Canadian Journal of Philosophy (2022), 52: 3, 246–255
doi:10.1017/can.2020.41

ARTICLE

Thinking about Values in Science: Ethical versus Political Approaches

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Abstract

Philosophers of science now broadly agree that doing good science involves making non-epistemic value judgments. I call attention to two very different normative standards which can be used to evaluate such judgments: standards grounded in *ethics* and standards grounded in *political philosophy*. Though this distinction has not previously been highlighted, I show that the values in science literature contain arguments of each type. I conclude by explaining why this distinction is important. Seeking to determine whether some value-laden determination meets substantive ethical standards is a very different endeavor from seeking to determine if it is politically legitimate.

Keywords: Values in science; ethics; political philosophy; political philosophy of science; inductive risk; citizen science

1. Introduction

Thankfully, we are now reaching the point where it is not controversial—at least among philosophers of science—to say that doing good science requires making non-epistemic value judgments. Scientists must manage inductive risk, create classification schemes, choose terminology, define concepts, structure quantitative measures, and analyze data—all of which can involve value judgments.[1] Now that we're (mostly) past the point of arguing about whether scientists must or should make value judgments, we can pay more attention to thinking about how those judgments should be made—about which or whose values should guide scientific research.

In this paper, I want to call attention to two very different perspectives from which scientists can make value judgments, or from which we can evaluate the value judgments scientists make: approaches grounded in *ethics* and approaches grounded in *political philosophy*.[2] I'll begin by briefly clarifying the distinction between ethics and political philosophy, showing that ethical and political principles constitute distinct normative systems which potentially yield conflicting guidance. I'll then survey the more general literature on values in science, showing that although they haven't been explicitly distinguished, strands of both ethics-grounded and political philosophy–grounded approaches are present. I'll then show that the same is true of the more practical literature

[1] See, for example, Douglas (2009); Dupré (1999); Elliott (2017); Reiss (2017); and Schroeder (2017b).

[2] A note on terminology: although I will contrast ethics with political philosophy, our everyday use of the term *ethical* encompasses many political norms. Consider, for example, a US government official who regularly uses her position to publicly advocate for her religious views. Such behavior would ordinarily be described as *unethical*, though plausibly the ultimate problem with it is that it violates distinctly *political* principles which say that the government should not endorse any particular religion. In this paper, I will describe such actions as *politically illegitimate*, reserving "unethical" and related terms to refer to actions that violate nonpolitical standards of individual conduct.

offering concrete recommendations to scientists. I'll conclude by highlighting the importance of the distinction and offering two suggestions for future work on values in science.

2. Ethics versus political philosophy

Ethics and political philosophy offer two different perspectives from which we can make or evaluate value-laden decisions. This thought is a very natural one. Common sense tells us that the principles that ought to regulate government actions are different from the principles that we ought to follow in our daily lives. In some cases, governments have the right to do things that it would be ethically unacceptable for private citizens to attempt—for example, to impose punishments, seize property, or engage in certain forms of coercion. In other respects, governments are subject to constraints that don't apply to private citizens. A government agency, for example, might be bound to maintain a neutral stance on religious issues, or abide by the expressed will of voters even in cases where it believes the public has made a mistake.

Intuitively, then, the principles governing political institutions differ from the principles that ought to guide individual ethical agents. Why? Philosophers have given two different explanations for the divergence, which are linked to two different views about the relationship between ethics and political philosophy. On the first view, political philosophy is essentially a branch of applied ethics, "applying general moral principles to the factual circumstances that make political society necessary" (Ripstein 2009, 1). Though such a view unites ethics and political philosophy at an abstract level, at the level of practical principles, it will yield substantial differences. Business ethics, military ethics, and medical ethics offer very different principles to guide CEOs, soldiers, and doctors, because CEOs, soldiers, and doctors make different kinds of decisions in different contexts. For the same reason, we would expect a branch of applied ethics offering principles to government agents to look quite different from ethical principles directed to moral agents in general. Christopher Woodard, for example, argues that even if the principle of utility ultimately applies to both governments and private agents, utilitarians should nevertheless employ different concepts when evaluating government actions than when evaluating the actions of private agents (2019, chap. 8).

