been invited to participate in a public debate. You'll be facing an experienced opponent. Should you accept?

Debates are a regular feature of public controversies. They might be in a public meeting, at a government hearing, on radio or television, or take the form of side-by-side texts in a newspaper or magazine. Debates can be

19 Lomborg responded to Friel's critique, and Friel in turn to Lomborg. Check online for the latest on this engagement.

exciting and illuminating to audiences, and some editors like to pit antagonists against each other.

The advantage of agreeing to debate is that you get to present your viewpoint. It's a prime opportunity, given that some audience members may make up their minds based on what they hear.

However, there can be a downside. The existence of a debate implies there are two positions worth considering. Suppose you are on the side of orthodoxy, faced by what you consider to be fringe or dangerous challengers. By debating, you may appear to give them a degree of credibility by accepting there is something to argue about.

For this reason, challengers to orthodoxy are nearly always more willing to participate in debates. Defenders of orthodoxy might prefer to stay away. Few biologists want to join a debate with creation scientists. Similar thinking can apply to debates about climate change, fluoridation and vaccination. Engaging with opponents can give them more credibility.

There's another matter: the skills of the debaters. Some challengers to orthodoxy become very good, through lots of practice, and are more than capable of embarrassing a knowledgeable scientist who is not used to the cut and thrust of public argument. This problem is exacerbated when there are few opportunities to practise.

If you're on the side of orthodoxy, there is a risk in declining an invitation to debate: it can appear arrogant. Opponents might say you're afraid to debate. Potential audiences might imagine that you don't have any good arguments.

In some instances, when a radio or television host invites experts or partisans to join a discussion or debate, those on one side refuse to participate if a certain well-known opponent is there too. Their thinking is that engaging with this notorious opponent is stooping too low. There's a risk, though, that the media host will decide to interview your opponent unchallenged. Which is worse, to give your opponent the stage or to join a debate and risk giving your opponent credibility?

Some campaigners do what they can, behind the scenes, to rig the debate in their favour. They might cultivate the moderator, demand unequal conditions, rule out certain speakers or ensure that the debate is not broadcast uncut. If you suspect that such machinations may occur, it is wise to be cautious and to learn as much as possible about those involved before committing to anything. Often the best source of information is people who have been involved in previous debates.

There is one final drawback in refusing to debate: people on your side then have limited opportunities to develop their debating skills. Finally, it is worth remembering that few people are greatly influenced by debates. Most of those likely to be interested already have strong views, and they will interpret the claims made through their own lenses, with confirmation bias shaping their assessments of the debaters and their arguments. So it's not the end of the world if you do poorly. There will always be further opportunities.

"The professional proponents of fluoridation, as a rule, refuse to discuss the subject in public meetings or

debate fluoridation with anyone who opposes it in public forums."[20]

"Several authors have recommended that debates be avoided and I concur with this recommendation. There is little to gain and much to lose from debating an emotional issue like fluoridation. A debate simply serves to give more credibility to fluoridation opponents."[21]

"Whether or not to participate in radio or TV talk shows or debates on fluoridation poses a real dilemma for the dental researcher … by refusing to appear on such programs, there is always the risk of permitting the antifluoridationists free rein."[22]

"During the weeks preceding the election, several organizations, including the Parent-Teachers Association and the League of Women Voters, tried to set up forums at which pros and cons of the [fluoridation] issue could be debated. The proponents were in the embarrassing position of turning down these offers. Many who were sympathetic to the proponent cause

20. Charles Eliot Perkins, *The Truth About Water Fluoridation* (Washington, DC: Fluoridation Educational Society, 1952), p. 7.

21. Robert Isman, "Fluoridation: strategies for success," *American Journal of Public Health,* Vol. 71, No. 7, July 1981, pp. 717–721, at 721.

22. Ernest Newbrun, "The public's oral health and the dental research community — participant or observer?" *Journal of Public Health Dentistry,* Vol. 45, No. 4, Fall 1985, pp. 208–212, at 211.

> but not actual members of the partisan group were bewildered by this apparent high-handedness and evasiveness. … when the proponents' strategy involves the avoidance of public debate and the appearance of keeping back information from the public, they [local physicians, dentists and public health officials] find themselves in the position of the irresponsible partisans who are violating the community norms of fair political play and widening the breach between sides."[23]

Factors to consider when deciding whether to debate

- The audience
- The knowledge, skills and experience of the debaters
- The format of the debate
- The attitude of the host of the debate
- The risk of giving credibility to the other side
- The risk of appearing arrogant
- Development of debating skills

23 Harry M. Raulet, "The health professional and the fluoridation issue: a case of role conflict," *Journal of Social Issues,* Vol. 17, No. 4, 1961, pp. 45–54, at pp. 51 and 52–53.

Nuclear power

What it is

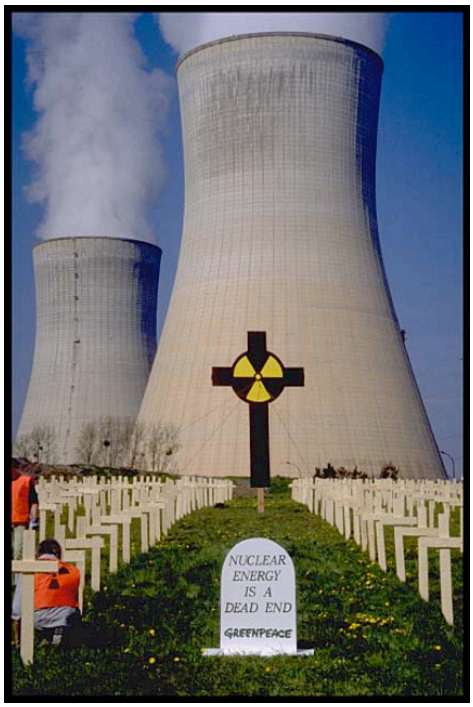
Nuclear power is the production of electricity using heat from controlled nuclear fission, most commonly from the splitting of the uranium atom.

Arguments for

• Nuclear power is an abundant source of high-grade energy.
• Greenhouse gas emissions are very low.
• Only a small amount of uranium is needed to produce a large amount of power.
• Costs are low, especially after construction of power plants.
• Environmental impacts are low compared to burning coal.

Arguments against

• Nuclear power plants can suffer meltdown accidents such as at Chernobyl and Fukushima.
• There is no proven method for securely disposing of long-lived radioactive waste.
• Nuclear facilities and nuclear expertise can be used to develop the capacity for nuclear weapons.
• Nuclear power is expensive.
• Nuclear facilities are potential targets for terrorists.
• To protect against accidents and against criminal and terrorist use of nuclear materials, civil liberties are compromised.



Experts and authorities

Many nuclear scientists and engineers support nuclear power. Some governments support nuclear power; others reject it.

Groups with vested interests

In most countries, government agencies run and tightly regulate nuclear power; they have a stake in this type of power. Companies involved in the various components of nuclear power production — uranium mining, plant construction and operation — benefit via income and profits.

State of play

Nuclear power plants produce about 10% of electricity worldwide, a small but significant fraction. Only a few countries are expanding their nuclear programmes; others are phasing them out.

Alternatives

Energy efficiency and renewable energy sources such as solar and wind power are alternatives to nuclear power.

5
Working together

Campaigners in scientific controversies often set up groups. Many of these groups are local and short-lived, whereas others become the face of an issue over a long period, such as the National Vaccine Information Center in the US, a node for vaccination critics since the 1980s.

There are a lot of things that can be said about groups, for example about constitutions, meetings and membership. Little of this is specific to groups dealing with scientific controversies. Here I'll touch lightly on topics relevant to citizen groups, raising them rather than dealing with them in depth.

5.1 Set up a group?

Many campaigners assume that to be involved in an issue, a group is essential. There are certainly advantages to having a group. It provides a place for like-minded people to get together, share insights and plan campaigns. It can develop a media profile and thus becomes a magnet for greater involvement. It can acquire resources, such as a library and financial reserves to fund campaigning efforts.

On the other hand, the existence of a group can cause problems. It sometimes can be a scene for squabbling and vicious power plays that alienate potential supporters. More effort can be put into maintaining the group — membership, newsletter, meetings — than in campaigning. If controlled by a few individuals, it can restrict initiatives.

Worst of all, it is susceptible to cooption, if the other side has lots of money. Some consumer health groups, oriented to providing support for people with particular diseases, are funded by pharmaceutical companies and become their de facto agents.

So before setting up a group, or joining one, it is valuable to think carefully about goals and methods. It is also worth thinking about different ways of going about things.

5.2 Groups versus networks

A group typically meets together regularly and/or has a formal structure with things such as a constitution, membership fees, and annual meetings. A network is less structured. It might be a list of people who can contact each other as the need arises. Even when there's a formal group, there is usually an associated informal network of people known to core group members.

There are all sorts of possibilities for groups and networks.

• *Office bearers, such as president, treasurer and secretary.* Formal organisations usually have these. They provide figureheads, sometimes useful for the media. Networks don't usually have office bearers — they might have spokespeople instead, for liaison with the media.

Formal offices give a degree of status and power to those in the positions, especially if they are paid. This can cement the involvement of these individuals, but there's a risk of power struggles. Those who are excluded from the positions, or who feel power is being abused, or who

simply disagree with decisions made, may try to destabilise the group or set up a rival one.

• *Constitution.* This is a set of rules for behaviour and operation, for example covering membership, elections, meetings and disputes. There's no obligation to have a constitution. If your group is small and works well together, you can happily proceed without formal rules. However, larger organisations often benefit from having constitutions, because the rules provide a way to ensure accountability and deal with power struggles.

• *Bank account.* If the group has membership fees, employs staff, receives substantial donations, pays rent or has any other significant financial transactions, a bank account is essential. However, for networks and small groups, it can be possible to get by without one. Members can contribute time, money, photocopying or whatever is needed for a task. Alternatively, you may be able to use another group's bank account for special events.

• *Meetings.* A local group, where members live fairly close to each other, can have regular meetings. A dispersed network, on the other hand, might not have meetings at all.

What is worth doing at meetings? In formal organisations, with constitutions and office bearers, there may be processes such as approving the minutes of the previous meeting, reports from office bearers, motions and votes. This sort of administrative process can be just a routine, dealt with quickly, or turned into a lengthy and tedious chore. You need to consider what is really useful for achieving the goals of the group, not just maintaining the group's existence.

Small informal organisations don't need to have minutes, formal reports or motions. They typically operate using consensus, which is a common agreement reached after discussion.

• *Website.* Having a web presence has become standard for organisations. It is the easiest way to provide information. A prominent website with a distinctive title or theme will rate highly in web searches, and thus becomes a way of connecting with potentially interested people, some of whom might join your group or become active on the issue.

• *Alliances.* If two or more groups are campaigning on the same issue, it might be worth joining together. One option is simply to keep in touch with each other and coordinate activities. Another is a formal connection. This can be done by becoming affiliates of a single organisation or by setting up an umbrella group, of which various groups can be members.

• *Ad hoc operations.* For a particular task, a group can set up a task force or subcommittee. Usually, subgroups like this are constrained by guidelines and precedents from the full group.

• *Guerrilla operations.* Some campaigners prefer to avoid formal processes and to take action covertly.

Starting in 1979, Australian activists refaced tobacco company billboards with anti-smoking messages, often humorously, as well as targeting advertising for other unhealthy products. They used the label BUGA-

UP.[1] Anyone who used the BUGA-UP moniker was a de facto member of the enterprise.

Guerrilla operations are sometimes organised but can be more spontaneous. An example is the smart mob, organised on the spot or on the run, typically using social media. Smart mobs can be used to demonstrate concern about an issue, for example with protesters suddenly appearing and then fading away.[2]

These various options are relevant to all sorts of groups. What are the special considerations for those involved in scientific controversies?

First, credibility is especially important. Mobilising supporters is important, whether for sporting teams or controversy campaigns, but in some situations a degree of understanding of the issues is vital. At a public meeting, especially one in which well-informed but uncommitted people are present, it can be counterproductive for supporters to ask silly questions or make ignorant comments. At a rally, journalists might ask a random member of the crowd their reasons for attending. An answer of "Sally told me to come" does not enhance credibility as much as "I'm concerned about the environ-

1 Billboard Utilising Graffitists Against Unhealthy Promotions. Spoken out loud, this sounds like "bugger up" meaning to spoil or mess up. BUGA-UP activists spoiled or disrupted the original billboard messages, transforming them into something they saw as closer to "truth in advertising."

2 The classic reference is Howard Rheingold, *Smart Mobs: The Next Social Revolution* (Cambridge, MA: Perseus, 2003).

mental and social impacts." In such circumstances, *informed* participation may be more important than larger numbers.

Second, the role of experts is crucial. Experts on your side might best play a role as active campaigners, as figureheads, as advisers or as nominally independent commentators. Different roles may suit different scientists. Your organisational structures need to cater for different roles. Some active campaigners may like organisations with elected officers and formal meetings, whereas a few may prefer being in a small non-hierarchical team. Some scientists may want the status of being the president or chair of an organisation. Others may want to be seen to be independent but are willing to give practical advice, for example on writing articles or preparing questions for politicians. Yet others are sympathetic but prefer to be at arm's length, perhaps liaising with one or two like-minded individuals.

If lots of scientists are supportive, as in the case of climate change science, then organisations can most usefully provide avenues for them to become more active in campaigning. If only a few experts are sympathetic, as in the case of climate scepticism, then providing a platform for them may be more important.

Third, existing organisations are important, especially large and prestigious ones. If a scientific organisation that offers membership only to outstanding scientists — such as the Royal Society (in Britain) or the National Academy of Sciences (in the US) — takes a stand on an issue, this has enormous power as an endorsement. Professional

associations, such as of cardiologists or entomologists, can also provide influential endorsement.

Aside from endorsements, though, large, traditional organisations can be cumbersome as supports for campaigning. Usually, members shy away from activism and many are reluctant to compromise their dignified status by getting involved in the rough-and-tumble of activism. One way to deal with this is to set up subcommittees, for example the fluoridation subcommittee of a dental association, to allow committed campaigners an outlet while retaining the authority of the larger organisation. However, subcommittee campaigners need to be careful not to alienate their larger professional constituency. Members of professional associations might be uncomfortable being affiliated with campaigners taking extreme stands, using abusive language or engaging in civil disobedience.

Rather than relying on endorsements or affiliations, another option is to set up different sorts of groups, such as small consensus-based groups, to carry out campaigning efforts. However, few scientists are likely to be comfortable in such groups. In some cases, scientists' concerns to make accurate statements and include careful documentation may clash with campaigners' preference for memorable slogans. In principle this tension can be resolved; in practice, doing so may be a lengthy and stressful process.

Fourth, some organisational forms are more suited to certain sorts of campaigning. If lobbying is a primary mode of action, then a formal organisation may give greater credibility. On the other hand, if civil disobedience

is an important technique, then a smaller, more flexible organisation or network might be better, with links to lawyers and support networks.

An important consideration is vulnerability to attack. A large prestigious organisation might prefer that its reputation not be put at risk by being associated with radical agendas or direct action methods, so campaigners preferring these approaches need to think about setting up independent operations. Another risk is direct attack on an organisation, for example by legal actions, police raids, surveillance, destruction of equipment, seizure of assets, criminal charges and physical assault. Some practitioners of alternative health therapies have had their practices closed down. Famously, US forest campaigners Judi Bari and Darryl Cherney were injured when a bomb exploded in their car, with Bari suffering severe injuries. It is widely believed the bomb was planted by police agents, yet Bari and Cherney were charged. In countries with repressive governments (including some that are nominally "democratic"), environmental and animal rights campaigners are sometimes treated as enemies of the state.

In situations of high risk or serious danger, organisational structures need to be light and flexible. A formal group with large fixed assets is a sitting target. It may be better to operate using a network, with no headquarters, and perhaps even with most participants being "off the books": if there is no membership list, opponents (including government authorities) cannot destroy the group as easily by harassing individuals.

For scientists and others with established reputations and who work in high-status institutions, it may seem

unnecessary to be worried about scenarios involving serious threats. However, anyone who takes a stand when vested interests are involved is potentially at risk. Even when the risks are low, it can be useful to think through possible dangers and prepare accordingly. This includes thinking carefully about organisational structures.

5.3 Organisational functioning

Your group may be a model of effective operation. Everyone has a role — in finance, outreach, media liaison, campaigning, research or other areas — and does it well. Administration is kept to a minimum so the real business can be done. Meetings are stimulating and efficient. Members get on well with each other and find it a joy to be involved. Leadership is inspiring. Communication is clear and efficient. When there are disagreements and tensions, skilled members are ready to address them using well-developed conflict-management processes, thereby strengthening the organisation.

If you're involved in a group like this, first pinch yourself to make sure you're not dreaming, and then enjoy every moment. It may be only a temporary period in paradise.

The more common experience in groups involves dysfunctions of various sorts: power plays, put-downs, poor communication, boring meetings and perhaps even bullying and corruption. This can be extremely frustrating when there are lots of people committed to the cause but who are put off by unpleasant experiences.

How to deal with poorly functioning groups is a major topic of its own.[3] Here, I look only at a few aspects relevant to groups involved with scientific controversies.

One common problem relates to the involvement of scientists. Like people in other occupations, scientists vary in their interpersonal skills. Some successful scientists are leaders of research teams and may have great skills in encouraging others to perform at their best. However, research teams are usually different from campaigning groups.

Scientists, especially elite scientists, are used to having others do routine tasks such as maintaining files or organising activities. In a campaigning group with

3 For conventional workplaces, see for example Seth Alcorn and Michael A. Diamond, *Managing People during Stressful Times: The Psychologically Defensive Workplace* (Westport, CT: Quorum, 1997); Manfred F. R. Kets de Vries and Danny Miller, *The Neurotic Organization: Diagnosing and Changing Counterproductive Styles of Management* (San Francisco: Jossey-Bass, 1984); Anne Wilson Schaef and Diane Fassel, *The Addictive Organization* (San Francisco: HarperSanFrancisco, 1990); Howard S. Schwartz, *Narcissistic Process and Corporate Decay: The Theory of the Organization Ideal* (New York: New York University Press, 1990). For egalitarian groups, see Charles Landry, David Morley, Russell Southwood and Patrick Wright, *What a Way to Run a Railroad: An Analysis of Radical Failure* (London: Comedia, 1985); Howard Ryan, *Blocking Progress: Consensus Decision Making in the Anti-nuclear Movement* (Berkeley: Overthrow Cluster, Livermore Action Group, 1985); Delfina Vannucci and Richard Singer, *Come Hell or High Water: A Handbook on Collective Process Gone Awry* (Edinburgh: AK Press, 2010).

members with differing backgrounds and skills, it might work fine to have the scientists being the experts and others doing routine tasks. However, this can be a source of tension or worse, especially if scientists are arrogant about their special knowledge.

For non-scientists, it is useful to remember that becoming a scientist requires years of specialised training but seldom involves extensive practice in interpersonal skills. Scientists vary quite a lot in their personalities, especially their sensitivity to other people. Some of them believe in the idea of natural talent and imagine, because they have excelled in intellectually challenging domains, their insights into campaigning, group dynamics and organisational dilemmas are similarly penetrating. In other words, they may be unaware of their own inadequacies. If keeping scientists in a group is important, then great care is needed to help them learn appropriate group-related skills, perhaps without them realising what you are doing.

Anyone with high-level expertise is susceptible to the same shortcoming of seeing themselves as a privileged member of the group. This includes some people who, though lacking specialist training, can develop advanced levels of understanding through reading, writing, networking and debate. Their self-perception as experts sometimes causes difficulties in the functioning of groups.

One common problem is that a few individuals, sometimes just one, become the ruling gurus in an organisation. Typically they have either exceptional specialist expertise or long campaigning experience. Lord Acton famously said, “Power tends to corrupt and absolute

power corrupts absolutely."[4] This can be adapted to organisations involved in controversies by replacing "power" by "power/knowledge": knowledge and credentials are a form of power, and power within an organisation is a common means of acquiring greater knowledge. This is not intrinsically a problem, but often leads to dysfunction when newcomers are discouraged from committing more time and energy to the cause. New members need to feel they have something to contribute and that there are opportunities for learning. If they feel patronised by a senior figure in the group, they may decide to put their energies elsewhere.

Some scientific heavyweights are so arrogant or otherwise difficult that they have a hard time working in groups. They may end up being solo campaigners, or occasionally loan their prestige to efforts by others by making endorsements.

Another problem is members whose behaviour potentially discredits the organisation. Making exaggerated, misleading or inaccurate statements is a common issue in scientific controversies. "Nuclear radiation is going to lead to children with two heads." "Fluoride is rat poison." If some members are scientists who want to maintain their reputation for accuracy, they might be embarrassed by statements by other members who are not on top of the technical detail or who exaggerate for the sake of impact.

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4 For research supporting Acton's observation, see David Kipnis, *The Powerholders* (Chicago: University of Chicago Press, 1976); Ian Robertson, *The Winner Effect: How Power Affects Your Brain* (London: Bloomsbury, 2012).

There are several challenges here. Some statements are correct at one level but inaccurate at another. Sodium fluoride is indeed used as a rat poison, but fluoride in water supplies is nowhere near the concentration that can cause acute poisoning; the more credible hazards are something different. Scientists often prefer to avoid emotive statements of any sort, whereas others may think that is the whole point of campaigning. If there is good will in the group, these issues can be thrashed out and perhaps some compromise or ingenious solution reached. The risk is that some members will be alienated by the rift or unhappy with a compromise and withdraw their support or reduce their commitment.

Another potentially disruptive behaviour is aggressive campaigning, for example making personal criticisms of opponents, holding rallies or chanting slogans. If everyone in the group agrees with the methods used, there's no problem, but often there are disagreements about the style of campaigning. Some members might want to lobby politicians and write submissions to government inquiries, others to focus on writing articles in the mass media, others to use Twitter and graffiti and yet others to organise noisy protests. When preferences differ, it may be hard to hold the group together. One solution is to use a variety of techniques, seeing them as complementary, but some members may be less than comfortable co-existing with completely different approaches.

The stereotype is that scientists are more likely to prefer methods that rely on rational argument, such as writing articles, whereas non-scientists are more open to using protest techniques. However, there are always

exceptions — for example, leading climate scientist James Hansen has been arrested at protests against coal mining. In any case, there is a potential for tension within an organisation.

