

Philosophical Impediments to Citizens' Use of Science

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Abstract

This chapter discusses three impediments to proper use of science in the creation of public policy. First, citizens and policymakers follow moral rules other than those that involve consequences, yet the main role of science in policy is to predict outcomes. Second, citizens believe that their proper role is to advance their self-interest or the interest of some narrow group, thus ignoring the relevance of science to policy issues that affect humanity now and in the future. Third, people fail to understand the nature of science as grounded in actively open-minded thinking, thus giving it an advantage over some alternative ways of forming beliefs.

Key Words: actively open-minded thinking, parochialism, citizens, self-interest, moral rules

Science can be relevant to public policy, but those in government frequently ignore relevant science, in part because the citizens who put them there ignore it, and in part because government officials are citizens themselves. The difference between those who see science as relevant and those who do not is in part the results of different philosophical positions. In this chapter, I discuss three of them: the role of consequences in decision-making; the proper role of citizens in a democracy; and the nature of science as an active, self-critical search for truth.

The Role of Consequences in Decision-Making

One of these issues concerns utilitarianism (or other closely related forms of consequentialism) in moral philosophy. Utilitarianism holds that choice options should be evaluated according to the values (utilities) of their expected consequences added up over everyone affected by the choice. If we choose an option that is deficient in this regard, our choice will harm someone without compensating benefit to anyone. Any moral rule that conflicts with utilitarianism will cause harm of this sort. Of course there

are complexities in working out the implications of this simple idea in any given case. Utilitarians argue that it is better to deal with the complexities rather than turning to some alternative rule that is certain to make things worse in some cases. Of course utilitarianism applies to choices among alternative public policies.

Science is relevant to policy because it can tell us about the expected consequences of alternatives. It is not relevant to people who base their moral views on rules that ignore consequences. Some of these rules treat property, autonomy, or the natural order as absolute constraints, which must be honored whatever the consequences. Such rules could lead people to oppose regulations that would benefit all—such as opt-out defaults for organ donation and for research use of medical records and tissues, or limits on fossil fuels—even if it is clear that the regulations are beneficial.

Other nonutilitarian rules concern restrictions based on traditional ideology, such as those that prevent women in some countries from voting or driving. Of course, people who oppose beneficial regulations or increased liberties will often convince

themselves that the proposed changes are harmful, even though this was not the original reason for their opposition.

In matters of public policy, the role of utilitarianism is especially clear. Utilitarian reasoning favors compulsory regulation to enforce cooperation in social dilemmas, that is, when people tend to choose an option that is in their self-interest (defect) instead of one that is in the greater interest of others (cooperate). Examples include excessive use of antibiotics, overfishing, spamming, excessive production of greenhouse gases, use of outdoor defecation (in some countries), having large numbers of children in areas that cannot support a high rate of population growth, and maintenance of private arsenals. Some of the opposition to legal control arises from principles of rights, such as property rights or autonomy.

Note that, when people follow moral principles that ignore consequences, they have less use for science. When people oppose opt-out organ donation, or stricter regulation of weapons, because these violate fundamental rights, these people have no use for statistics about organ-donation rates or reductions in accidental deaths. Their opposition is dictated by moral rules that apply whatever the consequences. The same opposition may occur in other cases, such as restrictions on the use of guns or promotion of birth-control technology in countries with excessive population growth.

My research and that of many others has found large individual differences in support for utilitarian approaches as opposed to moral rules that ignore consequences. Some of these differences result from the fact that utilitarian arguments, such as the idea that punishment is justified in part by deterrence, are completely unfamiliar. Educators should at least make sure that students have heard of these arguments. We cannot expect scientists themselves, or journalists, to be advocates of paying attention to consequences. But we might at least point out that, when we advocate a policy because it is best for everyone, then any alternative policy, whatever its basis, will make things worse for some people without sufficient compensating improvement for others. And we might even challenge opponents of our favored policy to explain to us why their principle must be imposed on those of us who do not accept its power to trump other considerations.

The Role of Citizens

Another issue concerns the role of citizens, for example, as voters. A simple utilitarian view of

voting is that a person should vote for whatever, or whomever, he or she thinks does the most good for everyone, now and in the future. If everyone voted this way, there would still be disagreements, because we have different beliefs about what or whom this would be. But this is not how many people think about voting, and the failure to think this way increases the disagreements. In particular, many people think that the purpose of voting is to defend their self-interest, or the interest of some group.