On a second view—one that I think is more common among political philosophers—political philosophy is not simply a branch of applied ethics; it is distinct in a more robust sense. At the heart of such views is the idea that ethics and political philosophy respond to different problems or human needs. We need ethical principles to (for example) tell us how to live a virtuous or flourishing life, or how to regulate our interpersonal relationships, whereas we need political principles to (for example) tell us how we can establish common rules for a society marked by disagreement about values, or how we can balance people's conflicting rights and liberties. Since ethical and political principles respond to different problems, neither is, in any straightforward way, derivative of or dependent on the other.[3] Kant, for example, does not approach politics by applying the Categorical Imperative to government actions. He defends legal and political principles that are independent of and have an unclear relation to the Categorical Imperative (Ripstein 2009). Robert Goodin defends utilitarianism as a basis for public policy, while rejecting it as a standard for individual action (1995). Rawls defends his principles of justice without grounding them in a theory of individual morality, and indeed insists that government must remain neutral on important ethical issues (1993; 1999).

Either of these two perspectives can explain why ethical and political principles look quite different. They also explain why ethics and political philosophy have developed into distinct philosophical subfields characterized by different concepts and methods. Philosophical work in

[3]This does not rule out that they are related to each other in some other way—for example, jointly issuing from common fundamental values such as basic human equality. The point is that political principles can't be derived from ethical principles (nor vice versa).

https://doi.org/10.1017/can.2020.41 Published online by Cambridge University Press

ethics tends to focus on values and principles themselves, seeking to determine what truly is valuable, or to distinguish substantively reasonable from substantively unreasonable principles. Political philosophy, of course, does the same, but it also pays substantial attention to the relationship between values, principles, and individuals. It thus gives a central place to concepts like representativeness, legitimacy, accountability, and authority, and it gives a greater role to procedure. These separate foci are reflected in different standard methods. Much work in ethics proceeds through the use of highly stylized "trolley-type" scenarios which abstract away from social context. In particular, they tend not to give any weight to how the characters in those scenarios think they should be resolved: the views of the trolley driver, bystanders, and potential victims are rarely even mentioned, because they are not seen as relevant to the reasonableness of the principles under consideration. Recent work in political philosophy, on the other hand, pays much more attention to social context and probably for that reason gives a less central role to "trolley-type" cases. Of course, political philosophers do sometimes make use of stylized examples, such as Rawls's veil of ignorance or Dworkin's shipwreck scenario. But in such cases political philosophers generally go to greater lengths to explain why and how their abstract examples are relevant to more realistic situations.[4] In ethics, it is often simply taken for granted that trolley cases can directly support or refute ethical principles.

To summarize, then, ethics and political philosophy are distinct philosophical subfields. They are characterized by different central concepts and methods and, at a practical level, they yield distinct normative principles. Further, because ethical principles differ from political principles—because what is ethically good or right may diverge from what is politically legitimate—the two standards can sometimes issue conflicting guidance. A government official may have good ethical reasons to tout one religion over another—reasons that any private citizen could appropriately act on—while at the same time recognizing that it would be politically illegitimate for him to publicly act on those reasons. A judge may find herself in a situation where a duly passed law demands she punish defendants for actions that she regards as ethically unproblematic or even virtuous. In general, a political agent should sometimes act contrary to what would be recommended by broadly acceptable principles of normative or practical ethics, and a private ethical agent should sometimes act based on principles that wouldn't meet standards of political legitimacy.

3. Ethical versus political approaches in the general science and values literature

The conclusions about ethics and political philosophy defended in the previous section have important implications for how we should think about the value judgments that scientists must make. Advice grounded in ethics may look different from, and be in conflict with, advice grounded in political philosophy. The values in science literature, though, have not distinguished these approaches. Nevertheless, that literature contains strands of reasoning grounded in ethics, strands of reasoning grounded in political philosophy, and strands of reasoning whose provenance is unclear. (I choose the term *strands* carefully; because the distinction hasn't been clearly noted before, I think many authors offer arguments that include both ethical and political elements, as I will illustrate below.) In this section, I will demonstrate that through a brief look at the more abstract literature on values in science.