One option is to break into different groups; in practice, different groups can have different emphases on arguments and methods. This can be a convenient solution, except that it increases the possibility that different groups may work at cross-purposes or even undermine or attack each other.

5.4 Decision-making

Groups need to make decisions. A formal group, such as a large professional association, with a constitution and rigid adherence to rules, will have motions, amendments, elections, constitutional changes and the like. At the other end of the spectrum are casual networks in which everything seems to happen in an ad hoc fashion.

For campaigning purposes, groups are often small and use de-facto consensus procedures. What this means is that core members of the group discuss things and reach a decision that everyone is willing to accept. Even if a vote is required by the group's rules, it will be taken only after everyone agrees.

Some groups have a more formal consensus process that involves proposals, checking for agreement, formal blocking of consensus (occasionally), a search for alterna-

tives, and so forth. Trained facilitators are often essential for this to work.[5]

The idea behind consensus processes is to harness the energy of as many people as possible. If an autocrat runs the group, those who disagree with key decisions will probably leave. Involving everyone in a decision-making process increases commitment to the decisions made. If there's a strong disagreement, with passionate beliefs on both sides, taking a vote can be risky — it might alienate those on the losing side, who may withdraw energy or even leave the group. Formal consensus procedures, or informal ones sensitively used, increase the odds of finding an approach that everyone can live with.

Keeping a written record of proceedings, and especially decisions and responsibility for taking action, is important. If someone agrees to do something, this should be recorded so that outcomes can be assessed at future meetings. Without record-keeping and accountability, meetings may just involve repetitive discussions of the same issues, without progress in doing anything.

Decision-making in groups involved in scientific controversies is not fundamentally different than decision-making in other groups. Some issues will be especially

5 Michael Avery, Brian Auvine, Barbara Streibel and Lonnie Weiss, *Building United Judgment: A Handbook for Consensus Decision Making* (Madison, WI: Center for Conflict Resolution, 1981); Virginia Coover, Ellen Deacon, Charles Esser and Christopher Moore, *Resource Manual for a Living Revolution* (Philadelphia: New Society Publishers, 1981); John Gastil, *Democracy in Small Groups* (Philadelphia: New Society Publishers, 1993).

sensitive. In an animal liberation group, is it okay for some members to eat meat or use animal products? In a campaign on climate change, should changes such as living in smaller houses or travelling less by car be mentioned, or should the arguments be to reduce carbon emissions while maintaining lifestyles?

The experience in many groups is that points of dispute internal to the organisation may be irrelevant to outsiders. For example, should money be spent on a paid advertisement for the upcoming public meeting, or should social media be used to publicise it? Not a big deal? Well, it could be a source of great tension and endless argument, perhaps because it taps into some deeper differences in assumptions, or more trivially because it's a manifestation of an interpersonal dispute.

It is useful to remember that areas of disagreement can be opportunities for the exercise of power. A faction can use a disagreement to humiliate or expel internal opponents.

You might think that everyone in the group would be pulling together in the common cause. If that happens, the group will be very effective indeed. More commonly, disagreements, personal frictions, miscommunication, poor group process skills and bullying lead to periodic internal conflict that is debilitating rather than productive.

Therefore, if you see a dispute that is seemingly about a technical matter to do with the issue, for example what to say about some recent research, sometimes it is a manifestation of underlying tensions or struggles.

5.5 Names

The name of a group is important for public recognition, member identification and ease of use. Effective names capture elements of a group's purpose in a catchy form. They make members proud to be involved.

Some groups have been around so long and achieved sufficient visibility that their names are icons rather than descriptions. Greenpeace, for example, is widely known for environmental and peace campaigning so that, for most people, the name has meaning as a whole rather than via its components "green" and "peace."

In setting up a new group, sometimes a name is chosen that is long and descriptive, such as the Northwest Suburbs Citizens' Group Concerned about Coal Seam Gas. There is little doubt what this group is all about. However, it is not easy to say, or even to remember. Using initials leads to NSCGCCSG, which is challenging to pronounce. Many new groups choose their name so that a pronounceable acronym results, or some abbreviation can be used. For example, NSCGCCSG could become NoGas.

Another option is to become a branch of an established organisation. The environmental group Friends of the Earth has branches in numerous countries, and country FoE groups have local branches, based in cities, towns or suburban areas. Some FoE groups have campaigns on nanotechnology, so if this is your issue, you might join a local FoE group and encourage action on nanotechnology, or even set up a FoE group for this purpose. However, this might not be attractive to some potential members who do

not want to be involved with an environmental group with a radical reputation.

5.6 Core operations

Some groups give the appearance of being a thriving operation — there are media releases, submissions, articles, leaflets, talks, newsletters, tweets — yet actually just one person does all the work. Such a group might be called a one-man band, although much of the time it is a one-woman band. Like a soloist backed by a sound track, a one-person group can sound impressive.

The solo group is an extreme example of a common phenomenon, the core group of individuals who do most of the work, within the context of a much larger membership or support network. The core group could be two or three or half a dozen activists, who lead and administer operations for a membership or network of dozens, hundreds or thousands of supporters.

There are several ways to look at soloists and core groups. A sceptical perspective is to say, "This group gives only an illusion of popular support. It's a facade." This may or may not be true. The core activists might be tapping into popular sentiment but be the only ones with the time, skills or courage to campaign. On the other hand, the core activists might be paid handsome salaries by a chemical or mining company, and have no genuine mass support. Sometimes the core activists are well paid, yet there is also popular support.

Another reason for the existence of core groups is poor personal dynamics. A soloist might be extremely

energetic but also hard to work with. Core group members might resent anyone trespassing on their territory. If you want to contribute to a campaign but receive little encouragement, you may be encountering a proprietary core group, or just some people with limited skills for building a mass movement. So think of joining a different group or network, finding a different way to contribute (financially, on blogs, etc.) or even choosing a different issue.

5.7 Front groups and captured groups

Corporations sometimes want to give the appearance that there is popular support for a cause that serves their interests, so they fund the creation and operation of fake grassroots groups. A few staff, paid for by a company or corporate association, adopt the surface features of a citizens' group. First is the name, such as South Central Association for Responsible Environmentalism, that gives the appearance of representing ordinary members of the public and serving a popular cause, when actually it is supporting legislation to protect polluting companies. Then come leaflets, media releases, websites, submissions, feature articles and blogs all purporting to represent popular opinion.

Setting up fake groups is sometimes called astroturfing. Astroturf is the synthetic grass first made popular in the Astrodome, an indoor stadium in Houston, Texas. Fake groups give the appearance of citizen action — action at the grassroots — without the substance, in the

same way that astroturf gives the appearance of grass without the organic substance.[6]

What to do? A good way to counter fake groups is to expose them for what they are. That means getting information about funding and membership, and letting people know about it.

It's normally considered legitimate for companies to present their viewpoint, and they regularly do, in advertisements, articles, websites and the like. From their point of view, this has a limitation: they are seen as self-serving. An advertisement from a company is treated more sceptically than a news story, which is expected to be independent or balanced. So companies sometimes try to make their advertisements look like news stories, perhaps with a small note somewhere saying, "This is a paid advertisement." Astroturfing is part of the same process of deception. A fake group gives the appearance of representing genuine citizen concern, when actually it serves the interests of its paymasters.

When people become aware that a group is fake, its utility declines. Another option is to provide support — money, paid staff, goods and services — to genuine groups. A common example is a group of citizens concerned about a particular health problem, for example breast cancer, depression or kidney stones. A pharmaceu-

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6 Sharon Beder, *Global Spin: The Corporate Assault on Environmentalism,* second edition (Totnes: Green Books, 2002); John Stauber and Sheldon Rampton, *Toxic Sludge is Good for You: Lies, Damn Lies, and the Public Relations Industry* (Monroe, ME: Common Courage Press, 1995).

tical or medical supply company comes along and offers to pay for newsletters, hire of venues, travel expenses and perhaps some administrative support. The group members are genuine in their concerns, but before long they become sympathetic to drug or other medical treatments. Options such as prevention through improved nutrition or avoiding certain chemicals are likely to be downplayed.

Groups like this are not fake. It is better to describe them as captured or co-opted: their agenda becomes shaped by the agenda of their funders. Members may think they are independent because they have genuine concerns. The influence of outside support is often subtle. Indeed, the more that members think they aren't being influenced, the more effective the influence is.

In some cases, funding from vested interests, or even from government, may be counterproductive because it gives the appearance of serving someone else's agenda. Imagine your group has a budget of $100,000 per year, nearly all of which comes from memberships, sales of campaign-related items, and small individual donations. Along comes a company or government agency that offers $10,000, no strings attached. An extra $10,000 could assist campaigning, but with the risk of making the group seem like it is captured. So perhaps it would be better to refuse.

5.8 An ideal group?

Generally speaking, there is no ideal form for a group, because a lot depends on the issue and the circumstances.

However, it is possible to specify the opposite of a fake group. The key characteristics of a fake group are:

- reliance on paid staff; limited or non-existent volunteer involvement
- service to the agenda of a group with a vested interest
- deceptive appearance, with the group presenting itself as something it isn't.

A more genuine group is different in these characteristics:

- strong volunteer involvement, with a limited role for paid staff
- limited or non-existent links with vested interests
- honest appearance, with information available about finances, purposes and methods.

A strong volunteer involvement is the basis for mobilising greater support: when people see their friends and neighbours participating, they may want to as well. Paid staff support the volunteers rather than driving their own agendas. This usually means pay is relatively low: by accepting modest pay, staff in effect volunteer a lot of extra time and effort to the cause.[7]

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7 The issue of wages for campaigning staff has many vexing aspects. If campaigners are poorly paid compared to equally skilled workers in other fields, they may feel exploited. They seldom have job security, yet they can have enormous responsibility. This combination can lead to resentment and burnout. It is risky to endorse a position that campaigners should necessarily be poorly paid. I thank Sharon Callaghan for valuable comments on this issue.

Keeping vested interests at a distance is important to ensure that the group follows an agenda determined by participants. An honest appearance is part of the same process.

Finally, members of an effective group will know that the group is not an end in itself, but rather a tool or medium for obtaining a desirable social outcome. A genuine group, in this sense, will support the creation of other groups and will liaise with solo campaigners. Ultimately, it might seek to make the group superfluous, because the issue becomes so widely understood that people everywhere will act accordingly.

In the meantime, most campaigners have to work in real groups, with difficulties in gaining interest, internal battles, attacks from opponents and the everyday hassles of getting things done. In this context, to imagine an ideal group may seem like wishful thinking. It can be useful, though, to remind members about what they are trying to achieve and desirable directions for achieving it.

5.9 Core members and newcomers

Many groups are open to newcomers. There's an advertised meeting time and anyone can come along. This seems, on the surface, to be a good way to attract new members.

What often happens in practice is a bit different. Suppose the core group — those who do most of the work — is composed of five people who know each other well. A stranger comes along to a meeting. Will she feel welcome? Not if the core members speak only to each

other, use acronyms and insider jargon, and are preoccupied with the latest events and what needs to be done. The newcomer may well feel this is not the place for her. The group is formally open and members may even be friendly, but there is no system for inducting newcomers into the ongoing operation.

One source of tension is views about the issue. Newcomers may arrive with zeal about the hazards of z-technology and want to talk about this, but core members may have already heard it all a hundred times, have a sophisticated approach to the issues and be focused on campaigning.

There's a better prospect that newcomers will return if someone in the core group knows them, introduces them and ensures that the meeting process enables their understanding and participation. Even so, a tension remains between the agenda of the core group and the needs of newcomers. What may happen is that newcomers show up, attend a few meetings and then drop away. The core members have become comfortable with each other, so the subtle vibes may make newcomers feel unwelcome or unneeded.

There are ways around this. One is to hold public meetings, aimed at newcomers, that address the issues, for example with speakers, films, debates or activities, hosted by one or two core members. When someone has become a regular at such events, they might be invited to the more practical meetings.

It can help to have a core member be a mentor for a newcomer, to explain jargon, provide help in joining conversations and to attune mutual needs. In a growing

movement, sometimes it works to set up entire groups of people new to the issue, for example a suburban or occupation-based group, perhaps assisted by a core member from a parent organisation.

5.10 Task and maintenance functions

What a group does can be divided into two categories: task functions and maintenance functions. Task functions are like organising meetings, sending messages and keeping accounts. To accomplish external goals, tasks need to be done efficiently and reliably.

Maintenance functions are what keep the group working harmoniously and keep members satisfied. They include providing personal support, maintaining morale and resolving tensions. Maintenance functions are often overlooked — they are "soft" skills and less visible than public speaking or website design. Yet these skills are crucial for keeping groups together.

Jane noticed that tension was developing around a forthcoming event that would cost a lot of money and feature one group member. She subtly shifted the conversation so the issues could be dealt with in a non-confrontational way.

Sally noticed that James — who was extremely knowledgeable about the issues — was uncomfortable. She quietly engaged him in conversation during a break, found out what was bothering him, and then intervened to slightly change the meeting agenda so James' concerns would be addressed.

Without people like Jane and Sally, many groups would lose valuable members or descend into acrimony.

Productive groups have a balance between task and maintenance functions. With too much orientation to tasks, the group may fragment. With too much orientation to maintenance, nothing gets done.

For some issues, it may be worth setting up different groups for different functions. A support group, for example for breast cancer survivors, provides a valuable place for exchanging experiences and processing emotions. Separately there can be an action group, for example to push for more research or for preventive measures.

The most common problem in campaigning groups is too little attention to maintenance functions. If there are continuing conflicts over actions, for example over whom to invite to speak or what text should go in a public statement, it may be that this reflects dysfunctional group dynamics. Improve the dynamics and planning may go more smoothly.

5.11 Shaming

Organisational culture can be emotionally toxic. One of the key elements is the feeling of shame, which is the sense of not being adequate or of having failed in some way. Attempts to induce shame are sometimes used as a tool against others, for example with questions such as "Why aren't you doing *more*?" or "*You* should have known better" or "What were you *thinking*?" These sorts of questions, if said in an accusing tone of voice, are put-downs. They encourage the target to think, privately, "I'm

not doing enough" or "I'm ignorant" or "I've made a serious mistake."

Attempts to shame others are commonly called "guilt-tripping": they seek to induce the target to enter a state of mind — a sort of mental trajectory or trip — that involves feeling guilty. Guilt-tripping is mostly used by those who are more experienced or in a privileged or inside position against newcomers or those on the outer or who are being scapegoated.

In groups dealing with controversies, there are three common topic areas for shaming:

- commitment to the issue or the group
- knowledge of the issue
- views about the issue.

Core members of a group often put in long hours. When others don't do as much, the core members may start to feel resentful. They may think, "What are these others doing in this meeting, pontificating about what we should do, when I'm doing nearly all the work?" When this sort of negative emotion arises, it's often a sign of impending burnout: the experienced, committed member has been so involved that the issue starts taking over their life and they lose perspective about what is reasonable to expect of others. When progress on the campaign isn't as rapid as they wish, or there are setbacks, instead of seeing this as reality or a challenge, they may turn on supporters and criticise them for being inadequate. This drives supporters away and confirms the core member's assessment.

Lack of knowledge about the issue can be a source of shame. Knowledgeable climate-change activists may be

dropping mentions of the latest research on tree-ring data, technical details of transition strategies, or scientific arguments concerning IPCC operations. A newcomer or less well-informed member may feel left out or like a second-class participant in discussions, even if the more informed members are trying to explain things in an understandable way. Some members may display their knowledge in a way that operates like a put-down. This sometimes encourages more effort to learn about the issues but equally can discourage people from participating.

Then there are viewpoints about the issues, for example whether to endorse more extreme scenarios for global warming, links to peak oil, or targets for a zero-carbon economy. Many groups have a "line," namely a standard set of beliefs about the issue. Those who disagree, even in minor ways, may feel unwelcome. Animal liberationists might have a line about animal suffering or the ethics of animal experimentation. Some groups have expectations about personal behaviour, for example being a vegan or riding a bicycle.

Not conforming to a group's beliefs and behaviours can cause a member to feel excluded or inadequate. Shaming can be caused by explicit put-downs or by silences, for example others refusing to engage after someone raises a sensitive point. Rather than clash with others and experience shame, those who disagree with the group's line may drop out. The result is greater uniformity, which can be seen positively as greater cohesion or negatively as less tolerance for internal differences.

Nearly every group has to deal with diversity of viewpoints and differences in commitment and energy. There are several ways to deal with this.

- Have regular discussions, with a facilitator who encourages expression of different viewpoints and who helps new members to join in.
- Organise different sorts of meetings or activities, some for those involved only occasionally, others for those with more time and experience.
- Arrange for an experienced member to be a devil's advocate, who presents views challenging the standard line, as a means of freeing up the discussion and helping think through how to engage with deviations.
- Hold skill-development activities designed to help less experienced members learn from old-timers.
- Set up different groups or sub-groups to cater for different orientations or levels of involvement.

5.12 Going solo

Groups can be very rewarding, offering a place for mutual support, stimulation, learning (about the issue and about campaigning) and collective action not possible by anyone alone. However, groups do have problems, including harassment, bullying and difficult behaviours, among many others. The fact that people remain in groups and form new ones shows that the rewards from working together must be significant indeed, to counterbalance the all too common negatives.

For some individuals, it is more productive to operate alone: to go solo. There can be many reasons for this.

Sometimes no one else is interested in the issue. Sometimes existing groups are too dysfunctional or co-opted or cautious or radical. Most importantly, some individuals are more effective operating on their own. In some cases, being seen to be independent is so important that it is better not to be affiliated with any group.

There are many potential roles for a solo activist or supporter. One possibility is doing research and writing articles, for which some scientists are especially suited, though non-scientists can do this as well. Another possibility is being a networker, for example finding relevant information and passing it on to those who can use it, and putting individuals in touch with each other. Yet another is providing resources to campaigners, which could be money, venues or equipment — or putting campaigners in touch with those who are able to provide resources. (This is another aspect to networking.) Some individuals have specialist skills they are willing to provide to movements, without becoming a member of a group, for example managing websites, handling finances, editing newsletters and organising conferences. In fact, just about anything a campaigner can do can be done independently of being in a group.

Scientists are especially likely to be solo campaigners. They have status as experts and may not want to spend their time attending meetings or undertaking the routine sorts of activities necessary to maintain a group. In some cases, being a member of a group, especially one with a radical reputation, can be seen as compromising. So remaining separate can be a strategic choice as well as a personal preference.

In a movement, groups and solo campaigners are both important. Often, they keep in touch through networkers. There are a few things to keep in mind.

Groups need to plan activities taking into account the solo campaigners. This means thinking about roles for those who are active on the issue. At the very least, it means keeping them notified about activities. Likewise, solo campaigners should keep in touch with groups so that efforts are coordinated rather than duplicated or even contrary to each other.

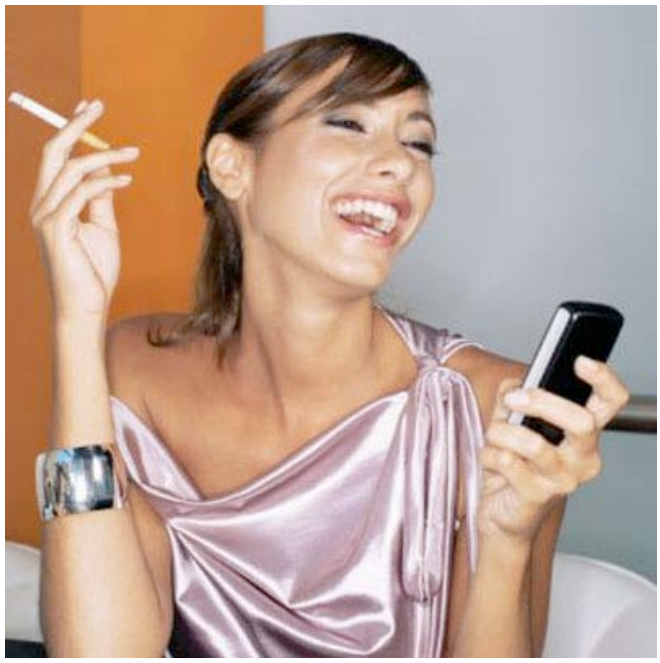
It is important to respect different people's ways of doing things, and to try to cater for different sorts of inputs. Some groups become inward-looking, thinking that people are "either with us or against us." This sort of attitude is alienating to others, and can hurt the movement. From the point of view of the group members, solo campaigners are rogue operators, muddying the message that is carefully managed by the group. From the point of view of solo campaigners, the group is exclusive and intolerant. Individuals willing to liaise between groups and solo campaigners have an important role to play.

It would be nice to imagine gaining an overall perspective on everything going on within the movement, and figuring out the best role and strategy for all the players. Yes, it's nice to imagine, but people are seldom so amenable to rational planning this way. They have passions and preferences and don't always do what others think is wise. Coordinating activities, including within groups, between them, and in relation to solo campaigners, is bound to remain one of the most challenging aspects of campaigning.

Smoking

What it is

Burning of tobacco leaf is a method of ingesting the drug nicotine.



Arguments for

• Cigarettes are legal to buy, so people should be free to smoke them.
• Evidence that second-hand smoke is harmful is not conclusive.
• Smoking is a personal choice.

Arguments against

• Smoking is a major contributor to cancer, heart disease and other diseases.
• Non-smokers exposed to second-hand smoke have increased risks of disease.
• Harmful drugs should be tightly regulated to reduce the cost to individuals and society.

Experts and authorities

Nearly all researchers say smoking is harmful to the health of smokers. Most researchers say second-hand smoke is harmful but the evidence is not as strong.

Vested interests

Tobacco companies obtain huge profits from the sale of cigarettes.

State of play

Health authorities and governments in different countries differ in their regulation of smoking, regulation of cigarette advertising, taxation of cigarettes and other smoking-related policies. In some countries, smoking is banned in most enclosed and some open public spaces; in other countries, smoking is largely uncontrolled.

Alternatives

The main alternative is to stop smoking, or cut back. There are some alternatives for delivering nicotine, such as patches and e-cigarettes.

6
Taking action

Some campaigners want to do more than present ideas. They want to directly contact decision-makers, organise protests or even undertake civil disobedience. These sorts of methods are used regularly by activists in some areas, for example human rights and anti-militarism. However, they may or may not be used in scientific controversies. Here, I won't try to cover details of all possible methods, because many useful manuals are available and many activists have great experience.[1] What I will do is present a few basic ideas about some key methods and note any special relevance to scientific controversies.