Of interest is citizens' understanding of the following key point: political participation is cost-ineffective in advancing self-interest or the parochial interest of a small group but is cost-effective in advancing the common good. The small influence that each citizen has over policy outcomes renders political participation nearly useless as a way of advancing self-interest. This small influence is more than compensated by the large number of people potentially affected by these outcomes, if the citizen has sufficient concern for these others. In terms of self-interest the expected benefit of a vote is roughly proportional to $1/N$, where N is the number of voters. But in a utilitarian calculation, which assumes some altruism, the benefit of voting must be multiplied by N , assuming that only voters are affected by the outcome. This multiplication cancels the dilution caused by increases in N voters. And the total benefit can be orders of magnitude larger if we consider effects on those who do not vote, such as children, foreigners, and future people. The larger the circle we consider, the more the small effect of a vote is magnified, and, therefore, the more worthwhile it is to use our vote (or other forms of participation) to advance our concerns for the good of others. Thus, faced with a conflict between self-interest voting and voting for the general good, the self-interest option is generally inferior to not voting at all, but, with sufficient altruistic concern for people now and in the future, the general-good option can be worthwhile. The same argument applies, less strongly, to the choice of voting parochially versus for all of humanity.

One might think that this kind of argument is unrealistic and no one thinks this way. Perhaps very few go through the entire argument all the way from understanding why voting out of self-interest is not cost-effective although it could be cost-effective to vote for the good of all. Yet a substantial number of citizens do endorse a cosmopolitan view, namely, the view that their political goal is to try to bring about what is best for the world in the long run. Of course, they do not all

agree on what this is. In the next section, I suggest that some of the disagreement can be remedied by improvement in thinking.

A second relevant feature of democratic citizenship concerns the role of government (including world government, such as it is or might become). Many policy problems concern getting people to cooperate, that is, to do what is best for everyone on the whole even if this requires some self-sacrifice. Examples are getting vaccinated, limiting ones use of limited resources, and paying taxes. A good way to get people to do these things is to threaten them with punishment if they do not. Governments (almost by definition) have the power to do this. Moreover, the cost of supporting government in doing it, by voting, is much smaller than the cost of cooperating voluntarily. Hence, many more people vote for higher taxes (when these are needed, and when the government can punish people for avoiding them) than who voluntarily send money to the government, and the voting usually costs much less than sending the money that would be raised by a proposed tax increase. The cost of government coercion is also low because the threat of punishment is effective in inducing cooperation. Even if the punishment is costly, it is rarely needed. Because of the efficiency of coercion, people often vote to give government the power to make them and others do what they would not do on their own.

The idea that government is a design to provide for the common good by solving social dilemmas like these (or providing public goods) is not widely understood; some people seem to think that government sanctions are rarely justified, or that government is a tool to be used for competition between parochial groups. Yet, in my own research, I have found many people who do think in terms of what is best for all. The idea that people can “think big” when they engage in political action is not pie-in-the-sky idealism. Many people already think this way, often at a world level.

In particular, I have found large differences in whether people think that the duty of each citizen is to promote the good of all, to promote the good of some group, such as a nation or ethnic group, or to promote the good of the citizen him- or herself, regardless of the effects on others. I gave people scenarios like the following:

June, an American citizen and resident, is in the oil business. Her company builds drilling rigs for major oil companies around the world. The US

government has proposed a tax increase on the use of all oil, in order to reduce carbon emissions into the atmosphere. June believes strongly that this tax would help to reduce the amount of global warming, so that everyone around the world would benefit, especially those in low-lying areas that are likely to be harmed by rising oceans. But the tax would seriously hurt her business.

The government decides to have a referendum on this proposal, and the vote is expected to be close.

How should June vote? (Choose one.)

- A. She should vote for the proposal.
- B. She should vote against the proposal.
- C. She should not vote. Why? (Click all that apply.)
- A. People should vote for what they believe is in their self-interest. The best proposals would be chosen then.
- B. People should vote for what they believe is best for everyone on the whole, even if they think it will be worse for them as individuals.
- C. People should vote for what they believe is in the interests of themselves and other people like them. They should be loyal to the people in their group.

Some scenarios pitted self against group and world. That is, what was better for the self was worse for one’s group and the world. Others pitted group against self and world, as a test of parochialism, a willingness to sacrifice for one’s group even when the total effect on everyone is bad. I found all three types of responses (with proportions depending on the particular story). Many thought that they should vote for their self-interest, others, for their group, and others for the world.