3.a Ethics-based strands

My sense is that the bulk of the philosophical literature on values in science takes an approach that uses the methods, concepts, and principles distinctive of philosophical work in ethics. For example, in her pathbreaking *Science, Policy, and the Value-Free Ideal*, Heather Douglas begins her core

[4]See Rawls (1999, e.g., at 19); Dworkin (1981, e.g., at 290–92).

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argument for the rejection of the value-free ideal by posing the question "whether all of us, *as general moral agents*, have a responsibility to consider the consequences of error" (2009, 66; emphasis added). She then goes on to explicitly reference the literature on moral, rather than political, responsibility (67). Douglas ultimately concludes:

> Scientists have *the same obligations as the rest of us* not to be reckless or negligent … *The scientist* acting as an advisor *should consider* the extent of uncertainties around [an empirical claim they are making] and the possible consequences of incorrectly accepting or rejecting the claim, and *they* should weight the importance of the uncertainties accordingly. (81; emphasis added)

In comparing scientists' obligations to those of "the rest of us," Douglas seems to be appealing to ethical rather than political considerations. And, whereas a political approach concerned with representativeness or legitimacy would likely direct scientists to pay attention to how the public values the possible consequences of error, Douglas here directs scientists *themselves* to assess the possible consequences of error. This again suggests an ethics-based approach.

Many other prominent contributors to the values in science literature adopt a similar strategy. Kevin Elliott, for example, echoes Douglas's explicit reference to ethics, arguing that the "values influencing our research enterprise should adequately represent *fundamental ethical principles* and, when those do not settle the matter, the values of those who will be affected by the research" (2017, 106; emphasis added).[5] And Torsten Wilholt also asks scientists to directly evaluate the significance of different types of error:

> [Inductive risk decisions] represent the research community's collective attempt to find the *right* balance between power and the two types of reliability. In that sense, they also represent an implicit consensus … *of the [research] community* with regard to the question of *how valuable* the benefits of correct results and *how grave* the negative consequences of mistakes typically are. (2016, 231–32; emphasis added)[6]

3.b Political philosophy-based strands

Although most philosophers writing about values in science approach the issue through the lens of ethics, several analyze such cases using distinctly political concepts and principles. Philip Kitchter's *Science in a Democratic Society* (2011) obviously puts political philosophy front and center. Gregor Betz defends the value-free ideal for science by arguing that it "ensures—in a democratic society—that collective goals are determined by democratically legitimized institutions, and not by a handful of experts" (2013, 207). Though she rejects the value-free ideal, Kristen Intemann agrees with Betz that it is crucial for science to be conducted in a democratically legitimate way, proposing what she dubs the "aims approach":

[5]The reference to the values of those who will be affected may seem to suggest a political approach. Below I explain why I don't think we can confidently draw that conclusion.

[6]A reviewer for this journal speculated that perhaps the split between ethics-grounded and political philosophy–grounded approaches tracks a distinction between philosophers thinking about value judgments made at the level of individuals versus those made at the level of groups or collectives; or between philosophers who approach these issues from the perspective of individual versus social epistemology. This strikes me as a very interesting and plausible suggestion, though I haven't done the sort of comprehensive evaluation of the literature needed to support or reject it. (For reasons I describe below, doing so would be a very complicated endeavor, since much of the literature can't easily be classified as ethics-based or political philosophy–based.) My sense, though, is that even if there is this sort of correlation, it will be a far from perfect one. The quote from Wilholt here, for example, exemplifies an ethics-based approach, but it appears in an article on collaborative research and social trust, in a volume dedicated to the epistemology of groups.