6.1 Lobbying

Campaigners often want to influence people in positions of power, especially politicians and sometimes corporate leaders, government officials, prominent individuals and others whose actions or statements could influence policy

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1 Mikki Halpin, *It's Your World — If You Don't Like It, Change It: Activism for Teenagers* (New York: Simon Pulse, 2004); Bill Moyer, with JoAnn McAllister, Mary Lou Finley, and Steven Soifer, *Doing Democracy: The MAP Model for Organizing Social Movements* (Gabriola Island, BC, Canada: New Society Publishers, 2001); Aidan Ricketts, *The Activists' Handbook: A Step-by-Step Guide to Participatory Democracy* (London: Zed Books, 2012); Randy Shaw, *The Activist's Handbook: A Primer* (Berkeley, CA: University of California Press, 2001).

or debate. Lobbying usually means meeting with or talking to individuals and trying to convince them of something, such as the importance of an issue, the need for a different policy, or the value of intervening.

Those with more power have many advantages in lobbying. In Australia, the fossil fuel industry is very powerful, and has been able to set the agenda on government policy.[2] This happens, in part, through meetings or conversations with key politicians and government bureaucrats.

Anyone can be a lobbyist, but some are more likely to be effective. The president of a large company might personally contact politicians. Another option is for the company to hire individuals to lobby on its behalf. Sometimes a company hires former politicians, who have personal connections with serving politicians. Companies often hire former government employees. A person might initially work in a government agency regulating industry and then get a job in the industry with the goal of influencing former colleagues in the agency — and perhaps then get a different government job, at a higher level. This is called the "revolving door": workers go back and forth between corporations and government. Lobbying becomes a matter of meeting with former colleagues and talking over issues and plans.

If you represent a group with a large number of members who are willing to take action — for example a

2 Guy Pearse, *High & Dry: John Howard, Climate Change and the Selling of Australia's Future* (Melbourne: Viking/Penguin, 2007).

trade union, an environmental group or a welfare organisation — then you may have reasonable prospects with lobbying. Being able to influence voters and elections makes politicians more responsive.

Even though lobbying nearly always works best for those with the most power, those without access to the "corridors of power" — where politicians and senior officials work — sometimes try to use lobbying too. The process is straightforward. You call a politician's office and ask to have a meeting. Perhaps the politician is too busy: you don't gain access, probably because you're not important enough. Sometimes, though, the politician will agree to meet with you. Then what?

You need to prepare carefully, because you might have only an hour, half an hour or even less to meet with the politician. This means you need to get your key points across briefly and powerfully. Choosing who meets with the politician is crucial. Maybe a prestigious scientist is willing to be involved, but is this going to be effective? It's useful to have a checklist.

Credible people for the meeting

This includes reputation, degrees and publications. It also includes the way people present themselves. If they rant and rave, they will discredit your cause. If they don't know the facts, they may be exposed as ignorant. If they dress in a sloppy or inappropriate way, they may hurt your image.

Short, focused delivery

You need to get your points across clearly and briefly. It's not good to have a prominent scientist who will launch into a lengthy discourse on scientific technicalities. Lobbyists need to communicate as well as impress. Scientific details need to be subordinated to the overall aim of the meeting.

Clear purpose

Before the meeting, make sure everyone on your delegation to the politician knows exactly what you are trying to accomplish. It might be to alert the politician to a new issue, to counter some recent development, to introduce some people who are involved with your campaign, to ask for support on a legislative or policy measure (a common goal), to maintain contact with a sympathetic figure, or to make sure the politician knows the arguments. Whatever the purpose, make sure it is reflected in your approach to the meeting. If your purpose is to gain support for a policy, it is not helpful to talk at length about the latest research findings.

Interpersonal skills

Your delegation needs to include at least one person who is very good at picking up cues about how to relate to the politician and how to advance your purpose. By watching the politician carefully and noticing responses to what you say, it is possible to modify your approach to be more effective. For example, you might expect to have 10 or 15 minutes to present your arguments, but the politician dominates the meeting by talking about other matters. You

need someone who can sense what is happening, gently interrupt and subtly turn the conversation to your agenda. Another possibility is that you notice that the politician is not impressed by what you are saying, expressing disdain or scepticism. You need someone who can sense the emotional response and steer the content or tone of your comments in a more productive direction. Interpersonal interaction makes an enormous difference to your effectiveness. In many cases, making a favourable impression — in part, by relating well on a personal basis — is more important than being knowledgeable about the issue.

Achieving your goal

At least one person in the delegation should remain aware of the goals of meeting with the politician and constantly monitor what is happening with the goals in mind, intervening if necessary. It is very easy to be sidetracked by the politician's own agenda, by topics raised during the conversation or by your own enthusiasm for the issues. For example, you might have the goals of reminding the politician about a particular policy and its importance and, secondarily, introducing one of your members, who is an up-and-coming figure. When the politician raises the question of some recent challenge by your opponents, you may become impassioned by the need to counter misinformation, and before you know it the policy is forgotten and the introduction of your member is left to the end. So you might suggest that your member be the one to counter the misinformation or, even better, to relate the misinformation to the policy you wanted to emphasise.

Achieving your goals may require some flexibility. Perhaps, based on the conversation, you think that there is little hope of sticking to your original agenda — you need to accommodate the politician's agenda. So you modify your goals as the meeting proceeds. Perhaps the conversation goes very badly, with the politician being more hostile than you anticipated, so you change your goal to simply maintaining a relationship that is pleasant. One danger in being flexible is that you move so much from your original goals that you end up selling out your group and its principles: flexibility is another word for compromise, but some compromises are not worth it. Remember that pleasing a politician, although it might be helpful, is not your ultimate goal.

Follow-up

When the meeting is about to finish, it is often useful to summarise the main issues you think are important, as well as thanking the politician for meeting with you. Furthermore, you might have some information — such as a leaflet — to give to the politician, to provide a reminder of the issues you think are important. After the meeting, you can send an email summarising the key points of the meeting (from your point of view) and sending relevant additional information.

Lobbying sounds like a powerful method: you talk to important decision-makers, present evidence and arguments (which of course are correct, logical and extremely convincing), and win over individuals to your cause. However, if you rely on evidence and arguments, lobbying

is unlikely to be effective. Politicians like to have evidence and arguments to support what they decide to do, but the decision itself may be taken for other reasons.

Politicians are lobbied by many groups. Some are more influential than others; powerful, wealthy groups have impact because they can make campaign donations, approve investments, hire workers, influence media coverage and possibly provide jobs for the politician or friends. If you are campaigning against over-prescription of pharmaceutical drugs, your opponents — the pharmaceutical industry, and perhaps front groups funded by the industry — can also lobby, often far more effectively. Remember that the other side also has evidence and arguments to give to the politician. You might think your evidence and arguments are persuasive, but the reality is that people can be swayed in other directions, and factors like donations, jobs and media coverage can make a difference.

If the other side has plenty of money, they can afford to pay employees to be lobbyists, or hire professional lobbyists. These lobbyists have skills and contacts, and get better through their experience; if they don't produce results, they may lose their jobs. When you are up against professionals, and you only have volunteers without much experience, you need to question whether lobbying is a good strategy.

There is one thing that politicians take notice of besides money and power: people expressing viewpoints, through letters, meetings, protest on the streets and media coverage of their viewpoints. When there is a strong popular opinion, politicians know votes are at stake and they pay attention. So if you approach a politician and are

able to say — or implicitly threaten — that large numbers of people will be complaining, voting or protesting a certain way, your message will be more powerful.

However, if your group or campaign has widespread support and is able to mobilise lots of people to take action, you may not need to lobby, because the message will be strong enough in other ways. In fact, if you're one of the protesters in the streets, you may need to worry that those lobbying on your behalf will sell out the movement by making unnecessary compromises and moving away from the campaign's original goals.

Key points

• Effective lobbying operations should have a clear purpose, focused message, credible people with interpersonal skills, goal orientation and follow-up.
• Evidence and arguments are valuable but seldom are effective on their own.
• Lobbying is usually far more effective for groups with the most power and money.

6.2 Petitions

Getting people to sign a petition can be an effective way of generating support. Often the assumption is that the effectiveness of a petition depends on whether politicians, the usual target for petitions, will take them seriously. However, politicians often just ignore petitions, assuming that many signers don't really care that much. (Individually written letters to politicians, not following a template,

are more influential because they signify greater initiative and commitment.)

The impact of a petition is often more through the process than the completed product. Some people, when asked to sign a petition, just refuse or sign without any fuss; in neither case is there much impact. But some carefully read the petition text and some engage in a conversation with those circulating the petition. Even if this engagement doesn't lead to a change of opinion, it indicates that the issue is being taken seriously. In other words, the petition process is a way of stimulating awareness of and thinking about the issue. Canvassers can be prepared by being able to offer leaflets or other information to those who are interested. It's also possible to gain new members.

So it's useful to think of a petition drive as a process of mobilising opinion. It provides the canvassers with greater involvement in the campaign and interaction with the public, exposes people to the issues, and potentially attracts new participants. Rather than trying to obtain as many signatures as possible, a somewhat different goal is to generate as much interaction as possible.

Online petitions have the advantage of being cheap and easy to circulate. Their disadvantage is the ease with which they can be deleted or, contrarily, signed with little thought. Forwarding a petition to friends is a way of saying "I care about this issue." The less often you do this, the more likely it is to have an impact when you do.

For those who organise petitions, a key challenge is what to include in the text. Typical components include a statement of facts or claims about the issue (such as about

climate change), the status of the claims (such as the authority of climate scientists), the significance of the issue (consequences of climate change for populations and the environment) and desired actions by the target of the petition (government policy that's needed). There are a few things to keep in mind.

- *Information,* included as a preamble to the appeal, can be valuable so potential signers can learn more about the issue. However, if the information is too detailed or long, people may not bother to read it or may not understand it or may not be willing to sign because they are committing themselves to too many claims.
- *Claims* about an issue can be modest — "some people react adversely to food additives" — or strong — "food additives are responsible for hyperactivity." If claims are strong, they are more dramatic but they can stimulate scepticism or resistance to signing. Overdramatic claims can reduce credibility.
- *Technical text* can be off-putting. Lots of facts and figures may be impressive, but a petition is normally not about technical claims but showing concern and commitment. To inform potential signers, scientific material is often better subordinated to values and goals.
- *Demands for action* need to be clear, plausible and brief in order to make sense to readers and to offer some sense of cohesion to the signature campaign. A list of 12 demands makes it hard to see which ones are most important. A demand that is too extreme —

> all genetically modified crops must be destroyed immediately — may make readers think you have no political sense and make them less inclined to sign. Often it is better to have demands that stimulate awareness and discussion.

When preparing text for a petition, a lot depends on your goals. This can include the effect on politicians, the effect on readers (non-signers or signers) and the effect on the group organising the petition. In some groups, there is a tension between being convincing to outside audiences and showing, to other group members, how strong their position is. Within the group, there can be competition between those with different views about the issue, sometimes with the more extreme views serving as tools to position moderates as not really committed. Subscribing to a climate-change goal of 100% renewable energy within a decade can be taken as showing more commitment than supporting a less ambitious goal. So the petition text may be a compromise among the group members rather than a carefully calculated attempt to appeal to members of the public. That's okay if it serves your purposes. Sometimes building group solidarity is more important than convincing others. The point is to be aware that designing a petition involves more than jotting down a series of points.

6.3 Electoral politics

Voters can make a difference: they can elect candidates who are sympathetic to your position. In some places, they are able to vote on referendums on your issue. So it might seem obvious that getting involved in election campaign-

ing is worthwhile. Sometimes it is, but sometimes this sort of campaigning is a waste of time or worse.

There are lots of people who know a great deal about election campaigning, so I won't try to give any detail. There are several considerations to take into account when deciding whether to become involved and, if so, how.

Will campaigning make any difference? Some issues get so big that they affect politicians. Stands on abortion or gun control can make US politicians vulnerable. In the 1980s, nuclear disarmament became a huge issue. In the 2000s, it was climate change.

However, just because an issue is big doesn't necessarily mean that your group should get involved in election campaigning. Perhaps there are plenty of others already involved, or not much chance of affecting the outcome. More importantly, getting involved in election campaigning might divert your group from its core priorities and its most effective methods of action.

You might believe your issue is the most important one of all, but do others agree? Few people will change their vote because of politicians' views on the biggest controversial issues, much less some lesser issue like genetic testing. So be realistic. Electing your favourite politician or the party that has the best stand sounds wonderful, but making a difference may be an illusion.

On the other hand, in some cases campaigning is directly relevant to your issue — for example when there's a referendum on fluoridation in your small town. Then your participation can make a difference.

Will politicians keep their promises? One of the most common phenomena in electoral politics is that politicians

promise to take principled stands but, when elected, do little, nothing or even the opposite of what they promised.

Generally speaking, politicians are most supportive to your position when it is also backed by powerful groups, such as corporations, militaries or the medical profession. Politicians need campaign donations; they need support from powerbrokers in their own parties; they need to prevent concerted opposition by powerful groups. If your position in the controversy is backed by pharmaceutical companies, then politicians are more likely to be supportive; however, if you are challenging the companies, then don't rely on politicians keeping their promises. Remember that lobbying still occurs, and you are at a severe disadvantage.

There is a risk in supporting a political party because it has a policy that you like — it makes the issue party-political. If your preferred party is in power, then you have an advantage. However, other parties may become more antagonistic. Environmental issues are often seen as linked to the left, but there is nothing intrinsic in this: protecting forests or promoting energy efficiency could just as easily be seen as conservative policies, maintaining a status quo or a tradition of frugality.[3] So it might be better not to be aligned with a political party or a political position, and instead to cultivate allies in different political parties. Some issues, such as fluoridation or nanotechnology, have no obvious political constituency, and it's possible to find supporters from across the political spectrum. If opponents accuse your group of being left-wing or right-wing or

3 See "Left, right, conservative, radical" in section 2.11.

being tied to some political party, this is a signal that it's probably better not to be aligned with any political party or grouping. (The same applies to other sorts of alliances, for example with religious groups. Some issues have a strong religious connection, for example abortion and stem cells, whereas others do not.)

Elections can be treated as opportunities to raise issues. Instead of supporting a candidate or a party, activists can use heightened interest to hold meetings, circulate material and generate discussion. This is especially true when an issue already has a high profile, for example nuclear weapons in the 1980s or climate change in the 2000s. People are concerned and many expect politicians to take action. So campaigners can organise activities to inform voters about the issues, without necessarily supporting anyone running for office. However, this runs the risk of being seen as aligned with one party, especially when one party has much better policies, from your point of view, than other parties.

Election campaigning can be exhilarating. There is a sense of opportunity and/or danger. There are opportunities for building support and helping promote better policy. There are dangers of the other side gaining advantages from the outcome of the election. Election of the wrong candidates might mean a setback on climate change, genetic engineering or any of a host of issues. So a lot is at stake.

After the election, there is often a letdown. Campaigners are exhausted and need a break; some are burnt out and may take months or longer to become active again. If the election result is bad, pessimism can set in —

it seems extra hard to keep going. On the other hand, if the election result is just what you wanted, there is a different danger: complacency. It is easy to think that the hard work is over, and politicians will handle things from now on. This is risky, because politicians do not necessarily follow through on their promises; they may be subject to lobbying from powerful groups, or be unwilling to confront entrenched approaches in government bureaucracies.

Whether to become involved in election-related activity on your issue needs to be carefully considered. The benefits seem appealing: helping favoured candidates and capitalising on heightened interest in the issues. The disadvantages are seldom so obvious, but they are important: having your issue seen as party-political and hence creating political opponents, a post-election letdown that hinders your effectiveness, and putting too much reliance on political solutions.

6.4 Rallies

To support a cause, campaigners and supporters may organise rallies, strikes, boycotts, sit-ins and various other methods. Typically, these go beyond regular political activities such as lobbying and election campaigning and involve some sort of challenge or disruption to usual ways of doing things. This type of protest is called nonviolent action, people power or civil resistance. There are many skilled practitioners and some excellent manuals. Rather than try to cover the full gamut of methods, I look here at rallies and then, in the next section, at strikes, bans and boycotts. This is only the briefest introduction to these

methods. When planning nonviolent actions, it is wise to consult experienced activists.

Some manuals on nonviolent protest

Handbook for Nonviolent Campaigns (War Resisters' International, 2009)

Howard Clark, Sheryl Crown, Angela McKee and Hugh MacPherson, *Preparing for Nonviolent Direct Action* (Nottingham: Peace News/CND, 1984)

Virginia Coover, Ellen Deacon, Charles Esser and Christopher Moore, *Resource Manual for a Living Revolution* (Philadelphia: New Society Publishers, 1981)

Per Herngren, *Path of Resistance: The Practice of Civil Disobedience* (Philadelphia: New Society Publishers, 1993)

Srdja Popovic, Slobodan Djinovic, Andrej Milivojevic, Hardy Merriman, and Ivan Marovic, *CANVAS Core Curriculum: A Guide to Effective Nonviolent Struggle* (Belgrade: Centre for Applied NonViolent Action and Strategies, 2007)

Srdja Popovic, Andrej Milivojevic and Slobodan Djinovic, *Nonviolent Struggle: 50 Crucial Points* (Belgrade: Centre for Applied NonViolent Action and Strategies, 2007).

Rallies are a form of protest and persuasion, along with marches, teach-ins, petitions, slogans, graffiti, pranks, vigils and a host of other methods. In some countries, rallies are so ordinary that they have become regular activities, but in others they are treated as a threat to the system and met with police violence. In the Philippines in 1986, East Germany in 1989, Serbia in 2000, Egypt in 2011 and in many other cases, mass rallies were part of a popular challenge to a repressive government and were instrumental in helping to bring down dictatorial regimes.

When large numbers are involved, and people are demanding some form of social change, this can be a powerful form of pressure group politics. Rallies provide a vivid demonstration of people's concerns and commitments, especially in the face of government opposition and police use of force. Participants may feel a thrill of being part of a movement for change; supporters can feel encouraged by the level of involvement.

Only in some scientific controversies do rallies play a significant role. There have been huge rallies against nuclear war and genetically modified crops but few people protest in the streets on issues such as antidepressants or multiple chemical sensitivity. Not every issue has the capacity to mobilise significant numbers of people in public demonstrations.

Critics sometimes ask, "Where are the protesters?" implying that unless large numbers are on the streets protesting, there's really not much concern. These sorts of comments reveal a lack of awareness of how much effort is involved in organising a rally. There is usually a large amount of work behind the scenes in planning, arranging speakers, liaising with police, producing leaflets, sending out emails, attracting mass media coverage and much else.[4]

Some forms of public protest are organised in a seemingly spontaneous manner, using social media such as Facebook and texting to let people know what will be

4 Jenny Briscoe, Sharon Callaghan, Karen Kennedy, Brian Martin and Yasmin Rittau, "Behind the activism" (Wollongong: Schweik Action Wollongong, 2010), www.bmartin.cc/others/SAW10.pdf

happening almost as it occurs.[5] This is a contrast with the traditional rally involving a fixed venue, prearranged speakers and performers, and prior publicity.

Because rallies are a common form of public protest, many people have experience in organising them. For issues where organised public protest is uncommon, it is worthwhile consulting experienced activists, for example from the labour or environmental movements. Several questions are worth considering.

- Who is organising the event? Who is responsible for liaising with authorities (if needed), arranging speakers, maintaining desired behaviour and arranging media coverage?
- What information is provided? Will there be leaflets, webpages and social media as sources of information? Who is responsible for the content?
- What sort of people are you trying to attract?
- What sort of image are you trying to portray?
- Who is your audience? Is the event mainly for energising participants or is it aimed at influencing decision-makers or the general public?
- What happens at the rally? Are there speakers, singers, chants, petitions, stalls? Are there organised opportunities for participants to meet each other?
- Are you seeking new members? If so, how will you attract them to the rally and how will you encourage them to become more involved?

5 Tim Jordan, *Activism! Direct Action, Hactivism and the Future of Society* (London: Reaktion Books, 2002).

- What sort of access is there? Is the venue convenient for public transport, disabled access and in other ways enabling wide attendance?

Many rallies follow a formula. A standard venue is used, usually a public place that is convenient or symbolically significant. There are several speakers, sometimes locals and sometimes visitors, who are knowledgeable about the issue, possibly with a public profile, or who represent groups involved in the rally. Most of the audience listens, perhaps joins in a chant or song but is otherwise uninvolved in the formal proceedings. Activists can use the opportunity to network with others who are there, but newcomers — without previous connections to participants — may feel alone. For this reason, smaller events, such as discussion meetings or film screenings, can be better opportunities for involving new people in the issue.

There is a final question to ask, which should be the first question: is a rally the best way to promote your issue? Getting people on the street can be politically powerful and can be stimulating for those involved. On the other hand, there can be an enormous amount of work involved in organising a rally, and this may not be worth it if only a handful of people show up.

6.5 Strikes, bans and boycotts

In a strike, workers walk off the job or stay home, preventing work from being done. Strikes are commonly accompanied by pickets intended to discourage or prevent others from working.

Strikes are most common in the support of wages and conditions, but they can also be taken on controversies. In the Australian debate over nuclear power and uranium mining, trade unions took some of the earliest and most potent actions, including strikes. Another workers' action is the ban: refusal to undertake specific jobs, such as loading uranium onto ships.

Strikes are potentially relevant to just about any controversy. If workers refuse to produce chemicals for fluoridation or refuse to add fluoride to public water supplies, then fluoridation cannot go ahead. However, only in a few controversies do workers take direct action such as strikes and bans. Campaigners should think carefully about the prospects of getting workers involved. This might be done through personal contacts, trade unions or having special workplace campaign groups.

Because workplace actions are potentially so powerful, governments and employers try very hard to restrict and restrain them, including through laws and severe penalties as well as intimidating or firing labour leaders, and cultivating tame unions. Unless the issue is very close to workers' immediate interests, workplace actions are usually unlikely unless there is widespread public support on an issue.

Employers can also use the strike as a tool. In what is called a capital strike or disinvestment, a company refuses to invest or threatens to move production elsewhere. Because other companies might step in and invest instead, disinvestment is usually only relevant as part of a wider campaign, for example the struggle against the former apartheid system in South Africa.