These attitudes are probably related to beliefs about the relevance of consequences. Once we start thinking about consequences of policies as the determining factor for adopting them, it becomes difficult to find good reasons to neglect consequences for all those affected. Utilitarians thus tend to think of the citizen’s moral obligation as helping to promote the good of all. The most polarizing policy questions seem to be those where science tells us about consequences for the world, for people as yet unborn as well as those living now, such as climate change.

Although we scientists and scholars are limited in how strongly we can advocate cosmopolitanism, we can at least point out that it is a defensible view that many people hold. Its rejection implies support for policies that, again, would make things worse for outsiders, in ways that cannot be fully compensated by the benefits to insiders.

The Nature of Science

A third issue is the nature of science itself, which is based on actively open-minded thinking (AOT), refining itself by challenging its own tentative beliefs. AOT is what people do to avoid “myside bias”: a tendency to search for reasons supporting a favored conclusion, a tendency to take such reasons at face value when they are found while finding fault with, or ignoring, reasons on the other side, and a failure to search for alternative possible conclusions, or (in the case of decision making) for goals that are being ignored. AOT thus searches actively for counterevidence and for alternative possible conclusions.

Most scholarship depends on AOT for its improvement. Astronomy differs from astrology because the latter has no standard procedures for thinking critically about its assertions. The same applies to a great deal of religious doctrine. Science, by contrast, engages in AOT at least as a group, if not within the heads of individual scientists. Scientists are rewarded (with publications, grants, promotions, jobs) for finding problems with the conclusions of other scientists. Individual scientists try (perhaps not always hard enough) to anticipate possible criticisms before they try to publish something. This is what makes science effective in approaching truth and understanding ever more closely.

Unfortunately, this process of criticism, carried out in public, may give the impression that “scientists don’t agree.” The problem is exacerbated because scientists use the same word “theory” for a proposal that remains to be tested and one that has survived a large number of tests and is now assumed as the basis of further advances. But many of the criticisms that get so much attention will in fact turn out to be wrong or misconceived, or they will lead to minor modifications. And many past conclusions of science are no longer questioned.

Karl Popper called the process “conjectures and refutations.” Describing the difference between African traditional thought and Western experimental science, Popper’s follower Robin Horton put it as follows:

The essence of the experiment is that the holder of a pet theory does not just wait for events to come along and show whether or not [the theory] has a good predictive performance. He bombards it with artificially produced events in such a way that its merits or defects will show up as immediately and as clearly as possible.

(The same point would apply to observations, as well as experiments.) Scientists seek them out because they could potentially challenge some hypothesis. Horton pointed out that African traditional thought was just as complex as science. But the former had no method for setting itself straight when it was wrong.

We have no better way. Alternatives such as “faith” or acceptance of the word of authority have no built-in mechanism for self-correction. If they are wrong, we have no way to know, and, therefore, we also have no way to know if they are right.

The argument for AOT is thus simple. Errors of judgment, and poor decisions, are common. Especially when judgments of different people conflict, as in beliefs about religion or public policy, at least one of the parties must be incorrect. How can we protect ourselves against such errors? The answer, the essence of AOT, was provided by J. S. Mill (e.g., “On liberty,” ch. 2, paragraph 7):

The whole strength and value, then, of human judgment, depending on the one property, that it can be set right when it is wrong, reliance can be placed on it only when the means of setting it right are kept constantly at hand. In the case of any person whose judgment is really deserving of confidence, how has it become so? Because he has kept his mind open to criticism of his opinions and conduct. Because it has been his practice to listen to all that could be said against him; to profit by as much of it as was just, and expound to himself, and upon occasion to others, the fallacy of what was fallacious.

In teaching science, we need to simultaneously teach how scientific knowledge is attained, and thus why, despite its continuing development, it is based on a type of thinking that is more likely to lead to correct beliefs and good decisions than any alternative. In schools, it may help to work through the history of how we came to know some scientific fact that we now take for granted. The story of Pasteur’s discovery of the cause of anthrax is a good example for middle- or elementary-school children. He began by asking whether the disease could be transmitted by injecting the blood of an infected sheep into another sheep. (It could.) So he knew that it was something in the blood. Would transmission still occur if he boiled the blood before injecting it? (It would not. So whatever it was was destroyed by boiling.) And so on, like solving a mystery. A similar story is Semmelweis’s discovery of the cause of childbed fever. More advanced students might work through the sequence of theories of the solar system

from Ptolemy through Copernicus, Tycho Brahe, Kepler, and Newton (The last steps required the invention of calculus).