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> The aims approach maintains that social, ethical, and political value judgments are legitimate in climate modeling decisions insofar as they promote democratically endorsed epistemological and social aims of the research. (2015, 219; *cf.* de Melo-Martín and Intemann 2018, 125–26)

Indeed, though the passages we saw earlier take an approach grounded in ethics, elsewhere Heather Douglas grounds her position in concepts from political philosophy. Here, for example, she argues that it would be ideal for scientists to defer to the public on matters of value:

> Regardless of which theoretical ideal of democracy one might hold, it is not acceptable for a minority elite to impose their values on the general populace. If scientists can make these judgments in private, not disclosing them in their published work, and thus shape public policy through these judgments with no possible avenue for public accountability, any standard of democracy will have been violated … An ideal situation would be to have a public debate over contested values, resolve the debate, and then ensure that scientists employ those values when making their judgments in practice. (2005, 156)

I have argued for a similar position in some of my work (Schroeder 2019; 2017a).

Finally, it is worth noting that many STS scholars analyze the value-laden aspects of science through a political lens. (See, for example, Jasanoff 1990 and Pielke Jr. 2007.) That same literature, however, typically refrains from offering detailed normative guidance to scientists, focusing instead on documenting the respects in which science is value-laden and then noting the impact that can have on political institutions. In that respect, it is importantly different from the political analyses offered by Kitcher, Betz, Intemann, Douglas, and others—all of whom employ normative political concepts as part of an explicit effort to improve or reform science.

3.c Stakeholder views

Above, I've given examples of reasoning that I think can fairly easily be characterized as either grounded in ethics or grounded in political philosophy. Much of the values in science literature, however, is harder to classify. One place in which this can be seen is in the many calls for stakeholder participation. Many scientists, philosophers, and other scholars of science have called for the increased involvement of citizen stakeholders in scientific research. The involvement of citizens in research might seem to suggest a political approach, since giving the public a voice in how scientific research is conducted seems to cohere with the ideas of democracy we saw in the last section. There are at least two reasons, though, that we should not be so quick to draw this conclusion.

First, stakeholder participation can be justified ethically. Kant's Formula of Humanity, for example, directs us to help others achieve their goals and to give them a say over how we treat them (Kant [1785] 1998). It isn't hard to see how this could generate an obligation for scientists to consult populations who will be impacted by their research. Second, according to standard political views, being affected by a decision—that is, being a stakeholder—is not sufficient for having a political right to make that decision.[7] International pesticide manufacturers are stakeholders when it comes to US environmental policies, but it doesn't follow that they deserve a vote on those policies. Thus, it is not clear that someone in search of democratic legitimacy would want to defer to stakeholders generally.

The narrow upshot of this discussion is that calls for stakeholder involvement in science are neither clear examples of ethics-based approaches, nor clear examples of approaches based in

[7]I also think that, unless one takes an extremely broad view of stakeholdership, being a stakeholder is not necessary for having a political right to make a certain decision. I have a right to vote for my city's next mayor even if I plan to move out of the city before her inauguration.

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political philosophy. To properly assess such proposals, we need to know more about why stakeholder involvement is being sought and what form that involvement would take. If stakeholders are being sought, for example, because they are thought to have a special appreciation for the urgency of the research topic, or as a gesture of reciprocity to account for the disruption to their community brought about by a research project, that would likely have an ethical justification. Whereas if scientists aim to recruit stakeholders representing the full range of public views on some issue, that seems more likely to be grounded in political principles.[8] The broader upshot of this discussion is that, once we move on from cases where philosophers clearly signify their perspective (e.g., through references to the literature in ethics or political philosophy), it can be difficult to distinguish approaches to values in science grounded in ethics from those grounded in political ideals and principles.

4. Ethical versus political approaches in action

In the previous section, I discussed the general literature on values in science. The distinction between ethics-based and political philosophy–based approaches can also be seen in more concrete discussions. Consider, for example, scientific research into *hormesis*, a phenomenon where substances that are harmful to organisms at high doses are beneficial to those organisms at very low doses. (Certain herbicides, for example, increase plant growth at very low doses.) Because of the difficulty and expense involved in studying the effect of low-level toxins on organisms, research on hormesis involves managing significant uncertainty along many dimensions. As Kevin Elliott (2011) and others have pointed out, this means that doing research on hormesis requires making a number of important value judgments.