A boycott is a refusal to participate in some sort of activity. The most familiar is a consumers' boycott, when shoppers refuse to buy certain goods. For example, the company Nestles has been subject to a long-running boycott due to its promotion of powdered milk to poor people in the Third World: critics argue this discourages breastfeeding and makes children more susceptible to water-borne disease. The Nestles boycott can be considered part of a controversy over powdered milk, breastfeeding and poverty.

Consumer boycotts are easy to imagine but very difficult to make effective. The trouble is that ordinary goods, for example those in a supermarket, are found in hundreds of places, and there can be millions of potential purchasers. Your group might stand outside a local shop handing out leaflets recommending free-range eggs or advising against buying anything produced by Monsanto because of its promotion of genetically modified foods, but unless there are groups doing this across the country or the world, the effect on the target company is likely to be small. In many cases, the primary effect of such boycott efforts is not on the target but on raising awareness among shoppers: a few of them might become more interested and join the campaign.

There are many other sorts of boycotts. For example, businesses can boycott other businesses, or governments can boycott companies from other countries. Campaigners can influence some of these, for example by lobbying or holding rallies to try to persuade governments or companies to refuse to do certain types of business, for

example the purchase of rainforest timber logged in countries like Indonesia or Brazil.

To make boycotts more effective, promotional materials need to be carefully researched and written. Most potential participants will take only a few moments to consider the arguments — after all, few shoppers are willing to spend half an hour studying the arguments about which sorts of oranges to buy (regular versus organically grown; imported versus locally grown) or whether to buy oranges at all. So the information about the issue needs to be clear and relevant. For the campaign to build credibility, the information needs to be solid, able to withstand criticism by those adversely affected by the campaign.

In order to get workers to take action, for example to refuse to handle certain goods, there are several paths. One is to lobby union officials. Another is to take your message to the union membership or to workers more generally, for example by giving talks at union meetings or by circulating information to everyone at a workplace. Another is for activists in the workplace to take the initiative, arranging discussions, circulating information, formulating motions and the life. Finally, workers can be influenced by a general change of community sentiment, via media coverage and contact with others concerned about an issue, such as family members. In many cases, workers are unlikely to take a strong stand unless community members are already supportive.

6.6 Sabotage

Actions that destroy or disable machinery or other objects, but do not harm humans, are called sabotage. For example, workers in factories run by the Nazis in occupied Europe sometimes caused breakdowns, slowing production. To avoid reprisals for such action, they would make the breakdowns look like accidents. Some other sorts of anti-Nazi sabotage were more obvious, such as blowing up railway tracks.

Sabotage against a repressive ruler is easy to justify and can have popular support, but in systems of representative government, sabotage can sometimes be counter-productive, because it is easy to demonise saboteurs. Some environmental activists, notably those with affinities to Earth First!, have used sabotage to disrupt commercial operations, for example by putting spikes in trees that are to be logged or putting sand in the fuel tanks of tractors.[6] Earth First! activists are extremely careful to avoid any danger to humans or to non-human animals. When spiking trees, they notify companies about their actions to avoid the danger to workers at sawmills when saws hit spikes and break. Nevertheless, the potential risk can itself be enough to alienate both workers and members of the public, and authorities seize on the danger, referring to eco-terrorism. In many places, activists discourage this

6 Dave Foreman and Bill Haywood (eds.), *Ecodefense: A Field Guide to Monkeywrenching* (Tucson, AZ: Ned Ludd Books, 1988, second edition); *Earth First! Direct Action Manual* (Eugene, OR: DAM Collective, 1997).

sort of sabotage because it can reduce support for the movement.

Sabotage online, for example defacing an opponent's webpage, can't hurt anyone physically. Especially when there is a humorous angle, this sort of action has better prospects of being seen as an acceptable way of striking against the opponent.

There are important limitations of any form of sabotage. It requires secrecy and usually only a few people are involved. Therefore participation is limited: sabotage is not the basis for a mass campaign. Because of the secrecy involved, there are fewer restraints on actions: there is less discussion and less peer pressure to ensure that actions are the most effective. Therefore, there is a greater risk that some supporters will do things that are counterproductive. For this reason, some environmental groups disown tree spiking and other forms of ecotage.

Another problem is that sabotage can lead to increased government repression. In response to sabotage by animal rights activists, governments have responded with spying, infiltration, arrests and prison sentences. Dissent becomes seen as criminal behaviour, and other groups, not involved in sabotage, may be caught up in police operations.

6.7 Organising

Lobbying is an approach based on trying to influence people at the top — those with more power. Engaging in elections often has the goal of getting the right sort of people into positions of power. These approaches can be

called "top-down": the people at the top take the initiative, influencing or controlling people with less power. For example, when governments mandate fluoridation, there is little prospect for resistance, except by avoiding drinking water from the tap.

The opposite approach is "bottom-up": build support from all sorts of people — ones not in positions of power — and rely on this support to bring about change, through personal connections or direct action. If many people oppose fluoridation, then usually some of them will be willing to agitate in various ways to bring about change, though there are no guarantees. The bottom-up approach can also be called grassroots organising and mobilisation, which means building support among ordinary people, in all walks of life.

There is a whole body of knowledge and experience in grassroots organising, most commonly called community organising.[7] The most common form — a community development approach — supports people living with social and financial disadvantage to develop their skills, understandings and capacity to act. This might involve going door-to-door in local neighbourhoods, meeting people, finding out about their problems and concerns,

7 The classic reference is Saul D. Alinsky, *Rules for Radicals* (New York: Random House, 1971). See also Chris Crass, *Towards Collective Liberation: Anti-racist Organizing, Feminist Praxis, and Movement Building Strategy* (Oakland, CA: PM Press, 2013); Robert Fisher, *Let the People Decide: Neighborhood Organizing in America* (Boston: Twayne, 1984); Eric Mann, *Playbook for Progressives: 16 Qualities of the Successful Organizer* (Boston: Beacon Press, 2011).

figuring out which issues might trigger action, discovering individuals who can become leaders, running workshops in skills for taking action, and advising about how to deal with resistance.

Skills in community organising can be used in scientific controversies. Opponents of nuclear power, for example, have gone door-to-door with petitions, addressed workplace meetings and neighbourhood groups, held meetings at people's houses, put leaflets in people's mailboxes, and in other ways followed the model of community mobilisation.

Organising — in the traditional form of organising in poor communities — is somewhat different from the usual conception of activism. An organiser assumes there is a problem, such as poverty and exploitation, and seeks to assist people to develop the skills and understanding to bring about a change. An organiser seeks not to convince people about a viewpoint, but rather to interact with them and facilitate the development of their understanding of their own situations, especially their individual and collective capacities to take action. An organiser seeks not to serve an existing organisation, but rather to encourage people to join or create organisations that will serve their own needs. An organiser seeks not to lead actions, but rather to find individuals who will become leaders. An organiser does not come with a pot of money to sponsor support, but encourages people to draw on and develop their own resources. An organiser seeks not to be at the centre of the action, but rather to help create a self-sustaining capacity for organisation and action — so the

organiser can leave and do the same sort of organising somewhere else.

An organiser in a scientific controversy seeks the same sorts of goals as an organiser in a poor community, but the context is somewhat different. A climate-change organiser might try to find concerned individuals who can develop their knowledge and skills and take leadership roles, encourage the creation of local groups, foster liaison concerning strategy, and suggest avenues for taking action. This is a process of helping to build a movement

On some issues, there is a natural constituency. For example, workers who develop mesothelioma or other asbestos-related diseases are an obvious group to become active on the asbestos issue — as are family members of these workers. On the other hand, although climate change potentially affects millions of people, those likely to be most affected in large numbers are future generations: people living today often become involved because of social concern, which might be called altruism: it is seldom about self-interest.

Organising is a different orientation to change than campaigning. Those who think they know the truth often assume everyone will agree with them if only they know the facts — the truth. This leads to lots of effort getting information out, whether by lobbying, advertising, leafleting, speaking, blogging or other means. Organising is based on a somewhat different set of assumptions, namely that the reason a social problem continues to exist is that not enough people have mobilised to act.

	Campaigning	**Organising**
Assumption about basis for change	People need to know the truth	People need to act together
Characteristic methods	Lobbying, advertising, leafleting, speaking, blogging, protesting	Canvassing, training, advising
Time frame	Short term	Medium and long term
Role of committed individuals	Promoting the issues	Finding and encouraging leaders
Relation to organisations	Work for or with organisations	Encourage creation of organisations
Profile of committed individuals	High, medium or low	Low
Key capacity	Knowledge and communication abilities	Encouraging others

In scientific controversies, campaigning is far more common than organising. However, most people familiar with campaigning will realise that organising occurs too, though perhaps not systematically. Indeed, the distinction between campaigning and organising is artificial. An experienced climate campaigner might visit a town and give a public talk and, during the visit, meet with local activists and give advice on building skills and taking action — namely adopt some organising roles.

In the long run, organising can be the most powerful basis for change. It is the approach most suitable for the side with less money and power. Corporations, governments and professions can use their influence to push

policy and practice in desired directions: that is why the rich become richer. To counter groups with vested interests, knowledge and logic are not enough. Mobilising many supporters is a way to have some success.

Organising is not glamorous. Organisers normally keep a low profile. Their goal is to help others become skilled and confident enough to take leadership roles. A prominent spokesperson or figurehead gets most of the attention; a good organiser gets results.

6.8 Personal contacts

Think of all the people you know, in all aspects of your life, including family members, friends, co-workers, salespeople and others, with whom you could strike up a conversation. In terms of their jobs, this might include shop assistants, accountants and hairdressers, among others. In terms of their leisure activities, this might include members of sporting clubs or dancing groups. You have a range of people with whom you might discuss your issue, whether overpopulation or Gulf War syndrome.

Next, think of others involved with your issue: they also have personal contacts. If your group has six members and everyone writes down all their contacts, the resulting list could be extensive. If you decide to spread the message to many or all these people, you can have quite an impact. If just a few of them become concerned, learn about the issue and start talking to their family, friends and co-workers, the message will spread.

Politicians can be influenced via personal contacts. Perhaps you talk to a friend who is a personal trainer, one

of whose clients is a teenager whose best friend is a politician's daughter. If your message starts spreading, the politician will hear about it from the daughter, and that may be more effective than hearing it from you. In other words, by talking to a friend, you may have more influence than by being a lobbyist. So spreading the message through personal contacts can be very effective.

Many activists tell some of their friends about the issues that are important to them. If they are passionate about an issue, they might also tell family members, co-workers, neighbours and anyone they happen to meet, such as shopkeepers and taxi drivers. If everyone in a group does this, the impact can be substantial.

Telling your friends about an issue relates to the points raised in chapter 3 on arguing. I've included it here because it's a way of taking action, closely linked to community organising.

There is a down side to telling everyone you know about an issue: your apparent obsession might alienate family and friends. Ever time they see you, they know they are going to hear about food additives or large dams or whatever — and some of them don't want to. To avoid this, they might start avoiding you. Even worse, they might be turned off about the issue, or become an opponent, because they think you are so obsessed there must be something pathological about your cause.

To be effective in presenting an issue to family, friends and others, there are several important things to remember.

The relationship

You need to think about what your relationship means to both you and the other person. Is it something deep that you want to last, even if you disagree about cancer therapies? Or is it purely an instrumental relationship, in which you want to win over the other person, even if this wrecks your long-term connection? For many people, maintaining a relationship with family members and friends is more important than any issue. If you turn off everyone close to you because they don't agree with you, before long you'll only talk to people who do agree — and your influence in changing opinions will be much smaller.

The approach

With some people you know, you might decide to raise the issues in a formal fashion, almost as if you are lobbying them. (So make sure you are prepared.) However, this might be counterproductive, if they think you care more about them as a means to an end than as a person.

Another approach is to bring up your favourite issue casually, or mention that you're involved, without suggesting any need to discuss it. If your friend then expresses interest, you can comment a bit and wait to see if they want to continue. You take your cues from the other person. As soon as you notice they are no longer interested or are feeling uncomfortable, you back off. This sort of softly, softly approach can be more effective with many people, because they see that you are sensitive to their concerns. You are not so much trying to win them over as letting them know about information and perspec-

tives you think are important, encouraging them to think about the issue for themselves.

Chris: "Did you hear the latest story about mobile phone hazards? What do you think?"
Sam: "It's a bit of a worry if using my phone increases the risk of a brain tumour."
Chris: "Everyone's using them, and people aren't dropping dead in the street. Surely the risk can't be that great."
Sam: "I think what the scientists are trying to do is figure out if there's a slight increase in the risk. They use statistics, because we wouldn't notice the difference otherwise."
Chris: "So do you think we should stop using our phones, or just carry on?"
Sam: "I'd be most worried about young kids using their phones 8 hours a day. Their brains are more vulnerable than ours."
Chris: "I'll have to tell our little Janice to restrict her use."
Sam: "Personally I'm more worried about mobile phone towers. That's where you can get a stronger dose of microwaves — and it goes on all the time if you live too close."
Chris: "You think so? Where are the nearest towers, anyway?"
Sam: "Just a few blocks away, at the corner of First and Jones. Some locals tried to stop it, but couldn't."
Chris: "What's the option? I need my phone to do business. In fact, the whole economy seems to depend

on phones. Surely the government is making sure everything is as safe as possible."
Sam: "The trouble is, there's hardly any independent research into risks or into options for improving safety. So the government regulators rely on industry research."
Chris: "That's a bit suspect. Are you sure? What about this latest story about hazards?"
Sam: "I think it was one of the few studies by independent scientists. That's why it was newsworthy."
Chris: "You've given me a lot to think about. See you."
Sam: "See you, Chris."

In this conversation, Sam — Samuel or Samantha — knows a lot about mobile phone hazards, but doesn't come across as an authority or as a zealot, but instead introduces a few ideas along the way, responding to Chris's concerns and taking the conversation in new directions: statistical risk, hazards to particular groups (children who are heavy mobile phone users), phone towers, citizen opposition and the limitations of research. Sam thus keeps the conversation as an interactive process rather than preaching at Chris. Is this more effective? It depends a lot on the people involved. Sam knows Chris and may value ongoing interaction, and thus takes a low-key approach. There is no single best way to introduce ideas into a conversation.

Openness

Many campaigners are totally convinced they are right. They might indeed be right, but complete conviction is not

necessarily the best way to engage in a conversation. Others may see the campaigner as having a closed mind. (I'm referring to "the campaigner" because surely this doesn't apply to you!)

But of course you have a strong commitment to your position, otherwise you are hardly likely to persist in the face of concerted opposition. So how can you be open when you are committed?

The resolution to this problem is to listen and learn and be open to new information. If you are always telling others about the issue and not listening to what they say (because it's wrong or misguided), you may come across as narrow-minded and arrogant.

Listening means several things. It means taking the other person's points and concerns seriously, even if you disagree. It means recognising differences in interpretation and values, which cannot be reduced to matters of right and wrong. It means being aware of when some new evidence or argument comes up — where you are not an expert or don't have definitive answers — and being suitably cautious in your claims.

In polarised controversies, being open can be quite difficult, especially when you confront people with opposite viewpoints. They are trying to score points and, from your point of view, they may be bending the evidence. If you are equally one-eyed, not being willing to listen, then there's no point to the conversation except as a sparring match.

Winning the argument

Many people, especially those who know a lot about an issue, have a strong urge to win an argument. They want to have the last word, to show their knowledge or to refute what the other person says.

If you are in a formal debate, with time limits and an adjudicator, then winning the argument is a reasonable goal. But when you're in a conversation, should your goal be winning — or something else?

If you care about an issue and have a perspective you think is worthwhile, your goal might be to encourage the other person to also care about the issue or to understand your perspective. This is not the same as winning in a competitive sense.

When the other person makes a comment you think is foolish, misguided or just plain wrong, it is tempting to provide a fact or argument that takes advantage of this mistake. What does this do to the other person? It depends, but they might well resent your superior attitude — or they might become even more determined to have the last word themselves and to show you are wrong. In other words, your success in winning the argument might actually make the other person more committed to their viewpoint.

Another approach is to try to make the conversation a mutual exploration, in which both of you examine the issues. You can proceed with the goal of understanding the other person's position and thinking and helping them understand your own.

What is best depends on your relationship with the other person, the other person's knowledge and interest

and openness, and what each of you hopes to do in the conversation. Winning the argument might be a suitable goal — but it might not be.

Scenario 1
Chris: "Mobile phones are totally safe. The telecommunications agency has studied all the evidence and found there's not a single bit of credible evidence to show any danger."
Sam (trying to win): "Actually, there are dozens of studies by reputable scientists showing a potential risk. Nothing is totally safe. And the agency is dominated by industry-funded scientists."
Chris: "Oh yeah? Nothing is totally safe in a literal sense — you might as well worry about breathing mountain air. All those supposed studies have been discredited. …"

Scenario 2
Chris: "Mobile phones are totally safe. The telecommunications agency has studied all the evidence and found there's not a single bit of credible evidence to show any danger."
Sam (exploring): "What sort of evidence would make you think there might be a risk?"

To become a more effective, there is no substitute for learning more about the issue, as discussed in section 2.18. But as well as knowing about the issue, there are skills in engaging with people. Some campaigners develop a standard package of evidence and arguments and use it

over and over. This may work all right, but usually there's little improvement. If you want to become better, the key elements are practice and feedback.

Sam can analyse her interaction with Chris. After the conversation, Sam can write down everything she can remember about how it proceeded, namely what each of them said and how they said it. She then writes down what she needs to learn (facts and arguments) and goes and learns it. She can also write down what she learned about Chris's knowledge and perspective. If she didn't learn much, why not? Is there some way she could learn more the next time? Finally, Sam can write down some things she might have done differently in the conversation, such as making different points, asking different questions, using a different tone of voice, and using different gestures. She can think about how the conversation might have progressed otherwise. And she can think about how she might do things differently next time.

Learning to analyse your conversations is a vital skill. You can improve at this by getting feedback from others. If a friend is present during the conversation, ask them what they thought. "What was the other person's best point? How could I have responded better?"

To learn about the other side's thinking, it can be worthwhile being a devil's advocate: in a conversation with a stranger, argue for a position opposite to your own. This will give you insight into arguments on both sides.

In your group, you can organise conversation practice by having role-plays, with different members taking opposite sides, and then analysing the conversations. Another possibility is for two people to role-play a

conversation with others listening, and then collectively analyse what happened.

The main things are to pay attention to what you're doing and saying, reflect on it, try out different approaches and learn from feedback. This sounds elementary but few do it systematically, which means you can get a lot better than you ever imagined possible.

6.9 The long haul

Controversies can last a long time. Debates over nuclear power and pesticides started in the 1960s and continue today. Disagreement over fluoridation started in the 1940s; major struggles blossomed in the 1950s and continue today in much the same form. Climate change became the biggest controversy in the 2000s; it had a prior life as a less well-known debate going back to the 1980s and earlier.

Quite a few new participants in scientific controversies put in enormous energy and imagine that victory is possible within a few years. Seldom does this happen. Can you see yourself still passionately engaged 20 or 30 years from now?

Realising that controversies can last a long time helps to put efforts in perspective. The most that any individual can do is contribute to a larger process. Even very prominent campaigners depend, for their effectiveness, on the contributions of many others behind the scenes.

Implications

• Think long term. Assuming the controversy won't be over quickly, make sensible choices. For example, rather than rushing into making a statement on a seemingly urgent issue, take more time if there's a risk of damage due to errors made in haste.

• Pace yourself. It makes sense to make your campaigning sustainable over the longer term.

Elizabeth Hart comments
Pacing yourself is very important. It would be easy to become disillusioned and suffer burnout. You have to find a balance with everyday life. Also try not to feel too pressured to do everything at once, particularly when you're trying to cover a broad subject. It's not going to go away, just take it steady and you might get a breakthrough one day.

• Promote methods that build support over the long term.

• You can't do it all yourself. Put effort into recruiting allies.

Vaccination

What it is

Individuals are given vaccines to protect against specific infectious diseases. Different types of vaccine products are used to protect against diseases such as polio, measles, whooping cough and flu.

Arguments for

• Vaccination is responsible for dramatic declines in death and illness from infectious diseases.
• When a sufficiently large proportion of people is immune, disease pathogens have difficulty spreading, a form of community protection called herd immunity.
• The risks of vaccination are small and far less than the benefits.
• Unvaccinated children increase the risk of disease to everyone else.

Arguments against

• Before the advent of mass vaccination, many infectious diseases were already declining in incidence or severity.
• Many parents' reports of adverse effects from vaccination are dismissed as coincidence when there is no plausible alternative explanation.
• Vaccines are seldom tested for long-term adverse effects.
• Vaccination may be linked to increases in some auto-immune diseases.

Experts and authorities

Nearly all researchers and health authorities support vaccination, with an increasing schedule of vaccines as new ones are developed.

Vested interests

Pharmaceutical companies derive significant profits from the manufacture and sale of vaccines. The medical profession has staked its reputation on the claim that vaccination is one of the greatest public health measures ever developed.

State of play

In most countries, many vaccines are recommended or mandated. Vaccination coverage is usually higher in richer countries.

Alternatives

The incidence and impact of infectious diseases can be reduced by safer water supplies, better nutrition and higher standards of living.

7
Defending

7.1 Attacks

Verbal abuse, threats, censorship, harassment, dismissal: these are some of the methods of personal attack used in controversies.

It is certainly possible for a controversy to proceed without personal attacks: the evidence, arguments and value judgements are discussed, disputed and challenged. The key is that the focus is on the issues, not the people or organisations participating in the debate. The sign of attack is that individuals are targeted.

Some campaigners think it is quite legitimate to attack opponents. After all, they deserve it! Here, because I'm opposed to attacking, I'm not going to provide advice on doing it, but rather on defending. But to do this, it's necessary to describe attacks. Some prime avenues are:

- Devaluation: rumours and adverse comments are circulated by word of mouth, blogs or stories in the mass media, including that an individual is ignorant, lacks credentials, has conflicts of interest, is arrogant, is obsessed, is irrational, is a criminal, is unscientific or is involved in unsavoury sexual activities
- Workplace sanctions, including ostracism, harassment, reprimands, demotions, punitive transfer, referral to psychiatrists, dismissal and blacklisting
- Direct harassment, including sending targets abusive messages, holding vigils outside their houses,

conspicuously following them around (stalking), and shouting or chanting derogatory slogans

• Physical assault or danger, including beatings, shootings, bombings, forced psychiatric treatment, murder, and threats of harm to family members

These sound pretty bad, and they are!