In conveying science to the public, it might help to review repeatedly the history of how we got where we are. For example, in discussing climate change, in addition to presenting the basic facts about the greenhouse effect and the increase in greenhouse gasses, occasionally it would be nice for the public to see how the basic theory has been challenged and what has been done to refute the challenges or to modify the main narrative to take them into account.

It is useful to think of AOT as a habit that can be inculcated through repetition. But it is more than that. People who believe that they should think in a self-critical way tend to do so. One of the most useful measures of individual differences in AOT is a short test of beliefs about how people should think. Some of the items (agree/disagree on a 5-point scale, some reverse-scored) are: “Allowing oneself to be convinced by an opposing argument is a sign of good character”; “People should take into consideration evidence that goes against their beliefs”; “People should revise their beliefs in response to new information or evidence”; “Changing your mind is a sign of weakness”; “Intuition is the best guide in making decisions”; and “It is important to persevere in your beliefs even when evidence is brought to bear against them.” The test predicts successful forecasts, sufficient search behavior in a perceptual task, and utilitarian moral judgment.

I found it surprising that many people received low scores on this scale. It was difficult for me to imagine how anyone could give a “completely agree” answer to the last question, for example. Would not it be embarrassing to endorse such stubbornness? Yet some people did. Who were they? Some insight about one source of the low scores came from the work of Jared Piazza, who found that consequentialist and utilitarian judgments were negatively correlated not only with political conservatism and religiosity but, especially, with a belief in “divine command theory,” the claim that people are incapable of understanding or questioning God’s moral pronouncements and should not try to do so. We found that a measure of belief in this theory was strongly negatively correlated with the self-report AOT scale and with utilitarian moral judgment. More generally, these results suggest that AOT as a trait is strongly influenced by culture. Some cultures (or subcultures) teach, from childhood up,

that excessive thinking, curiosity, and questioning are wrong and should be discouraged.

AOT has other social benefits aside from helping to understand science. Political disagreement is often the result of people acting on the basis of beliefs that are not only incorrect—at least one side must be incorrect in many disagreements—but also poorly formed. Take, for example, the beliefs of many who participated in the Nazi holocaust. Although they were repulsed by what they did, they felt compelled to do it because Germany was alone in fighting a worldwide Bolshevik/Jewish conspiracy. Current examples of people doing horrible things that they think are for the greater good are not hard to find. Less dramatically, an increase in AOT can bring about greater agreement on the facts among people with similar goals, for example, cosmopolitan citizens.

The absence of AOT is also part of the source of political polarization among citizens in general. Political views on one side or the other may be maintained by lack of critical thinking about the factual evidence or moral arguments. Note that I said “one side or the other.” AOT on everyone’s part would not necessarily lead to the conclusion that the middle view is correct, perhaps not even very often. Once people have committed themselves to the wrong side as a result of myside bias, they will use all their cognitive tools, other than AOT, to defend that side. It may even turn out, as Dan Kahan has repeatedly found, that those who know more are the most polarized. (One of the measures of “knowing more” is a test of science factual knowledge; the other is essentially a math test. Neither is a test of AOT.)

When people act politically to advance views that would not survive an actively open-minded examination, they harm others to the extent to which they succeed. Thus the cognitive processes that lead to such action may be seen as a moral failure. The fact of this failure is not mitigated by pointing out that it arises from cultural influence, as does most immorality. Importantly, it seems likely that people’s actual thinking reflects their understanding, or the lack of it, of why AOT is a superior way of thinking. Such understanding is also necessary to appreciate why science “works” and what distinguishes it from other ways of forming beliefs.

AOT also answers the question of how we can protect ourselves against dangerously false beliefs about matters of fact and indefensible moral doctrines, like those of the Nazis. AOT is not a guarantee, but it is all we can do to protect ourselves.

This conclusion does not imply that poor thinking deserves punishment. Rather, support for AOT must come from culture, starting with schools. Schools that teach ideology and discourage questioning, all too common throughout the world, should be reformed or replaced.

Conclusion

To the extent to which the problems in communicating science are the result of philosophical disagreements, it is difficult to know who should do what to fix them. Few would advocate a forceful takeover of the education system by cosmopolitan utilitarian scholars. Aside from the impossibility of such a move, it would encourage groups with opposing views to try the same thing. Even modest efforts to teach understanding of the methods of science sometimes run into political opposition from those who see this as a form of left-wing indoctrination.