Who is at risk? This depends a lot on the controversy and the sort of players involved.

• Anyone who plays a prominent role in a debate — for example through giving talks, writing articles and appearing in the media — is at risk of devaluation techniques.

• Employees who take a stand and who work within industries with vested interests are at risk of work-place sanctions.

• Politicians and corporate executives, especially when they are closely identified with policies, are common targets for direct harassment. Sometimes scientists are harassed. For example, animal liberationists might target a scientist in charge of a research facility or anti-abortionists might target a doctor.

• Direct-action campaigners, for example in forestry, are at risk of physical assault.

Harassment can discourage the target from being involved or sometimes induce a more conciliatory stance. On the other hand, it can be seen as unfair and heavy-handed, and sometimes can make the target more determined.

Harassment sometimes escalates, with damaging consequences. If it is seen as acceptable to yell abuse at an

opponent, then some activists might go further and sabotage the opponent's car, spray graffiti on their house, throw eggs or tomatoes at them, or physically assault them. These sorts of actions are much more likely to be counterproductive: they make the target seem like a martyr. Another form of escalation is attacks on lesser figures, some of whom may not be responsible for the policy. The worst scenario is harassment of someone who is actually your supporter, but playing a low-key role within the system.

7.2 Attacks on scientists

Scientists with expertise relating to controversial issues are special targets. Because this can make a big difference in the way a controversy proceeds, it's worth considering it in some detail.

> Melvin Reuber was a scientist who had developed a reputation studying cancers linked to pesticide exposure. He had had glowing reviews of his work at the Fredrick Cancer Research Center, until one day in 1981 when his boss hauled him in and castigated his performance. Even worse, his boss's written attack was published in a magazine published by pesticide manufacturers. Reuber, in distress, resigned. But then, recovering a bit, he sued but, after many years pursuing the case through the courts, he lost.[1]

1 Brian Martin, "Critics of pesticides: whistleblowing or suppression of dissent?" *Philosophy and Social Action,* Vol. 22, No. 3, 1996, pp. 33–55.

> George Waldbott, a doctor and medical researcher, was the most prominent US opponent of fluoridation from the 1950s through the 1970s. Proponents of fluoridation within the American Dental Association attempted to discredit Waldbott through a misleading dossier that was published in the *Journal of the American Dental Association* and distributed wherever Waldbott appeared.[2]

> Numerous scientists and engineers critical of nuclear power, from many different countries, have had their research grants withdrawn, lost their jobs, or otherwise been penalised.[3]

Attacks are most obvious and most ruthless when most scientists line up on one side, along with vested interests. In this situation, it seems that all authorities support one position — except for a few dissident scientists. Discrediting these dissident scientists then becomes especially important, because it can turn the issue from a debate to a monologue.

In the course of a debate, a scientist's research and public statements can be criticised. This is predictable and reasonable enough. However, personal attacks on the scientist's ability to speak and research opportunities are a different, and often much more serious, matter. There are lots of possibilities.

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2 G. L. Waldbott, *A Struggle with Titans* (New York: Carlton Press, 1965).

3 Leslie J. Freeman, *Nuclear Witnesses* (New York: Norton, 1981).

- Censorship of publications
- Refusal of permission to speak in public
- Denial of research grants
- Denial of opportunities to do research
- Reprimands
- Deregistration (of doctors and dentists)
- Blocking of publications
- Misconduct charges, investigations and hearings
- Demotions
- Forced transfers
- Dismissal
- Blacklisting (coordinated blocking from any job in the field)

Campaigning scientists are prime targets, but so are non-activist scientists whose results are threatening to the orthodoxy. The non-activists are sometimes seen as greater threats because they are perceived as straight scientists who are objective rather than partisan. Dissident scientists are prime targets of attack whenever they support a position opposed by groups with vested interests and especially when there are only a few dissidents. There is safety in numbers.

To better understand attacks, it is useful to note several of the things valuable to a vocal scientist. Each of these can be targeted in an attack.

- Livelihood, including job and job prospects
- Opportunity to do research
- Ability to speak out
- Reputation; credibility

Attacks on livelihood include demotion, dismissal and blacklisting, and the threat of any of these. Any scientist who is employed is vulnerable if their employer is linked to vested interests or is susceptible to pressure. A sympathetic boss can make a big difference.

Attacks on opportunities to do research include blocking research grants, refusing ethics approval, assignment to other duties, denying access to research data, and a host of other methods, sometimes subtle. Another way to prevent research is through overload, for example assigning heavy teaching loads to academics. Yet another approach is petty harassment, which can be so time-consuming and distressing that research is neglected.

Speaking out can be prevented through censorship, rejection of articles and de facto bans by media outlets.

Reputations can be attacked through rumours, misrepresentation, reprimands, public denunciation, and exaggerated attention to minor misdemeanours, among other methods. Attacks on livelihoods often damage credibility.

Melvin Reuber was vulnerable because he was an employee in an organisation that could be pressured by pesticide manufacturers.

George Waldbott was harder to attack. He had a successful private medical practice, so undermining his livelihood was not easy. Furthermore, he funded his own research, which did not require expensive apparatus. Although some of his submissions to scientific journals were apparently blocked by pro-fluoridation reviewers, he could usually find other

places to publish. The most damaging attack was the entry in the American Dental Association's dossier: pro-fluoridationists aimed directly at Waldbott's credibility.

Attacks may or may not be effective in discouraging or stifling those directly targeted, but there is a wider and more damaging effect on those who witness the process. Many others may be deterred from being involved or doing relevant research.

Most scientists like a quiet life. They would rather stay away from heated controversy, especially when their reputations might be affected. So when something even worse is possible — being prevented from doing their research, or even losing their jobs — most will prefer to avoid being involved.

If only a very few scientists are willing to do research or speak out on one side of a controversial issue like the health hazards of microwaves, and those few scientists come under heavy attack, this will discourage most others from becoming involved. That is why shooting down those few dissident scientists is such a crucial issue. It sets an example of what to expect.[4]

On the other hand, attacks on scientists can be seen as unfair and generate sympathy from those who find out about it. So there is also the potential to mobilise greater support.

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4 Brian Martin, "Suppression of dissent in science," *Research in Social Problems and Public Policy,* Vol. 7, 1999, pp. 105–135.

7.3 Responding to attack

The fundamental rule in effective response is to think before you act: consider options, seek advice and then proceed with the course of action most likely to work for you. Regularly evaluate the situation — especially actions by opponents and supporters — and revise your course of action as needed.

There are six main types of options to consider.

1. Leave; exit; get out

Some people, when faced with abuse or attacks or threats, decide to escape. This might mean physically moving to another city or country. In the case of being harassed at work, it might mean quitting the job. It might mean dropping out of the debate.

Leaving might sound like cowardice, but in some cases it is the wisest course of action. If your family is under physical threat, then leaving may be the best way to protect them. If your health is suffering because of abuse at work, quitting is often the best option. If abusive language or attacks on your reputation are causing you too much stress, then it might be better to stay out of the public debate.

Leaving doesn't necessarily mean giving up. You might find a safer place to live, a better place to work, or another issue to get involved in. Or you might contribute to the debate in a lower profile role, helping with memberships, finances or training rather than front-line debate. Or you might engage in the debate under a pseudonym, for example making comments on blogs from relative safety.

2. Don't respond; put up with it; ignore the attack; acquiesce

You're under attack — but you just ignore the abuse and carry on. If opponents are circulating rumours or making derogatory allegations, you can proceed with what you've been doing, and not respond. If your boss or colleagues are harassing you, you can just try to do your job and not give any indication that you're bothered. If you receive threats to your family, you can file them away and pretend they never occurred.

Sometimes it is effective to ignore abuse: opponents are trying to annoy you and to make you feel distressed and prone to unwise decisions. If you can just continue without letting the abuse affect you, then you deny them the satisfaction of having upset you. Sometimes workplace harassers give up if their efforts seem not to be having any effect. Many threats are just bluffs: they are attempts at intimidation, never intended to be pursued.

However, ignoring attacks is not easy psychologically. It can be distressing to be abused. At work, putting up with discrimination, dead-end tasks and ostracism can be hard to handle. Furthermore, not responding may not work: the attacks may continue or even escalate, as your opponents see that you are not going to do anything to stop their behaviour.

3. Reduce vulnerabilities

If you are being attacked or could come under attack, it can be useful to limit damage or risks by reducing vulnerabilities, especially weaknesses that are apparent to others. One step is to be extra careful when making public

statements, whether via blogs, media releases or interviews. Written items can be checked with others. Attacks might be launched if you make a mistake or foolish comment in haste or anger.

Maintaining good behaviour is a way of reducing vulnerabilities. If you're a public figure, it's risky to be involved in seemingly dubious financial arrangements, unusual personal affairs, or participation in strange rituals. If you are prone to yelling abuse, this could be revealed and used against you. Even your appearance, especially if unconventional, could be a point of vulnerability. Of course it is unfair to have to conform to arbitrary social norms: it should be legitimate to be able to have the same choices as anyone else about financial, sexual and other aspects of your life. You just need to be aware of the risks, and take whatever precautions you and your allies deem appropriate.

Having allies is important. The higher their status in the community, the greater the value of their being linked to you in some way. You can think about ways to forge friendships, memberships or affiliations that will provide protection via association with others who are valued.

Tips from Tanya

Tanya is involved with a field considered, by those in the mainstream, as fringe. It is referred to here by the fictional name "xylotherapy." Her advice could apply to people involved with aromatherapy, cold fusion, alternative cancer therapies, psychic phenomena or any number of other areas.

Don't present yourself as the "expert" even if you are. Instead, let others draw that conclusion and present you that way themselves. Then you can't be ridiculed so easily, especially if you don't have formal qualifications related to the area of the struggle. Instead, refer to and comment judiciously on other people's significant writings that address the issues you think are important. By doing so, you deflect the heat away from yourself and toward a person not directly involved in your struggle, making it more difficult for opponents to justify ridiculing and harassing you. The big bonus is that those following your comments will nevertheless see *you* as the expert: you acquire authority by association that is difficult to attain when only talking about your own material.

Look for people whom your attackers normally speak highly of, or would like to be associated with, and then quote their views and opinions extensively in order to neutralise their attacks on your own similar views. For example, while I may personally think doctors have only have a rudimentary grasp of xylotherapy, I frequently quote and refer to their comments and writings on xylotherapy, highlighting the good bits. I gain credibility by association, as discussed above. Because those who attack me are often from mainstream groups, they have trouble discrediting a lot of what I say without also discrediting a colleague or some other highly respected person. This confuses them, makes their job difficult, and they hate it. I try to avoid polarising myself against respected people or organisations in society. Instead, I

try to find common ground and use that as much as possible.

4. Complain to authorities; use official processes for pursuing grievances

The idea here is to find some individual or official body that will intervene to stop the attack and reprimand the attackers. For workers being harassed by co-workers, this might mean going to the boss; if the boss is the harasser, it means going to the boss's boss, or maybe the board of management or owners. For campaigners being defamed on blogs, the relevant authorities might be the moderator of the blog or the Internet service provider. If the attacker is a scientist, it might be possible to complain to the scientist's boss, or to a professional association. If the attack is by a journalist, it might be possible to complain to the editor or to a media watchdog body. Another option is to use the courts, filing a case for defamation, discrimination, harassment or whatever.

Complaining to authorities seems like an obvious option. After all, the authorities are supposedly there to ensure that professional standards are maintained. However, when dealing with a powerful opponent, authorities are seldom all that helpful. They may give only the illusion of providing justice. Individuals within official bodies such as grievance committees or professional associations may be doing as well as they can, but they are constrained in several ways.

- Their processes involve lots of technicalities, so the key issues are obscured.
- Their processes are slow.
- Their power may be limited.
- Their interventions may not solve the problem.

Before seeking support from an authority, it's worth finding out how others have fared in similar situations. If you are thinking of complaining to the boss's boss or to a professional association, try to find out who else has done this before and what their experiences were. The odds are you can't obtain the information, in which case this approach is a huge gamble.

Many whistleblowers believe official channels are the solution to their problems, but their actual experience is that official channels hardly ever work.[5] Unless you have good evidence that a particular procedure has worked for others previously, and that the odds of success are good, it is wise to not rely on official channels.

5. Fight back

With this option, you retaliate using the same methods as your opponents. If they put abusive comments about you on a website, you put equally scathing comments about them on your own website. If they tried to disrupt your talk, you organise to disrupt their talks.

Fighting back can be emotionally satisfying — but is it effective? You have to remember that the debate doesn't just involve you and your opponent: others are observing

5 Brian Martin, *Whistleblowing: A Practical Manual* (Sparsnäs, Sweden: Irene Publishing, 2013), chapter 7.

the encounter and judging the sides according to your behaviours.

If you are on the side with fewer supporters or less money and power, then fighting back using the opponent's nasty techniques is usually a mistake. You are in an unequal battleground, and by playing the opponent's game you throw away your greatest asset, a reputation for good behaviour.

Imagine this scenario. You're having an on-air debate and your opponent starts making nasty comments or even shouting and pointing fingers. If you start doing the same thing, then audiences who know little about the issues will have nothing to choose between the two of you. But if only your opponent behaves abusively, then many audience members will be sympathetic to you.

Powerful opponents often prefer that you respond aggressively. When you say something nasty, this gives them the pretext to be nasty themselves — and they have the numbers and/or money to be more effective at it. This is the same reason that police sometimes use infiltrators to encourage protesters to be violent. When you adopt even just a bit of your opponent's bad behaviour, observers see two sides behaving badly — fighting, yelling, being abusive, trying to censor, or whatever — and don't think so much about which side has more power.

6. Expose the attack and seek to win allies

When the other side uses methods that others might think are unfair, a powerful form of response is to expose the methods to wider audiences — but not respond using the same methods. This can be called an assertive response: it

is neither passive nor aggressive, but is a principled form of resistance. To formulate this response more effectively, it is useful to understand the process of outrage management, described in section 7.4 below.

A scientist considers the options

Clem, a junior scientist, works at a government research body and comes up with some findings about the adverse health effects of a chemical. She gives a preliminary draft of her results to her supervisor who, a few days later, calls her in and says the findings need to be checked — and that an industry collaborator will not be happy. For Clem, this rings warning bells. She considers her options.

1. Leave. Clem had recently been sounded out for an academic job, which would allow her to continue the research with less pressure. She needs to find out whether the job offer still stands and whether she could use the data from her government post, otherwise months of experiments would need to be redone.

2. Acquiesce. Clem meekly repeats all her experiments and finds the same results. Her supervisor gets her to report the findings in a way that minimises awareness of the hazard.

3. Reduce vulnerabilities. Clem makes sure all the requirements for her job are satisfied. She makes sure she has records of ethics approval, performance reviews and leave entitlements. She tries to appear relaxed and unconcerned, and says nothing about her private life.

4. Complain. Clem considers whether to make a formal complaint to the internal ombudsman. It doesn't seem like there's all that much to complain about yet, but if she waits until later, problems may be much worse. She needs to find out whether anyone else has made a formal complaint and, if so, what happened.

5. Fight back. Clem fiercely resists her supervisor's request and announces that if there's a hazard, the public needs to know and industry should stop using the chemical. This outburst was emotionally satisfying but it may cause grief later, as Clem finds numerous small impediments in her path, interrupting her research and making it difficult to publish her findings. Clem acquires a reputation as being emotional (and hence "unscientific") and finds her collaborative research opportunities reduced.

6. Document and be prepared to expose and challenge the problem. Clem writes a private account of the meeting with her supervisor. Outwardly she conforms but she seeks opinions from others about any similar experiences of industry pressure. She makes copies of all her research data, and keeps a copy off-site, as a precaution. She makes contact with researchers in other organisations studying similar chemicals, discreetly determining their positions. She finds out which journals are open to findings like hers. She checks out environmental groups that might be interested in the results. She collects more and more information (research data and information about options) so she can later speak out, leak the findings, and encourage her supervisor to support her. If necessary, Clem can leave her job — and take the information.

There is no single correct option for Clem. In some circumstances she might be better off putting up with the difficulties and continuing her research as well as she can. If there's an attractive job on offer, leaving might be better. If there's a recognised and hard-hitting grievance process — unlikely, but conceivable — then this might be the best road. Fighting back is seldom advisable, but there are a few bosses who respect disagreement and independence and, when confronted, will back off and actually be more supportive in future. Finally, the assertive option of documenting, exposing and challenging the problem has promise in some situations.

Clem needs to:

- recognise what is happening
- consider a range of options
- learn about the circumstances: learn about individuals (in particular, her boss), processes, precedents, possibilities
- consult with experienced people who can be trusted
- choose a course of action
- monitor what happens and reconsider if necessary.

This isn't easy, nor does it come naturally to Clem, who prefers to do research rather than engage in organisational politics. It's all the more important to seek out people who can give wise advice.

There are now many people trained to be coaches for business, career planning and making life decisions. Clem might find it useful to find such a coach, even one unfamiliar with scientific research. A coach will help

Clem clarify her goals, assess the situation, examine options and choose a way forward.

7.4 Outrage management

When opponents attack, they often do something — use abusive language, censor publications, spread rumours, play dirty tricks — that observers see as inappropriate. In fact, observers may be upset, outraged or disgusted by attacks. If this emotional reaction can be harnessed in your support, then the attack can backfire on the attackers: it will be counterproductive.[6]

Sal is a prominent campaigner. Following an exchange with an opponent, he tweeted some sexist and racist comments. The opposition sent these around to its members and posted them on its website. Sal's comments backfired on him, hurting the cause.

In 2012, the Heartland Institute, a free-market think tank in the US, put up a billboard advertisement with the words "I still believe in Global Warming. Do you?" next to a photo of Ted Kaczynski, dubbed the Unabomber, a criminal notorious for sending lethal homemade bombs through the mail. This attempt at discrediting global warming through association with Kaczynski triggered a backlash against the Heartland Institute, with many companies withdrawing their support from the organisation.

6 See "Backfire materials," www.bmartin.cc/pubs/backfire.html. See especially Brian Martin, *Backfire Manual: Tactics against Injustice* (Sparsnäs, Sweden: Irene Publishing, 2012).

There are five main ways to reduce outrage from an action and thereby reduce the risk of backfire.

- Hide the action.
- Devalue the target.
- Reinterpret what happened.
- Use official channels to give an appearance of justice.
- Intimidate and reward people involved.

Scala, a productive scientist at a government research laboratory, did research showing a widely used drug had unexpected adverse side-effects. The drug's manufacturer put pressure on Scala's boss, and Scala's job was terminated. The manufacturer and Scala's boss can use each of the five methods to reduce outrage.

- Cover up the action. The manufacturer and Scala's boss do not reveal their interactions. No announcement is made about Scala leaving.
- Devalue the target. Rumours are spread that Scala had to leave because of poor work and unsavoury sexual behaviour.
- Reinterpret what happened. When challenged about Scala's departure, Scala's boss said it was by mutual agreement and due to funding shortfalls.
- Official channels. Scala went to a tribunal and alleged unfair dismissal. Months later, following a long and highly technical assessment of claims, the tribunal declared it had no jurisdiction.
- Intimidate and reward people involved. Scala's colleagues were afraid to speak to the media because

they might also lose their jobs. Scala's boss received a lucrative grant from the manufacturer and, later on, high-paying consultancies.

These five methods are used regularly by powerful perpetrators of injustice, for example governments, large corporations, and bosses. On the other hand, perpetrators without much power are less able to use these methods. Imagine trying to frame your boss for embezzlement. You can try to hide your activities but have little capacity to overtly devalue the boss, reinterpret your actions once they are known, use official channels to protect yourself or to intimidate others. The five methods are used mainly by those with more power.

The five methods are commonly used, but what actually happens varies from case to case. Sometimes an attacker needs only the method of cover-up to reduce outrage, with other methods deployed if cover-up fails. Sometimes attackers are brazen and don't bother to hide or reinterpret their actions, thinking they are invulnerable. Powerful attackers commonly use the five methods intuitively, rather than according to a plan. They seldom think of themselves as deliberately unfair; instead, they think their actions are necessary or justified. They believe their reinterpretations. Often, they think they are the ones suffering an injustice.

Suppose you are giving a talk about kangaroo culling policy, and opponents of your view start shouting and calling you names. Some in the audience, who do not have strong views about kangaroo culling, may think the way you're being treated is unfair — but only if you do not

respond the same way. If you are also personally abusive, just occasionally, then observers are likely to see both you and your opponents as abusive, even if your opponents are much worse.

This leads to a fundamental rule: in order to make attacks backfire, avoid counter-attacking.

If the other side is behaving badly, be prepared for attempts to provoke your side into unwise actions. If you're giving a talk, members of the audience may yell out nasty comments and hope that you will respond with a derogatory comment. If you do, they will quote it — and perhaps circulate a recording — and use this one rash comment against you. Your lapse turns one-sided abuse into an exchange, and your moral advantage is squandered. Rather than being provoked, it is far better to ignore the abuse or perhaps ask, "Can I quote you on that?"

If you know what the attackers can do to reduce outrage, you can respond in ways that increase outrage. As well, you can plan your activities so attacks are less likely. For each of the five ways to reduce outrage, there is a corresponding way to increase it.

- Expose the action.
- Validate the target.
- Interpret the action as unfair.
- Avoid or discredit official channels. Instead, mobilise support.
- Resist intimidation and rewards.

Consider each of these methods in turn, using the example of a scientist who is harassed and eventually dismissed.

Expose the action

Attackers usually prefer to operate out of the public eye, covering up their actions. The obvious way to challenge this is to expose their actions to wider audiences.

The foundation for exposure is to collect evidence about what is happening. The best evidence is unambiguous, unimpeachable, vivid, ample and secure.

Unambiguous. The evidence needs to be clear to outsiders. Emails from the boss asking you to delete some files might be evidence of a cover-up — but only if there also is evidence the files contain unwelcome data.

Unimpeachable. The attackers will try to discredit your evidence. The boss might say, "I never sent that email." If you have signed statements from two colleagues that they received the email, or vouched for it, this provides support.[7]

Vivid. Exposure is more powerful when it uses images or words that resonate with audiences. In 2004, photos from Abu Ghraib prison in Iraq were published, showing US prison guards torturing and humiliating Iraqi prisoners. This was the ultimate in vividness, causing a cascade of condemnation. Prior to the publication of the photos, reports had been published about abuse at the prison, but these reports had received little attention.

You're not going to have Abu-Ghraib style photos, but you might have messages from the boss with some striking words. If a reader or viewer isn't disturbed by the

7 To hide your colleagues' identity and protect them from reprisals, you might give their statements to a lawyer or other figure who can say they have viewed the statements.

evidence, it may be that the material you've chosen isn't vivid enough.

Ample. You need plenty of evidence. A rule of thumb is to have ten times as much evidence as you think you'll need. That's because your opponents will try to discredit the evidence, explaining it away as a mistake or misunderstanding or anomaly or joke. The more evidence you have, the harder it is to dismiss or discredit. Sometimes this means holding back from exposing the problem until you've collected more information.

Secure. You need to save multiple copies of your evidence. Imagine your boss coming into your office and destroying or confiscating your computer files. Imagine a break-in at your house and theft of your files. Imagine the most unlikely accidental loss of materials. Imagine a court order demanding surrender of documents. Then prepare for these sorts of contingencies by keeping back-ups in numerous locations, for example with friends nearby and in other countries.

After collecting evidence, the next step is to put it into a form that others can comprehend.[8] Sending someone a large file of emails or documents puts a heavy burden on them: how many people would be willing to read through 100 or 1000 pages of text in order to figure out what's going on? It is valuable to provide an explanation, for example an overview of the issues, to explain the signifi-

8 Explaining the issues and the evidence logically falls into the response category of "interpret the action as an injustice," but fits better here in a time sequence.

cance of the events and to provide a framework for understanding the documents.

When you have an overview ready, along with relevant documents, you are ready to expose the problem. Some possibilities are showing the file to your opponent, giving it to some close friends, sending an email to colleagues, giving it to a journalist and putting it on a website. How to proceed depends a lot on the circumstances.

> Scala, the scientist, put her job at risk by exposing the problem. Therefore, it might be better to wait until obtaining another job, or to consider leaking documents to a journalist or outside group.

> Tallon, a citizen campaigner, has collected evidence of dirty tricks by opponents. Tallon is retired and relatively safe from reprisals, and so can expose the dirty tricks directly, by putting out a media release and posting the materials on the group's website.

Why would you ever show the file to your opponent? Isn't that giving them a great advantage in being able to respond? There are several circumstances in which it's worth sending your material to your opponents.

• They are honourable, and try to behave in an open and honest way. They might disagree with you, but examine the material with an open mind. Perhaps they will be willing to correct some mistakes you've made. Perhaps they will be upset by the behaviour of some of their allies, and address their concerns to those allies, thereby curtailing the obnoxious behaviour without you having to do

anything more. They might not realise that their own behaviour is inappropriate, and be thankful for the feedback.

• They are prone to going to court as a method of attack. By sending documents to them, you give them the opportunity to point out any legal objections, such as false and defamatory statements. If they don't take this opportunity, then their lack of action will look bad if, later, they do sue.

• They are likely to go ballistic with anger, make abusive statements and unwise decisions, and thereby discredit themselves. An abusive boss, for example, might launch into a tirade. If you're prepared (with a covert tape recorder), this might be the opportunity to document the problem much more vividly.

Exposing — or threatening to expose — your opponents' abuse, double standards, dirty tricks and other inappropriate behaviour is often the most powerful method for responding. Ideally, it will make them regret and rethink their behaviour. On the other hand, they may resolve to continue but make extra efforts not to be exposed — or to discredit you or explain away what happened. This leads to the next two ways to challenge attacks.

Validate the target

The reputation of the target, namely the person or group under attack, is vitally important in struggles. One of the key ways to justify attacks is to discredit the target, for example by spreading rumours or claiming their beliefs are loony. If the target is seen as having low status, then things done to them — abuse, harassment, censorship, dismissal — don't seem so bad.

The opposite of devaluation is "validation," which means maintaining or increasing the status of the target. There are several ways to do this.

- Document good performance and good deeds.
- Be associated with valued individuals and groups.
- Behave honourably.

Suppose you are a scientist who has come under attack for dissident work, with claims that your research is substandard. It helps to be able to have documentation of good performance, for example publications, research grants, collaborations, favourable performance reviews and evidence of service to the profession. Anyone working in a sensitive area should make extra efforts to document their work, in anticipation of possible attack.

Next is being associated with valued individuals and groups. Statements from your colleagues and collaborators are helpful. So are letters from leading figures in the field. When respectable figures vouch for you and your work, the claims by your attackers may look misguided or vindictive. If you are a longstanding member of a respected organisation, this can help.

Finally there is the matter of behaving well. When you come under attack, the pressure is immense. Many people in this situation become frightened, sullen, demoralised — or distressed and angry. Your opponents may know how to poke, prod and needle you so you blow up in a rage. So beware — if you do something that can be portrayed as inappropriate, it will be used against you.

Your aim should be to appear calm, respectful, committed and friendly, and any other desirable attributes

you can think of! It's not easy. And it's unfair. Your opponents are the ones being abusive and sneaky, yet it's you who needs to behave well. This is the way the game is played. The world isn't fair. If you want to be effective, then think about how your behaviour will be interpreted by others. If observers see you behaving honourably in the face of spiteful attacks, more of them will support you. That's the idea, anyway.

> Scala was a member of the Society for the Advancement of Science, and had even been an office bearer. Several of her colleagues were respected figures in the field, with profiles in the wider community. She let her supporters speak on her behalf. When interviewed, she was calm and factual.

Interpret the events as an injustice

You're being attacked — unfairly. It might seem obvious to you, but it may not be obvious to others, especially if your attackers and their allies provide some plausible explanations. You need to get the message across that what's happening is wrong.

> When actions were taken against Scala, her boss said it was standard procedure and that no one was being targeted. When Scala lost her job, her department head said it was due to a shortage of funds, a reorganisation, an administrative process — anything that sounded legitimate.

There are several ways to communicate the message of unfairness to others. One is to say that it's unfair, and sometimes this is all that's needed to encourage people to

question the pretext provided. Often it's powerful to use the double standard test, showing that the target has been treated differently from others with the same performance: people will then ask, why has the dissident been singled out for adverse treatment?

Another way to emphasise unfairness is to use frameworks that highlight rights, justice and correct procedures. Attackers may use administrative or economic frameworks, talking about policies and costs. To switch frameworks, you need to talk in terms of free speech, scientific freedom, workers' rights or whatever is appropriate.

> When Scala lost her job, her supporters pointed out that ten other scientists in the department, with lower productivity, had not lost theirs. When the department head said the decision was based on financial assessments, Scala's supporters pointed to new appointments in another area and a financial surplus in Scala's unit. When the department head said there was no change in the department's commitment to research in the area, Scala's supporters showed that the research direction was being shifted.

Reinterpretation includes lying, minimising effects, blaming others and framing. Challenging these can mean exposing lies, showing the full effects of the actions, pinpointing responsibility and using a frame that highlights injustice.

Avoid or discredit official channels. Instead, mobilise support

When under attack, many people think automatically of obtaining justice from some authority, such as senior management, courts, professional associations, ombudsmen, journal editors or politicians, depending on the issue. These can work reasonably well if you are the more powerful party, for example if you're the boss or representing the government. But if it's the other side that's powerful, authorities often give only the illusion of protection from attack. They are slow, expensive, focus on technicalities and seldom provide much relief. In many cases they are worse than nothing.

> Scala, when under attack by her boss, wrote to senior management about what was happening. Before long her boss knew about this and intensified his attack: she had gone outside the line of command. She then went to the ombudsman for her organisation, but the ombudsman took so long making an assessment that it didn't help.

Whistleblowers — people who speak out in the public interest — regularly seek relief from agencies, such as ombudsmen, anti-corruption bodies, auditors and courts. Research shows that they report receiving useful assistance in only one out of ten times, and many times they are worse off than before.[9] Some whistleblowers try one agency after another, being fobbed off time after time.

9 William De Maria, *Deadly Disclosures: Whistleblowing and the Ethical Meltdown of Australia* (Adelaide: Wakefield Press, 1999).

Veteran whistleblower adviser Tom Devine, of the Government Accountability Project, has painted a gloomy picture about US whistleblower laws. Despite being periodically strengthened by Congress, the laws have been undermined by the courts. For example,

> Between passage of the 1994 amendments and September 2002, whistleblowers lost 74 of 75 decisions on the merits at the Federal Court of Appeals, which has a monopoly on judicial review of administrative decisions.[10]

If the odds are so bad, why do whistleblowers keep seeking justice from agencies? One factor is a cognitive illusion. The chance of success, based on previous cases, may be very small, but each individual whistleblower, being intimately familiar with their own case, knows they are right — and therefore assumes the outcome will be different. They don't stop to think that all the other whistleblowers knew they were right, too, yet were unsuccessful. The statistics aren't treated as relevant, but vivid experience is.[11] Unfortunately, this leads to poor choices and outcomes.

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10 Tom Devine, "Whistleblowing in the United States: the gap between vision and lessons learned," in Richard Calland and Guy Dehn (eds.), *Whistleblowing around the World: Law, Culture and Practice* (Cape Town: Open Democracy Advice Centre; London: Public Concern at Work, 2004), pp. 74–100, at p. 85.

11 See Daniel Kahneman, *Thinking, Fast and Slow* (New York: Farrar, Straus and Giroux, 2011), on base rates.

Instead of relying on official channels, it is far more effective to build support by talking to colleagues, preparing persuasive documents, tapping into networks, making allies, obtaining media coverage — indeed all the sorts of things that are effective in campaigning about a controversy. Coming under attack is best treated as another tactic in the controversy. Rather than seeking justice from some higher authority, it is better to think strategically, asking questions like:

- "What is my best option?"
- "How can this attack be turned against the attackers?"
- "How will my response help build our campaign?"
- "What are the attackers likely to do in response to my response?"
- "How will this be taken up in the media?"

Resist intimidation and rewards

When you come under attack, the stress can be incredible. It is tempting to retreat or give up, but often it is better to resist.

Sometimes it is better to retreat in the face of attack. However, to counter attacks, some targets need to resist, at least on some occasions. Likewise, when opponents offer huge bribes, such as funding or jobs, it is tempting to take the bait, but often disastrous for the campaign. Those who can be portrayed as "turncoats," for example switching from an environmental stand to a corporate post, are often trumpeted as somehow showing the superiority of the corporate stand.

Scala decided not to contest her dismissal, but instead encouraged publicity about the issues involved, while seeking another job. Her former employer approached her with an offer: they would arrange a redundancy pay-out, but Scala would have to sign an agreement preventing her speaking out about what had happened. She refused to sign and continued making public comment.

Conclusion

Attacks are often highly distressing. It is tempting to retreat and avoid the conflict, to bite back angrily or to seek intervention by some higher authority. These are understandable responses, but may not be the most effective. The most promising approach is to think though options, seek advice and support, make a decision and then take action.

7.5 Physical violence

The concept of violence has different meanings for different people. Some people refer to anything they don't like as violence, and there are various forms such as emotional violence and structural violence. Here, I mean physical violence such as beatings, torture and killings.

In a rally involving a confrontation between protesters and police, one or both sides may use physical violence. Protesters might use their fists or throw stones; police might strike protesters using batons or use pepper spray against them.

Sometimes the media report on a "violent confrontation," but actually the protesters were entirely peaceful. Only the police were violent.

In most countries, authorities treat the slightest physical violence by campaigners — such as opponents of militarism — as a serious threat, and do everything they can to use this violence to discredit the campaigners. (On the other hand, violence by police in the course of doing their duties is treated as legitimate.) Hence you need to realise that violence by your supporters is very likely to be counterproductive, and that your opponents may claim you are violent even if you're not.

According to correspondent inference theory, observers look at your actions and infer your motivations.[12] Al Qaeda's stated goals have been political, for example ending the Israeli occupation of Palestine and getting US troops out of the Middle East. However, most members of the US public did not interpret the 9/11 attacks as actions for these sorts of political goals, but rather thought the attackers had the goal of destroying the US way of life, hence the common plaint "Why do they hate us?"[13] The method used was violent destruction and therefore many people assumed the goal was also violent destruction. The implication is that terrorism — in this case the 9/11 attacks — was systematically misunderstood: the methods used sent a message far stronger than the official pro-

12 Max Abrahms, "Why terrorism does not work," *International Security,* Vol. 31, No. 2, 2006, pp. 42–78.

13 Ziauddin Sardar and Merryl Wyn Davies, *Why Do People Hate America?* (Cambridge: Icon, 2002).

nouncements by Osama bin Laden or other al Qaeda spokespeople.

Correspondent inference theory can apply more widely. When protesters use destructive methods, many observers assume their goal is destruction — and the stated purpose of the action is ignored or dismissed. Miscommunication when using violence is regularly fostered in two main ways. First, authorities usually want to discredit challenges, and therefore claim that opponents are violent, for example with labels of "eco-terrorism," even when they aren't. Second, the mass media give far more attention to violence than to peaceful protest. A large rally might be entirely peaceful except for a minor scuffle between police and a couple of rowdy participants, but the scuffle is most likely to be shown on television.

If methods of protest send a message independently of the stated goals of the protesters, it is sensible to think carefully about all aspects of an action. As well as the type of action — rally, strike, sit-in, etc. — these include:

- numbers of participants
- duration of the event
- sex, age and ethnicity of participants
- dress
- language
- behaviour: quiet, disruptive

Critical Mass is a monthly protest in favour of cycling: people join by riding their bikes. These actions send a message about who cares. If most participants are young and some nearly crash into pedestrians, this sends a

different message than if participants include diverse age groups and everyone cycles in a sensible fashion.

Be aware that you're bound to offend some people by anything you do. Some observers find any sort of action objectionable. Even a rally offends them, because it occupies space, or a boycott offends them because it challenges the supposed sacredness of the free market.

There's another consideration: your own supporters. They are prime recipients of the message implicit in your actions. When you hold a rally, they may feel inspired, validated or reinforced, whether participating or simply knowing about it.

So when methods of protest send a message, there are multiple audiences, including opponents, neutrals and supporters. An ideal action stymies opponents, wins over some neutrals and encourages supporters.

With this framework, what about violence, such as smashing a shop window or hitting a police officer? It might encourage some supporters, but it is likely to alienate others.

It's useful to know what the police would like you to do — assuming they are opposed to your group. A common police tactic is to provoke violence by protesters, for example by taunts or unnecessarily rough arrests. The police know that when protesters use violence, this will discredit the protesters and justify police use of force. Another tactic is for police agents to infiltrate groups and then to initiate violence or encourage others to become violent. These sorts of infiltrators are called *agents provocateurs.*

There is quite a bit of evidence of the use of agents provocateurs, but absolutely none of police using infiltrators to encourage protesters to use methods such as marches, sit-ins, vigils or boycotts. This suggests that nonviolent actions are far more credible.

Many activists realise that violence can be counterproductive and make strong efforts to minimise the risk, for example by only organising safe sorts of actions, by counselling against violence and by training members how to remain nonviolent in the face of provocation.

7.6 Radical flanks

Suppose you are involved in a mainstream group, the respected conservation organisation ZZZ, and there is another group, Radenv, with the same environmental concerns, but which has more radical goals, such as socialism, or uses stronger methods, such as lock-downs and sabotage. What is the effect of Radenv on the success of environmental campaigning? There are two possible scenarios.

1. Radenv demonstrates that there are people seeking radical change. Opponents turn to ZZZ as a safe alternative. In this way, Radenv gives ZZZ more credibility and influence.
2. Radenv's positions and actions are seen as so extreme that they discredit the movement as a whole. Radenv undermines ZZZ's credibility and influence.

Radenv is called a "radical flank." A radical flank is a group seen as outside the mainstream: it is off to the side

— the flank — of the rest of the movement. The influence of Radenv on the movement can be positive or negative. Scenario 1 illustrates a positive radical flank effect and scenario 2 a negative radical flank effect.

Radical flanks are quite common in public scientific controversies.

• For those supporting euthanasia, the mainstream position is to use education and lobbying for legalisation of dying with dignity, with tight controls on who has access to euthanasia. Groups like Exit International, that give people information on how they can end their own lives peacefully, are radical flanks.

• In the animal liberation movement, the mainstream includes campaigning using education and public protest against mistreatment of animals, factory farming and in favour of vegetarianism. Groups that liberate animals from research facilities are a radical flank.

Radical flanks are normally thought of as using more extreme methods — such as liberating animals, an illegal activity — or having more far-reaching goals — such as giving people the knowledge of how to end their lives on their own terms. But in scientific controversies there is another sort of radical flank: extreme claims.

In the climate change debate, the IPCC represents the mainstream view that global warming is occurring, is most likely caused by human activity, and that serious efforts are needed to reduce greenhouse-gas emissions. This sounds significant enough, but some campaigners

> go much further, saying that global warming is happening much more rapidly than the IPCC predictions and that a massive mobilisation of resources is needed to drastically cut greenhouse-gas emissions, akin to a wartime emergency. In relation to the IPCC mainstream, such campaigners are a radical flank. To the extent that this "alarmist" position gives more credibility to the IPCC mainstream and pushes action along, these more alarmist campaigners cause a positive radical flank effect. To the extent that they cause decision makers and citizens to become more sceptical, because they think the problem has been exaggerated, they produce a negative radical flank effect. Both these effects can occur at the same time, and it may be difficult to sort out the net effect of a radical flank.

A radical flank effect can occur whether or not the radical flank has the correct scientific or political position. The question is not whether a position is right or wrong, but what effect it has on the debate.

Radical flanks can occur on both sides of a debate.

> Modest climate sceptics say that the evidence for global warming is not as strong as claimed by the IPCC and that expensive measures to cut greenhouse-gas emissions are not warranted. More extreme sceptics say that no global warming is occurring and that mainstream climate scientists prevent publication of sceptical findings to maintain their research money, and climate change campaigners are trying to tear

down civilised society. If sceptics sound too extreme, they may discredit the sceptical position.

What should be done about radical flanks? It depends. If you are in the mainstream and have to deal with a radical flank, obviously you'd like it to have a positive effect rather than a negative one. Often there is little that can be done — people's positions are too entrenched. Even so, it can be useful to open lines of communication, namely to talk to members of the more extreme group. Perhaps you have more in common than you realised. Perhaps there are opportunities to coordinate your actions. Perhaps you can agree to disagree. If nothing else, it can be useful to understand the other group. Even if you feel obliged to publicly distance yourself from actions of the radical flank, there may be value in maintaining some connections.

The same applies if you are a member of the radical flank. Campaigners with more extreme positions often see those in the mainstream as compromisers or sell-outs, who actually help maintain the system that causes the problem. If there is an emergency, then those who want to move slowly and carefully may seem like part of the problem. Ironically, though, your efforts may be valuable in supporting this mainstream position, making it seem reasonable and achievable. So it can be worthwhile to talk to those in the mainstream and see what you can do to help promote the issue, and perhaps move the mainstream a bit toward your position. Down the track, there may be a new radical flank, more extreme than you — you might become part of the new mainstream. Alternatively, if the

other side is winning, then what is now the mainstream may seem radical.

7.7 Surveillance and infiltrators

You're having a strategy meeting and, unknown to you, someone from the other side has installed a microphone in the room and is able to record and listen to everything you say. Surveillance is possible and is becoming easier technologically.

- Your phone can be turned into a microphone, so others can listen to everything you say.
- A program can be installed on your computer so every keystroke is recorded and transmitted.
- What you say in a room can be detected through the vibrations on a window, monitored by a laser.

Should you be worried about this sort of surveillance of your discussions? In most controversies and for most people, the answer is "probably not." Surveillance is most likely by police against those seen as threats to the state, which includes groups planning violence, extremist groups (left-wing or right-wing), and groups capable of mobilising mass action. Peace and environmental groups have been subject to surveillance, but there is little evidence of police monitoring of groups active on controversies over chronic fatigue syndrome or smoking. However, there may be more surveillance than people are aware of.[14]

14 Eveline Lubbers, *Secret Manoeuvres in the Dark: Corporate and Police Spying on Activists* (London: Pluto Press, 2012).

Many activists imagine their phones are tapped or their emails intercepted. But in most cases, there is a greater risk from infiltrators: people who support the other side who attend your meetings and report on your plans and activities.

Are there a lot of infiltrators? Occasionally news emerges about a prominent activist who for years had been feeding information to the police or other authorities. In some cases, infiltrators exploit a group's vulnerabilities, by being highly sympathetic to the cause — saying all the right words — being energetic in support of the group's efforts and by forging close personal relationships, including sexual relations, with group members. There seems to be no easy way to determine who might be an infiltrator or who might be genuinely sympathetic but still willing to provide information to opponents in exchange for money or other benefits.

Some groups become wary of newcomers and may put members through various tests of loyalty. This sort of approach can be effective in reducing the chance of infiltration but at a severe cost: the paranoid atmosphere can alienate potential members; sometimes the group expels someone, suspected of being a traitor, who is actually genuine. The damage from misguided suspicions and loyalty tests can be worse than the damage from an infiltrator.

Instead of becoming paranoid about surveillance and infiltration, another approach is to make your group and activities more open. This means there is less to hide and hence little to gain by putting the group under surveillance.

A group was planning a civil disobedience action. It notified the police and invited the police to attend its meetings. (None did.) It forwarded minutes of its meetings to the police. This openness meant the police knew what was being planned and were not afraid of antagonism or violence. On the day of the action, the police were accommodating.

Conclusion

In some controversies, campaigners treat opponents with respect: the issues are debated openly and fairly. That is the ideal. In many controversies, though, all sorts of aggressive methods are used, including personal abuse, complaints to professional bodies, legal actions and physical attack. These sorts of methods can be disturbing and distressing, and cause some people to withdraw. In the worst scenario, abuse escalates on both sides, and those seeking a middle ground are increasingly marginalised.

The good news is that by being prepared, it is sometimes possible to make attacks backfire. The more campaigners who are able to expose and discredit attacks, and the more successful they are in doing this, the less likely opponents will be to attack in the first place. The bad news is that persevering in the face of attacks can be incredibly difficult, especially for those with few allies and limited popular support. If you can survive while retaining a measure of grace and a sense of perspective, you will be a model for others.