Yet these modest efforts must continue. And the same should be done for the other philosophical positions discussed here. We do not need to indoctrinate citizens or pupils with utilitarian cosmopolitanism, but we can make sure they have heard of these views, along with others. Some of my research has indicated that most Americans, including even law students and judges, have not heard of one of the most famous ideas of utilitarianism, namely, that punishment is a harm and is thus wrong unless it is justified by the prevention of greater harm. This idea is part of the history of government. It is not rocket science. Every student should know that the idea exists. The same can be said for other ideas that I have discussed.

Climate change is an example that is on the table here. Many Americans say they do not believe that the world climate is changing for the worse and that this change can be mitigated by reductions in atmospheric carbon dioxide and methane. Presumably their apparent disbelief results largely from the policy implications of this conclusion—which would seem to involve the use of government power at a worldwide level—and the moral principles that lead them to favor freedom from government coercion and the autonomy of nations. When they are asked whether they accept the scientific conclusions about climate change, they may say no, simply to express their opposition to policies that others take these conclusions to imply.

In some cases, they may think parochially, believing that climate change is not so bad for the United States, although it may be bad for the world on the whole, or that the benefits of actions taken by the United States will largely accrue to others

and are therefore not part of our duty as citizens to support. This is not a failure to accept the scientific conclusions but another way to make some of them irrelevant, namely those that predict consequences for the rest of the world.

Deniers may also engage in biased thinking by interpreting facts so as to maintain the belief that the scientists are wrong. Or the very political and moral beliefs that led to their opposition may be the result of unreflective thinking about how to justify beliefs that oppose the greater good. When such myside bias is involved, it becomes a moral failure because it affects others. AOT is relevant to thinking about morality and citizenship, as well as being the core of scientific thinking itself. Finally, some deniers may find it easier to dismiss the conclusions of scientists because they do not understand the role of AOT in reaching these conclusions. Although they may know the facts of science, they may not fully understand what science is.

In sum, while we cannot force our fellow citizens to accept the ideas that would make science more relevant to them, we can try to ensure that they are familiar with these ideas, including the nature of AOT and its role in both science and other kinds of thinking. And, just as AOT requires that we challenge our own favored conclusions, we can challenge opponents of specific conclusions to defend their own principles, rather than simply accepting them as inevitable and precious, as if they were hothouse flowers that could not tolerate the outside air. In the end, the power of good ideas may win out, as it has, very slowly but surely, over the course of history. Moreover, journalists in particular could spend more time discussing consequences of policies. It is, I have argued, these consequences that should determine our response.

Selected Readings

- Baron, J. (1993). Why teach thinking? An essay. *Applied Psychology: An International Review*, 42, 191–237.
- Baron, J. (1994). Nonconsequentialist decisions. *Behavioral and Brain Sciences*, 17, 1–42.
- Baron, J. (2012). The “culture of honor” in citizens’ concepts of their duty as voters. *Rationality and Society*, 24, 37–72.
- Baron, J., and Jurney, J. (1993). Norms against voting for coerced reform. *Journal of Personality and Social Psychology*, 64, 347–355.
- Buchan, N. R., M. Brewer, G. Grimalda, R. Wilson, E. Fatas, M. and Foddy, M. (2011). Global social identity and global cooperation. *Psychological Science*, 22, 821–828.
- Edlin, A., Gelman, A., and N. Kaplan. (2008). Vote for charity’s sake. *The Economist’s Voice*, 5(6), article 6.
- Horton, R. (1967). African traditional thought and Western science (pts. 1–2). *Africa*, 37, 50–71, 155–187.

- McFarland, S., M. Webb, and D. Brown. (2012). All humanity is my ingroup: a measure and studies of identification with all humanity. *Journal of Personality and Social Psychology*, 103, 830–853.
- Mill, J. S. (1859). *On liberty*. London: J. W. Parker & Son.
- Pauer-Studer, H., and J. D. Velleman. (2011). Distortions of normativity. *Ethical Theory and Moral Practice*, 14, 329–356.
- Piazza, J., and J. F. Landy. (2013). “Lean not on your own understanding”: belief that morality is founded on divine authority and non-utilitarian moral judgments. *Judgment and Decision Making*, 8, 639–661.
- Popper, K. R. (1962). *Conjectures and refutations: The growth of scientific knowledge*. New York: Basic Books.