8
Being principled

Honesty, courtesy, transparency, citizen participation — many people see these as desirable. They are possible principles or goals for participants in scientific controversies. But are they viable? What if being honest is a prescription for losing, and losing means disastrous consequences?

The alternative to sticking to principles is doing whatever is required to win and saying "the ends justify the means." Following this approach, creating an ideal society might require killing a few people, or maybe a few million.

Maintaining principles can be difficult, and there are situations in which a principle needs to be compromised. For example, providing a media sound bite can mean your message comes out sounding less than full and frank. Situations in which principles clash can be especially difficult.

Although principles are not ironclad guides, it is worthwhile thinking about appropriate behaviour. There are several reasons to try to maintain principles.

- Principles are worthwhile in themselves, even if violating them gives better results.
- Following principles leads to better results; violating them creates the potential for disaster.
- Following principles helps create a more desirable society.

8.1 Being honest

Telling the truth is widely recognised as a virtue, though in practice people lie every day in small ways, and sometimes in large ways. Lying is normally thought of as telling falsehoods; researchers on lying also include withholding the truth.[1]

In a controversy, there are several potential audiences for lies. One is in public debates. In selling one's position, it is commonplace to spin the evidence to advantage, citing favourable studies and not mentioning unfavourable ones, emphasising helpful arguments and misrepresenting contrary ones. Is this lying? In many cases it's not, because lying involves an intent to deceive. Campaigners see things from their own sets of assumptions and values, so what one side sees as a cut-and-dried conclusion is disputed by the other, with each side being entirely sincere.

However, deception does occur. For example, a campaigner might say "I've never received any industry funding." If evidence of industry funding surfaces, this sort of false claim can be very damaging. In such a situation, dishonesty might help the cause in the short term but at the risk of being harmful should the truth be revealed. So it is useful to be aware of information that might be harmful should it become public knowledge.

This brings up another audience for lies: campaigners on your own side. Suppose you have a member who is a

1 See section 3.12 for more on lying.

good speaker, and apparently knowledgeable, and who says he has a PhD in microbiology. But it turns out he enrolled in a PhD programme but never completed it. If he has become a spokesperson for your group, this could be damaging. So could various other things, such as industry funding, membership in a church widely considered to be a cult, a criminal record or an uncontrollable temper.

Fostering honesty among your members makes for a much more solid campaign, especially if the other side is good at digging up dirt. If you know about the dirt first, you are better able to minimise the damage. But how can you encourage honesty of this sort? One way is to model the process, by starting a conversation, in a meeting or on an individual basis, in which you reveal things about yourself, asking how the group should deal with it. This doesn't need to be some deep dark secret — it can be a small thing, such as when you made a mistake in a blog, misrepresenting some point. By telling about your own mistakes, you make it easier for others to tell about theirs.

You don't need to go overboard by telling about lots of mistakes or very serious ones — revelations might be used against you by internal or external opponents, if they find out. By being honest, sometimes you make yourself unnecessarily vulnerable.

Honesty within your own side is advantageous when it enables a sounder discussion about strengths and weaknesses of your evidence, assumptions and arguments. If no one ever reveals any doubts, weaknesses may persist and accumulate and the campaign may become ossified, not adapting to new circumstances. If some members are willing to express their doubts about the arguments, and

others are willing to have a free and open discussion, then a group can make its arguments much stronger, and more members will be fully supportive.

Another level of honesty is with one's self. Some partisans secretly hold doubts about various matters — for example whether the campaign will ever be successful — but never tell others: this is dishonesty within their own side. There are also some partisans who dare not acknowledge their own doubts to themselves: in some part of their mind, usually unconscious, they have reservations or heresies, but these are not acknowledged at the conscious level. This makes it hard to adapt and strengthen one's perspective.

There is a psychological process called projection in which a person denies a certain part of themselves and instead attributes it to others. A classic case is a man who has homosexual urges but does not acknowledge them, seeing them as evil — and therefore attacks gay men. The undesired part of one's own psyche is repressed psychologically, attributed to others and then attacked.[2]

Suppose a campaigner is a "true believer," who thinks every bit of evidence supports their own side's position.[3] A true believer might have some hidden doubts, but these are denied at the psychological level, and

2 See appendix 3.

3 A true believer has no doubts about the cause. See Eric Hoffer, *The True Believer: Thoughts on the Nature of Mass Movements* (New York: Harper & Brothers, 1951). Also relevant is Robert A. Burton, *On Being Certain: Believing You Are Right Even When You're Not* (New York: St. Martin's Griffin, 2008).

attributed to others — and who is more convenient than other campaigners? So when a fellow campaigner expresses some minor doubt about some of the arguments being used, the true believer attacks with criticisms or even an effort to drive the person out of the group.

It's easy to see how damaging this sort of dynamic can be for a group. Open and honest discussion becomes risky, because true believers become uncomfortable or go into attack mode, so the group's arguments become stagnant, not adapting to new circumstances or more reflective approaches. In the face of an attack by true believers, those who voice disagreements or have doubts may decide to leave. The entire group then becomes dominated by true believers, none of whom is able to admit any weaknesses.

Much of the ire of true believers is directed against opponents, but this too can be counterproductive when the language and debating style become so excessive — filled with hatred or disgust — that witnesses to the debate are offended. Only true believers will want to join such a campaign and it will be harder to build a wider base of support.

When true belief spreads throughout a group, one way to counteract the damaging effects is to institute a role: the devil's advocate. This is a person who presents arguments that go against what all or nearly all people think or plan. In a discussion about organising a meeting, the person with the assigned role of being the devil's advocate might say, "But what if no one comes?" or "This is the wrong time" or "The speaker we've invited is not the best." The idea is to stimulate a discussion, with those

taking the standard position being forced to justify their choices and examine alternatives.

It's often best to assign the role of devil's advocate to a true believer, as long as this person takes it seriously. This way, no one is likely to start attacking the devil's advocate. Some groups are lucky enough to have some nay-saying members who are de facto devil's advocates, but these valuable members, who keep the group from reaching consensus too quickly, may become targets for attack by true believers and be silenced, discouraged or driven out.

The idea of devil's advocates seems some distance from the topic of honesty — and it is. What individuals and groups need is self-understanding. Honesty can help in this understanding, but often other tools and techniques are needed to help individuals and groups analyse their own dynamics.

For individuals, it is useful to be able to analyse motivations — your own as well as those of others. One key question is "Would I continue to be active on the issue if I received no pay?" If you're unpaid, this is easy, but if you're on a salary, it might be awkward to answer. A related question: "Would I be willing to support the other side if I were paid a large salary?" If so, you might be a mercenary campaigner, available for the side that gives the best salary and conditions. Few individuals would admit to this themselves — but you might find it revealing to assess others in the campaign. How many of them are mainly in it for the money? How many would remain active campaigners as volunteers?

For some campaigners, especially on the side where funds are limited or non-existent, status is far more important. One key question is "Would I continue to be active on the issue if I was no longer welcome in my group?" Some campaigners maintain their self-image through their role: as leader of a group, as valued secretary or treasurer, as reliable behind-the-scenes worker. If this role is taken away, commitment may drop. When internal power-plays bring in a new clique to run the group, longstanding activists may be shunted aside or even expelled from the group. For many campaigners, this is a severe psychological blow and can sour any future connection with the issue.

It is quite common for campaigners to get much of their energy from like-minded people, especially those they work with regularly. So it is understandable, even predictable, that when campaigners are humiliated or rejected by others, they may withdraw from the issue. This is a moment when honesty to self is valuable. You can ask "What is it that really keeps me going? Is it because I care about the problems in the world, or because I obtain satisfaction from working with like-minded others?" Most people have multiple motivations. It can help to recognise them. If you do care about the issue above all, then you can figure out a way to contribute, somewhere, somehow. However, if this particular issue isn't all-important to you, then you may want to switch to a different issue. Lots of peace activists move to environmental issues, or the other way around, depending on what seems more important at the time. Sometimes it is only the true believers who stick with an issue when it becomes unfashionable.

Acknowledging your innermost motivations, doubts and fantasies to yourself can be useful, but telling others about them can be risky. You might trust others, but do you really know them well enough? Some people, even with the best of intentions, cannot keep a secret. Some things may be better kept to yourself.

In summary, honesty has several dimensions: in campaigning, among campaigners on your side, among close friends, and with yourself. Honesty includes not telling lies and not hiding the truth. You can be honest as a matter of principle or on a pragmatic basis. Finally, there is value in honesty but sometimes other values take precedence.

8.2 Supporting free speech

In the early 1980s, when I worked at the Australian National University and was active in the anti-nuclear power movement, a leading opponent of nuclear power sent a letter to the Vice-Chancellor of the university. The letter stated that Sir Ernest Titterton, a prominent supporter of nuclear power who also worked at the ANU, had made mistakes in a publication and the university should disown and withdraw it. I wrote to the Vice-Chancellor saying I supported Sir Ernest's right to publish on nuclear power, despite any alleged mistakes. Why did I defend Sir Ernest's speech when I disagreed with him? I knew that if the university started restricting academic freedom to comment on controversial issues, including those

> outside one's formal expertise, I was much more vulnerable than Sir Ernest.

There is a lot of rhetoric about free speech, but in practice many people are intolerant of those they disagree with. In controversies, many are tempted to try to censor opponents, meanwhile complaining loudly when they themselves are censored.

Supporting free speech requires being opposed to censorship of opponents. There are several reasons for this.

- If you're on the side with less power and influence, free speech is to your advantage, because you are far more likely to be censored than to be able to censor others.
- Free speech allows more viewpoints to be heard, with a greater prospect of having different perspectives taken into account. Partisans can learn from what they hear, improve their arguments and sometimes modify their positions accordingly.
- Free speech allows greater participation in controversies, with a possibility of greater learning by those unfamiliar with the issues.
- Free speech is a worthy goal in itself. It provides protection against tyranny.

There are limits to free speech. It doesn't mean you have to open your blog to anyone, no matter how abusive or disruptive. It doesn't mean providing equal time to opponents on every occasion. It *does* mean that you don't try to stop others from having their say.

In controversies, a common slogan is that "people are entitled to their own opinions but not to their own facts." This is misleading, because facts are disputed, facts are interpreted according to paradigms, and there is more to controversies than facts.

The bottom line is that people should be able to speak even though they are wrong. The penalty for being wrong should be loss of credibility, when critics expose mistakes and deceptions. To try to censor others because they are wrong is, in effect, saying you don't trust people to be able to tell right from wrong.

It is important to recognise inequalities in people's capacity to speak, due to money, power, connections and skills. Those with money and power usually have plenty of opportunities to speak: they can pay for advertisements and for media advisers. Free speech is most important for those with fewer opportunities and who want to say things that are unpopular or that challenge powerful groups.

Sometimes politicians, corporate leaders and media owners make a big play about free speech, often referring to their capacity to say what they want without equal opportunities for others. Furthermore, free-speech rhetoric often hides controls over the speech of others. Employees inside government and corporations seldom feel free to speak out, especially if this means criticising their bosses. So it pays to look behind the words and figure out who is speaking and who is being sidelined or hushed up.

8.3 Being open

Many organisations — such as government bodies — make a great play about being transparent. This is supposed to mean their processes and practices are open to scrutiny. Transparency is closely related to honesty: a transparent organisation is analogous to an honest individual. A synonym for transparency is openness.

Transparency is a way of minimising corruption. If all financial processes and transactions are open to scrutiny, there is less chance of employees stealing — and often the biggest thieves are those at the top.

One way an organisation can be open is to reveal all sources of funding and all recipients of expenditure. This would mean providing details about who made donations, and how much, and who received wages and expenses and how much. Few organisations provide this sort of detail to members, much less anyone else.

Openness of this sort can be valuable to show supporters that operations are fully legitimate and to counter any claims by opponents. In practice, the only groups close to being this open are small, poorly funded ones, such as all-volunteer groups that rely on small donations and sales of books or bumper stickers. Groups with substantial budgets might be embarrassed to reveal the level of their funding from corporate donors or expenditures on advertising and lobbyists. This especially applies to front groups that try to give the appearance of being grassroots organisations. Transparency would undermine their credibility.

For these reasons, transparency is worthwhile for groups with nothing to hide. By being open, they set a standard their opponents cannot achieve.

As well as knowing about finances, members should know how decisions are made (about campaigns, purchases, appointments and anything else important). If a clique makes important decisions, while meetings give a false impression of participation, this is a lack of openness and can enable abuses to occur.

Transparency is a worthwhile goal, but it can be taken to extremes. Imagine recording every conversation in a group and putting the recordings on YouTube. This would make the group very open indeed. Some group members would not want to say anything whereas a few might relish the publicity.

Confidentiality and privacy are values needed to counterbalance transparency. What should be open are processes and outcomes, not necessarily all the details. Should your membership list be open for inspection by anyone? Maybe, if your group is small, or if everyone is being paid. Maybe not, if you have members who are taking a personal risk by being involved.

There is no formula for working out the ideal level of transparency, and expectations can change. The important thing is to have this as a regular topic for discussion. Your campaign needs to be open enough to treat openness as a serious matter.

8.4 Being courteous

For some campaigners, it can be very tempting to treat opponents with contempt: to call them names, not greet them or shake hands in meetings, to use sarcasm, to shout abuse. After all, the opponents, especially prominent ones, are deceptive, dangerous and arrogant. Why should they be treated courteously?

There are several audiences for your attitudes and behaviour towards opponents. The first is the opponents themselves. If you are nasty towards someone, they are less likely to listen to what you say and less likely to take you seriously. The chance that leading opponents will change their minds is minuscule, but discourteous treatment can make them more determined. As well as the opponents you insult directly, others on the opposing side will witness or hear about your behaviour. (Objectionable behaviour by the other side is usually one of the first things to be shared around.) Lower-profile opponents are not as likely to be highly committed to their positions. If you're nasty, this could well cement their commitment, whereas if you are unfailingly polite and respectful, they will be more open to moderating their stands, possibly becoming less active or enthusiastic.

All these processes are even more important for third parties, namely the people not directly involved in the controversy. They are observers, listening to the arguments and seeing how partisans behave. For many, abusive language and disrespectful behaviour are a turn-off: they will think less of the side that uses disreputable

techniques. (On the other hand, some people think abuse is deserved or just funny, and treat it as a kind of sport.)

Then there are the people on your own side. In being abusive towards opponents, you may alienate some supporters who dislike nastiness. On the other hand, you demonstrate a style of campaigning that others may mimic — they may join in the abuse. There's a danger in this: attitudes and habitual behaviour towards opponents can become default ways of interacting that are then deployed towards supporters. For example, if there is a disagreement about campaigning, it becomes all too easy to respond to those who disagree with sarcasm or worse.

It can be useful to ask yourself, "What sorts of attitudes and behaviours by opponents are most likely to cause me to treat their views seriously?" If you are like most people, you will value respect over abuse. Then turn this question around: "What sorts of attitudes and behaviour are most likely to encourage opponents to treat our views seriously?" If you're sure that you're behaving properly but your opponents are behaving badly, check your assessment by inviting an independent person to collect materials from both sides and evaluate them. The best test is by those without a prior commitment.

8.5 Fostering deliberation

Imagine this way of resolving a controversy. A panel of citizens is created by randomly selecting 12 people. To obtain a demographic balance, the number of places is set in advance for particular categories, for example 6 men and 6 women. Individuals chosen randomly from each

category are invited to join the panel until the category is filled. The panel meets for several days or a week, addressing a specific task or question, for example "How should food additives be regulated?" Led by neutral facilitators, the panellists read documents about the issue and hear from experts and from partisan groups on all sides of the question. The panel members, after studying the evidence, questioning those presenting evidence and viewpoints, and discussing the issues with each other, attempt to arrive at an agreed position in response to its task. This position is then used by policy-makers as the basis for action.

This is a lot of responsibility for just 12 people. For a major issue like climate change, there could be dozens or hundreds of panels across a country developing initial recommendations, and then new sets of panels to address the most common recommendations.

These sorts of panels are called citizen juries or policy juries. They are analogous to court juries except they address policy issues, typically the most difficult or contentious ones.

Citizen juries have several features different from the usual processes of decision-making. The jury members, when randomly chosen, are demographically representative of the entire adult population, unlike parliaments or panels of credentialed experts. The jury members focus on just one issue for an extended time, unlike politicians who must make decisions on a wide range of issues. The jury members, because they are chosen randomly, are very unlikely to have ties to vested interests. They are, nearly always, independent, in the same way as members of a

court jury. (To ensure independence, a screening process can be used.) Because the jury members sit only for a limited time, there is much less opportunity for lobbyists to have an influence over them — nothing like campaign contributions to politicians. Jury members expect to return to their regular occupations and neighbourhoods at the completion of their term as jurors, so there is less temptation to serve groups with vested interests.

Finally, and most importantly, the jury members have an opportunity to deliberate: to carefully study the evidence and arguments, to ask questions of experts and partisans in a non-confrontational atmosphere, and to discuss the issues with each other in a constructive fashion, with protocol maintained by the neutral facilitators.

Deliberation involves assessing the strengths and weaknesses of different positions, with participants seeking a level of common ground sufficient to agree on recommendations (with opportunities for minority positions to be expressed). The factors of weighing strengths and weaknesses and of seeking consensus distinguish deliberation from discussion, debate and dialogue.[4]

The combination of independence and deliberation is powerful: it has the best chance of producing recommendations that are balanced and serve the interests of the community as a whole. This, at least, is the conclusion reached by those who have studied the results of hundreds

4 I thank Lyn Carson for helpful comments about deliberation.

of citizen juries, and related processes of citizen participation, in numerous countries.[5]

Independence and deliberation are usually absent from public controversies. Most of the "discussion" in the public sphere is partisan comment, with the aim of convincing people or getting a desirable outcome, rather than carefully considering the issues. The aim of most partisans is winning, not encouraging deliberation.

Campaigners can ask themselves:

- Would we be happy for decisions on our issue to be made using citizen juries?
- What are we doing to encourage deliberation?

Being open to citizen juries means trusting ordinary people, with time and commitment to study the issues carefully, to make sensible decisions. Groups with vested interests often do not like this.

> A citizen jury was set up to look at the issue of container deposit legislation, namely laws putting a price on bottles, cans and other containers when they are returned to the seller. In Australia, beverage and packaging companies oppose this sort of legislation. Although they initially appeared willing to participate in the citizen jury process, by speaking to panels against the legislation, they pulled out at the last

5 Lyn Carson and Brian Martin, *Random Selection in Politics* (Westport, CT: Praeger, 1999); John Gastil and Peter Levine (eds.), *The Deliberative Democracy Handbook: Strategies for Effective Civic Engagement in the Twenty-First Century* (San Francisco: Jossey-Bass, 2005).

> minute, refusing to provide speakers. This suggests the companies did not think their arguments would be effective with an independent panel carefully evaluating evidence and options. The companies have been highly influential in blocking container deposit legislation in most Australian states, using lobbying and other insider techniques.[6]

Citizen juries, and related processes for public participation, involve quite a different mindset than the usual processes of campaigning. Campaigners use connections, lobbying, advertisements, slogans, rallies and a host of other techniques, many of which involve trying to persuade, manipulate or pressure people into providing support or not opposing a decision, with little incentive for encouraging careful study, reflection and calm discussion.

Deliberation can make a difference in seemingly intractable debates.

> In 2007 and 2008, the Bioethics Council in New Zealand ran an extensive set of deliberative forums dealing with pre-birth testing for genetic and other disorders, a contentious topic closely linked to the issue of abortion. The process had a positive impact on participants. The resulting report stated:

6 Lyn Carson, Stuart White, Carolyn Hendriks and Jane Palmer, "Community consultation in environmental policy making," *The Drawing Board: An Australian Review of Public Affairs,* Vol. 3, No. 1, July 2002, pp. 1–13, http://www.australianreview.net/journal/v3/n1/carson.html

> At these deliberative events we heard something more than we had heard in previous dialogue events organised by the Bioethics Council. In the past, we certainly heard viewpoints challenged and enlarged as people interacted with one another. But the deliberative process added another dimension, as people considered a variety of possible responses. As they did so, they negotiated to produce policy directions that the group could share, or identified key policy issues for decision-making.[7]

> When the government closed down the Bioethics Council, many leading church figures wrote in protest. Anglican, Catholic, Methodist and Presbyterian churches acted together on this political issue — not a common occurrence — suggesting the high value they placed on the Council's deliberative processes.[8]

Campaigners who believe in greater citizen participation in decision-making and who trust people's good sense can try to orient their efforts to foster greater deliberation. Instead of an advertising campaign, more effort could be put into organising discussions with people who normally would be ignored. Instead of developing catchy slogans, more effort could be put into developing information resources — articles, presentations, films — that genuinely inform people about the issues. Instead of

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7 Toi te Taiao: the Bioethics Council, *Who Gets Born? A Report on the Cultural, Ethical and Spiritual Aspects of Pre-birth testing* (Wellington, New Zealand, June 2008), p. 22.

8 I thank Simon Wright for information about this issue.

presenting just one side of the debate, more effort could be put into developing materials that seriously address opponent views, knowing that readers will be carefully considering material from both sides.

It's even possible to imagine getting together with campaigners on the other side to have a serious, respectful discussion — maybe with some neutral facilitators to assist. This might be unlikely, but should it be a goal? Deliberation rather than debate — that is radical indeed.

8.6 Seeking solutions

Some controversies are so polarised and bitter that they seem likely to never end. Fluoridation, for example, has been debated ever since it was proposed in the 1940s and introduced in the 1950s. The arguments are much the same as they were in the 1950s. In countries where fluoridation remains on the agenda, attitudes seem not to have shifted.

In some controversies, the choice seems stark: their side either wins or loses. There is no middle ground, especially when laws or policies are involved. The water supply is either fluoridated or not.

In other controversies, there are intermediate outcomes. In the GM controversy, one crop might be allowed to be genetically modified but others not, or GMOs allowed in one locality, or GM food labelled but only in small print. Though intermediate outcomes are possible in most controversies, campaigners may be very unhappy about them. Campaigners often focus on specific goals, for example stopping any GMOs or mandating prominent labelling. They might seek to stop building of a particular

nuclear power plant. The outcome for that particular plant is seen as winning or losing, even though there are hundreds of struggles over power plants across the globe.

One key strategy in campaigning is to identify intermediate goals that can mobilise constituencies and provide a stepping stone towards other goals down the track. The anti-smoking movement has targeted cigarette advertisements, smoking in cinemas, planes, trains and buses, smoking in offices and restaurants, and even smoking in public areas like beaches. Meanwhile, a movement about a different sort of smoking, in support of marijuana, has sought decriminalisation.

These sorts of intermediate solutions fit on a spectrum between success and failure in relation to the issue being debated, whether abortion, GMOs or smoking. Participants seldom step outside the spectrum to look at solutions that sidestep rather than resolve the controversy.

- Promoting dental hygiene and a low-sugar diet would reduce the alleged need for fluoridation.
- Promoting better health by reducing poverty and disadvantage might reduce the need for some vaccines.
- Reducing consumerism would cut greenhouse emissions and the supposed need for nuclear power.
- Promoting better birth control would reduce the need for abortion.

Some campaigners push for such solutions, but they are a minority. The most intense and long-lasting controversies, such as fluoridation, involve a sort of lock-in: each side wants victory over the opponent and will not

consider alternative ways of achieving their ostensible goals. For example, many opponents of abortion also oppose sex education and easy access to contraceptive devices.

You personally might prefer a solution outside the spectrum, but what choice do you have if opponents refuse to think the same way?

1. You can put your energy into the controversy, seeing it as the main game and seeing the issue as too important to be left in the hands of opponents. Seeking alternative solutions is likely to be a waste of time or worse.
2. You can engage with the controversy but remain alert to opportunities to step outside the battle lines and seek a win-win solution.
3. You can actively seek dialogue with individuals on both sides of the controversy who are willing to consider unconventional options.
4. You can try to position yourself outside the main lines of the controversy, but still make contributions to it.
5. You can avoid the controversy altogether, seeing it as unproductive.

There is no right or wrong choice here. It is important, though, to be aware that there are options. The dynamics of polarised controversies push people to be either all in or all out, in other words to choose option 1 or option 5. The intermediate options are challenging and can be uncomfortable.

If you've been involved with a controversy for years, presenting the arguments over and over and running into the same objections and obstacles, you may begin to wonder whether it's all worth it. If you've been criticised unfairly, perhaps accused of fraud, or experienced threats and reprisals, you may decide what you're achieving is not worth the personal cost — and that's assuming you can see some results from your efforts.

Furthermore, perhaps the controversy is trapped in a downward spiral of misrepresentation and abuse, with opponents shouting you down for supposed mistakes and transgressions — and the opponents feeling exactly the same way as you. You think you're being unfairly treated, and so do they. The prospects for deliberation seem remote. Anyone who tries to take an intermediate position is likely to be attacked by one side and captured by the other side, or sometimes attacked by both sides, or perhaps simply ignored.

Suppose you start asking yourself, "Is it worth all the effort?" One answer is "Yes, certainly" and you start reminding yourself of everything at stake, including lives, freedom and democratic choice. So you rededicate yourself to the debate.

There's another answer, in the form of a question: "Is there another way?" If there is, you may want to think about putting your effort into options that sidestep the controversy, such as promoting good diet or responsible governance.

There's also another way to think about this. You can ask, "What do I really care about most? Is it winning the debate, or achieving some social goal?" Can you imagine

getting out of the debate and putting your energies into some other activity that achieves some of the same goals, but lets the opponents run rampant on the issue? Perhaps, if you're too worn out, this is irrelevant: you just need to get away from it all. On the other hand, maybe a different approach will offer a new prospect for doing something worthwhile.

Appendix 1
My background

I've been involved with scientific controversies for a long time. In 1972, while doing my PhD in theoretical physics at the University of Sydney, I was introduced to the controversy over the effects of exhausts from supersonic transport aircraft on stratospheric ozone. My first book, published years later, was built around a facet of this controversy.[1]

After finishing my PhD, in 1976 I obtained a job as a research assistant at the Australian National University, mainly doing mathematical modelling. Soon after arriving in Canberra, I joined the local Friends of the Earth group. At the time, FOE's main issue was uranium mining and nuclear power. We wrote leaflets, gave talks, held information stalls and organised rallies.

I didn't have a great knowledge of nuclear physics, but from my physics degrees I knew enough about it to know that expertise in nuclear physics was not needed for understanding the key issues concerning nuclear power: reactor accidents, radioactive waste, energy needs, economics, proliferation of nuclear weapons, and mining of uranium on indigenous land, among others. The issues were both complex and simple. There was complexity in every dimension, for example the half-lives of radioactive isotopes

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1 Brian Martin, *The Bias of Science* (Canberra: Society for Social Responsibility in Science (ACT), 1979).

and how long containment was necessary, and the effect of the discount rate on the economics of nuclear power. At the same time, the key issues were straightforward, given some clarity about values.

After some involvement with the nuclear power debate, I started writing about the issues, including leaflets and short articles. Nuclear power was vigorously debated in the letters columns of the *Canberra Times,* and before long I was one of the more frequent contributors. One of the challenges in this debate was engaging with prestigious nuclear experts, especially Sir Philip Baxter, a nuclear engineer and former chairman of the Australian Atomic Energy Commission, and Sir Ernest Titterton, professor of nuclear physics at the Australian National University. I was working at the same university, but on one-year contracts as a research assistant in applied mathematics, so even with my PhD my standing as a technical expert was considerably less.

Before long, I planned a bigger project: an analysis of the arguments of Sir Philip and Sir Ernest. I collected as many of their articles as I could and obtained numerous newspaper cuttings about them, and wrote a long critique of their views about nuclear power, nuclear weapons and the nuclear debate. The result was a booklet, *Nuclear Knights,* providing information for other anti-nuclear campaigners who came up against Sir Philip or Sir Ernest.[2] Doing this

2 Brian Martin, *Nuclear Knights* (Canberra: Rupert Public Interest Movement, 1980).

project gave me greater insight into the role of expertise in controversies, in particular the influence of people's occupations and social positions on their views and the ways arguments can be adapted to circumstances.

About the same time I was working on *Nuclear Knights,* I started gathering information about what I called "suppression of dissent." Jeremy Evans, who taught environmental studies at the ANU, was in danger of being denied tenure, despite an excellent teaching performance and satisfactory research output. Today, nearly everyone supports protection of the environment, at least rhetorically, but in 1980 this was considered radical, especially among scientists. It seemed that Jeremy was being targeted because of his key role in the Human Sciences Program, which presented challenging views about environmental issues to undergraduates.

Jeremy's tenure case was just one example. A number of other environmental researchers and teachers, in Australia and New Zealand, were encountering attacks, such as being censored, being denied tenure or being threatened with dismissal.[3] Suppression of dissent seemed to be a regular phenomenon, especially when someone with credentials or expertise did research or spoke out on a controversial issue, threatening groups with vested interests.

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3 Brian Martin, "The scientific straightjacket: the power structure of science and the suppression of environmental scholarship," *The Ecologist*, Vol. 11, No. 1, January-February 1981, pp. 33–43.

As a result of this experience, I started looking into suppression of dissent in a number of areas. For example, I found examples in a dozen countries of attacks on scientists and engineers critical of nuclear power.[4]

After my short-term appointments in applied mathematics came to an end, in 1986 I obtained a lectureship in the Department of Science and Technology Studies at the University of Wollongong. This meant I could devote all my research time to social science topics — including controversy studies. I decided to study the fluoridation controversy in depth. I studied arguments on both sides, interviewed leading Australian proponents and opponents of fluoridation and wrote a book about the controversy, analysing the interplay between knowledge and power.[5]

Along the way, I also wrote articles about pesticides, nuclear winter and (with Gabriele Bammer) repetition strain injury. I found that each controversy has its own unique features but also that there are regular patterns.

In 1990, I received a package of materials written and compiled by Louis Pascal, an independent researcher. He argued that AIDS had originated from contaminated polio vaccines used in Africa in the late 1950s, but had been

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4 Brian Martin, "Nuclear suppression," *Science and Public Policy*, Vol. 13, December 1986, pp. 312–320.

5 Brian Martin, *Scientific Knowledge in Controversy: The Social Dynamics of the Fluoridation Debate* (Albany, NY: State University of New York Press, 1991).

unable to get his articles about this published. I agreed to publish one of the articles in a working paper series at the University of Wollongong because I believed his ideas, whether right or wrong, deserved attention. Two decades later, I am still following the debate over the origin of AIDS, and occasionally writing articles.[6]

The origin-of-AIDS debate is different from most of the others that I've been involved with: there is no social movement supporting or opposing theories in this area. Even so, there is popular interest in the issues. My role in the origin-of-AIDS debate also has been somewhat different than with other controversies: by publishing Pascal's paper and subsequently by writing articles, I intervened in the debate, not as a partisan on one side but as a social scientist making a judgement that one theory was not being treated fairly due to the role of vested interests.

In 2010, I became involved in the Australian vaccination debate. A group critical of standard vaccine policy was coming under organised attack by a pro-vaccination citizens' group. Not having a strong view about vaccination, my main role has been to defend the right of critics to be able to speak

6 Most recently, Brian Martin, "How to attack a scientific theory and get away with it (usually): the attempt to destroy an origin-of-AIDS hypothesis," *Science as Culture,* Vol. 19, No. 2, June 2010, pp. 215–239.

out. As a result, I also came under attack by the pro-vaccinationists.[7]

Being involved in controversies can be exciting and a great way to learn about issues and campaigning. However, I try to remind myself that the issues debated most strenuously are not always the most important ones.

7 Brian Martin, "Debating vaccination: understanding the attack on the Australian Vaccination Network," *Living Wisdom,* No. 8, 2011, pp. 14–40.

Appendix 2
Scholarly studies of controversies

There are two main types of writing about controversies. The first, typically voluminous, is writing on the issues under debate, for example writing about genetic engineering, its benefits, possible hazards, economics, morality and much else. Some of this writing is by partisans, some of it by journalists and some of it by other commentators. I have drawn on this material with an eye to what is practical for understanding and engaging in public debate.

Then there is another sort of writing: academic analysis of the controversy, examining the key players, the way arguments are deployed, and so forth.[1] If you want to learn about controversies, then some academic analyses can be helpful: they can provide informative overviews of the arguments, of the key players and the issues at stake.[2]

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1 These two types of writing can't always be demarcated: for example, some academic analyses are highly partisan and some commentaries by journalists provide insightful analysis.

2 Useful collections include Daniel Lee Kleinman, Karen A. Cloud-Hansen, Christina Matta and Jo Handelsman (eds), *Controversies in Science and Technology: From Climate to Chromosomes* (New Rochelle, NY: Mary Ann Liebert, 2008); Daniel Lee Kleinman, Jason A. Delborne, Karen A. Cloud-Hansen and Jo Handelsman (eds), *Controversies in Science and Technology: From Evolution to Energy* (New Rochelle, NY: Mary Ann Liebert, 2010); Daniel Lee Kleinman, Abby J. Kinchy and Jo Handelsman (eds) *Controversies*

However, if you are involved in a controversy and know a fair bit about it, and are looking for insights about how to be more effective, then academic analyses seldom have much to offer. It is a familiar experience for activists to be disappointed with scholarly treatments. Social movement scholar James Jasper sums this up very nicely:

> My research on social movements showed me just how little social scientists have to say about strategy. Over the years many protesters have asked me what they might read to help them make better decisions. I had nothing to suggest, beyond Saul Alinsky.[3]

Having studied scientific controversies for several decades and read many scholarly analyses, my assessment is that research into controversies can be sophisticated and insightful but seldom is it oriented to providing insights useful to participants. In part, this is because of academic jargon and writing style, which is expected in scholarly journals but off-putting to non-academics, indeed to anyone outside the social sciences and humanities. In part it is due to the orien-

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in Science and Technology: From Maize to Menopause (Madison, WI: University of Wisconsin Press, 2005); Dorothy Nelkin (ed.) *Controversy: Politics of Technical Decision* (Beverly Hills, CA: Sage, 1979).

3 James M. Jasper, *Getting Your Way: Strategic Dilemmas in the Real World* (Chicago: University of Chicago Press, 2006), xii. Saul Alinsky was a community organiser whose most well-known book is *Rules for Radicals*. Incidentally, Alinsky was not a scholar.

tation of scholarly investigations. Scholars typically seek to learn *about* controversies, for example why they occur, why they persist and how they are resolved, but this is not particularly useful to participants, who know very well that the controversy is occurring and want to know what to do. Scholars, however, seldom provide how-to information. Sometimes this is because they don't know or because they have little experience as participants, but a big factor is that how-to information is not seen as scholarly. I think this is because scholars, as a group, set themselves apart from those they study by their language, style and preoccupations.

The upshot is that there is some valuable material in books and articles produced by scholars but, to be taken up by controversy participants, it often needs to be mined for practical insights and translated into accessible language. This doesn't happen very often. Campaigners are too busy to do it. Furthermore, even after scholars' work is translated into an accessible style, there may be little of practical value.

A few academic studies are useful to activists. These papers are eagerly circulated to others.

Meanwhile, scholars gain little recognition from peers — other scholars — by popularising ideas from their fields. Academics look to their peers for recognition, and this usually means writing things that will impress those peers. Anything seen as popular usually has low credibility among serious scholars. The orientation of academic work to other academics means that social science studies of scientific controversies are seldom all that helpful to participants.

Mathieu Albert has studied the pressures on academics to produce work aimed either at their peers — for example papers in scholarly journals, usually of little interest to wider audiences — or at people outside the academy, for example contributions to public debate. In a study of economists and sociologists at two Canadian universities, Albert found that over a period of couple of decades, there was greater emphasis on publishing work aimed at peers.[4] If aspiring academics put a lot of effort into writing for audiences outside their discipline, they are less likely to obtain tenure. This trend is despite concerns about the commercialisation of universities.

Social researchers need to move away from the view that the dynamics of controversies are largely determined by social structures and processes, such as class structure, globalisation, technological change or the knowledge economy. In controversies, participants make choices, and the choices they make can influence the evolution of debate and, in some cases, outcomes. This is the element of strategy that Jasper lamented as virtually absent from scholarly studies of social movements.

Some researchers, to understand controversies, become personally involved. They might have a particular research method, for example participatory action research, or just feel they need to do something about a pressing social issue.

4 Mathieu Albert, "Universities and the market economy: the differential impact on knowledge production in sociology and economics," *Higher Education,* vol. 45, 2003, pp. 147–182.

Getting involved in controversies provides a deeper and different sort of insight. By being a participant, a researcher affects the controversy being studied — and this disturbance is theoretically interesting in itself.[5]

By studying strategy or getting personally involved, it is much more likely that findings will be of interest to controversy participants. The only remaining requirement is to write up the findings in an accessible fashion.

I'm at the stage in my career that I don't need to publish esoteric scholarly papers, and anyway I enjoy writing in an accessible style. Furthermore, I've long believed that good ideas in social theory — the abstract sets of ideas so prized by scholars — often arise from practical experience. By writing a practical handbook on scientific controversies, I am not abandoning scholarly activities, but rather pursuing them in a different guise.

5 I treat these issues in "Sticking a needle into science: the case of polio vaccines and the origin of AIDS," *Social Studies of Science*, Vol. 26, No. 2, May 1996, pp. 245–276.

Appendix 3
Are you projecting?

Have you ever known someone who makes nasty comments about others — and who regularly complains about other people being nasty? Or someone with obvious prejudices who claims to be unbiased — and obsesses over other people's prejudices?

Such individuals may be "projecting." Projection is a psychological process in which a person denies things about themselves and instead "projects" those things onto others, namely sees them in others.

Projection is a particular hazard in polarised controversies. Here, I use other sorts of examples. If you're familiar with particular controversies, you will see the relevance of these ideas.

Let's start with projection of bad things. Rather than acknowledging their own faults, people may attribute those very faults to others. Then, to top it all off, the others are attacked because of the terrible things. Projection is usually an unconscious process.

Consider a family with lots of problems: abusive language, lack of respect, flouting of rules. Sometimes the blame is shunted onto a single member of the family, the "black sheep." The rest of the family blames the black sheep for everything bad that happens. It's quite convenient, because no one else has to accept having contributed to the problems.

A similar process can occur in workplaces. A few employees are seen as poor performers, disruptive or even

criminal, and blamed for bringing down the group — with everyone else absolved from responsibility.

Projection is a key psychological process in wartime. The enemy is painted as pure evil, while the home side is conceived as entirely virtuous. Governments use propaganda to help everyone join in this projection process.

Many men have homosexual impulses, but they can be frightening and dangerous to acknowledge consciously, especially in a rigidly heterosexual context. So instead of recognising these impulses, they are projected onto gay men, who are then derided, condemned or even assaulted.

Those who are relatively powerless — people with disabilities, ethnic minorities, refugees, foreigners, dissidents and criminals, among others — are prime recipients of projection. However, projection can also be aimed at powerful people. For example, some people blame politicians for all the problems in society and avoid thinking about their own responsibility.

Why?

Projection can serve to unify communities. By attacking and expelling someone who is different, the group endorses its common values and denies its capacity for doing bad things.

In earlier periods in human evolution, projection and scapegoating might have had survival value. In a situation of scarcity, internal dissension could be disastrous: the group needed to be unified to maintain food and other necessities and to defend against other groups.

However, what was once beneficial to human survival now is often damaging. The key challenge is not survival of a small group in a situation of scarcity but rather

harnessing a wide variety of perspectives and skills to deal with large complex problems such as running large organisations, dealing with environmental breakdown and preventing war. Previously, the main threats were from the natural environmental: predators, lack of food, harsh conditions. Today, the main threats are created by humans themselves. Projection can be dangerous because it focuses attention on the wrong source of danger.

Symptoms

How can you tell whether projection is occurring? Perhaps the black sheep really is the source of the family's problems. Perhaps the enemy really is evil.

There is no single test for projection, but there are a number of hints.

- There is a dichotomy between good and evil (called "splitting"): others are treated as either entirely good or entirely bad, with no shades of grey. There is no acknowledgement of the other's humanity or good intentions. The self is treated the same way — usually as entirely good.
- There is an excessive hatred of the other. Loathing is typically visceral, without a satisfactory rational foundation.
- Problems are attributed to individuals, not to social systems, organisations or practices. In short, evil is personalised.
- There is no recognition of one's own faults or one's own contribution to or participation in problems. Usually there is no self-reflection. The focus is entirely on the other.

• Vengeance is sought. There is little rational assessment of how to deal with problems, including whether punishment of the other is effective.

Projection of virtues

It's also possible to deny good things about oneself, instead projecting them onto others.

In many cases, the family black sheep or workplace scapegoat actually believes what others say about them. They may deny their own virtues, projecting them onto the group.

Bosses and national leaders are prime recipients of projection of virtues. Submissive employees may put all their trust in the boss to make correct decisions, make the organisation thrive and protect it from hazards.

Citizens may exalt a top politician, projecting all their strength, autonomy and confidence onto the leader. The citizens, having projected their positive attributes, themselves are drained and feel powerless and thus receptive to following their leader.

This process is taken to extremes in cults, in which followers lose most of their capacity for critical thinking and independent action, relying entirely on the cult leader. Cults can range from small groups to entire societies. Projection is only the psychological component of cults, which also contain social, political and economic processes to keep followers dependent.

The legal system is often assumed to work perfectly to deliver justice. The law is assumed to be ideal. Individuals project their capacity for fairness onto the law, reserving for themselves the flaws of bias and serving of the self.

Experts of all kinds — especially medical experts — can be recipients of projection of virtues.

Some say the concept of God is a projection. Humans take what is good about themselves and project it onto a supreme being, who is separate from themselves and who will take care of them.

The danger in projecting virtues is that an individual's or group's own capacities are denied and wither through non-use, while the recipient of the projection is allowed to have exceptional power, a possible source of corruption.

Introjection

Introjection is when you accept views about yourself that others place onto you. Usually this is an unconscious process. Introjection occurs when an office scapegoat accepts the negative views of co-workers or when citizens accept their leader's view that they must be obedient.

Introjection is the opposite of projection. The two processes often operate hand in hand, for example with cult members projecting their autonomy onto the leader and introjecting the leader's assumption of their own dependence.

Overcoming projection

The first and most important step in overcoming undesirable projection is to recognise that it is occurring. Suppose a person has a deep-seated hatred of the prime minister. Recognising that deep-seated hatred is a possible symptom of projection might lead to reflection that the problem is not the particular individual who is PM, but rather the policies or political style the PM represents. Perhaps the problem stems from deeper forces within society.

After recognising projection, the next step is to reduce its impact by changing one's way of thinking or behaving. Instead of assuming that problems are always caused by individuals — invariably someone else — we can look for causes based in relationships, in organisational structures and in social processes. Rather than assuming that exploitation is caused by evil capitalists, we can look at how systems lead to exploitation — and how victims can help bring about change through their own behaviour.

What next? Or what else? Working together in groups to develop balanced, respectful relationships — without projection — is helpful. With this foundation, and some preparation, it becomes easier to deal with others without either projecting onto them or accepting their projections onto you. This is a personal challenge, but help from others makes it easier. It is also an experimental process: we have to see what works. There's a lot more learning to be done in order to develop practical steps to overcome damaging projection.[1]

1 For a stimulating analysis of the psychological dynamics of oppression, using the ideas of projection and introjection, see Philip Lichtenberg, *Undoing the Clinch of Oppression* (Cleveland, OH: Gestalt Institute of Cleveland Press, 1994, 2nd edition). The cover has a different title: *Community and Confluence: Undoing the Clinch of Oppression.*

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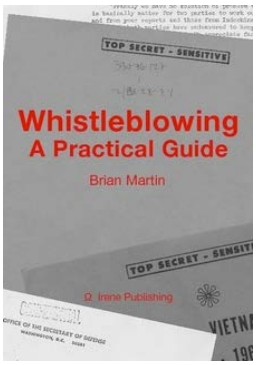

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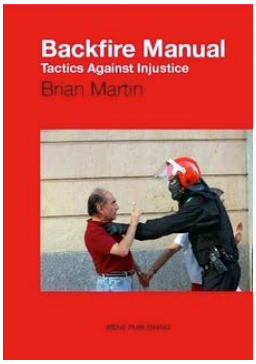

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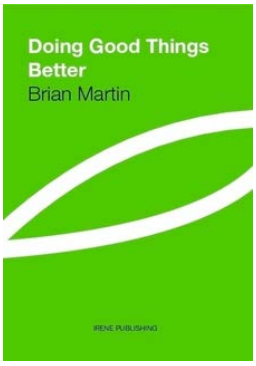

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