In 2008, Elliott was invited to serve as guest editor for an issue of the *BELLE Newsletter*, a scientific publication dedicated to discussing the impact of low-level exposures (Elliott 2008). Elliott invited contributions from philosophers and scientists discussing value-laden aspects of hormesis research. Most of the contributors Elliott recruited discussed hormesis research using the concepts and principles of ethics. Hoffman and Stempsey, for example, defended their argument through references to the literature in normative and practical ethics: Ross, Frankena, Beauchamp, and Childress (Hoffman and Stempsey 2008, 14). And Kristin Shrader-Frechette offered an argument whose substance only makes sense within the realm of ethics. She argued that in order for policymakers to resolve certain uncertainties in a way favoring the existence of hormesis, it would need to be true that "risk bearers should and would give informed consent" to that approach, and that it would not "use some risk victims as means to the end of others, even the end of benefits for all of society" (2008, 40–42). But stringent principles requiring informed consent and forbidding risking harms to some for the benefit of others are plausible only as *ethical* principles. It is indeed reasonable to think that a physician, for example, must get informed consent before risking harm to a patient and that she should not impose a risk on some patients merely for the benefit of others. But these principles clearly can't govern political actions. Every time a government permits industrial pollution, sets less than maximal vehicle-safety standards, or transports hazardous waste, it imposes risks on some for the benefit of others, and there is no reason to think that any such policy would receive informed consent from *all* affected citizens (setting aside the impossibility of actually securing such consent). Indeed, if the government had to individually get informed consent from each citizen it exposed to a risk of harm, it couldn't do much of anything.[9]

Hoffman, Stempsey, and Shrader-Frechette thus analyze the values involved in hormesis research through the lens of ethics. Contrast that with Ortwin Renn's contribution to the same

[8]I discuss these issues in more detail in an unpublished paper, "Diversifying Science: Comparing Arguments from Feminist Philosophy and the Citizen Science Movement".

[9]This is a point which libertarians have grappled with at length. See the discussion in Sobel (2012).

https://doi.org/10.1017/can.2020.41 Published online by Cambridge University Press

volume. After a long discussion which explains why fundamental ethical principles can't settle important debates about hormesis, Renn frames the problem in a distinctly political way:

> Assessing potential consequences of human interventions and evaluating their desirability on the basis of subsequent knowledge and transparent valuation criteria are two of the central tasks of a risk governance process. However, *the plural values of an heterogeneous public and people's preferences have to be incorporated in this process*. But how can this be done *given the wealth of competing values and preferences*? Should we simply accept the results of *opinion polls* as the basis for making *political decisions*?" (2008, 27; emphasis added)

Renn takes as his starting point the different values and preferences held by the public, and then searches for a way to adjudicate among them. This corresponds to what we saw earlier as a common characterization of the job of political philosophy: to determine how to establish common rules for a society marked by disagreement about values. The contrast with the earlier authors' ethics-based approaches is clear. While Hoffman, Stempsey, and Shrader-Frechette began by putting forward and defending specific ethical values or principles, Renn starts by asking what the public values.

5. The importance of the distinction

Ethics and political philosophy are different subdisciplines offering different normative standards from which we can assess the value judgments scientists make. To this point, the literature on scientific value judgments has not paid attention to, or even noted, this distinction. This oversight is important for at least two related reasons. First, as we saw above, standards that come from ethics will sometimes differ and offer conflicting guidance from standards grounded in political philosophy. The politically legitimate thing to do may not be the best option from a substantive ethical perspective. The politically legitimate definition, for example, of a concept like *abuse* or *unemployed*—that is, the definition which can appropriately serve as a basis for public decision-making—may be the one endorsed by the public or enshrined in a legal code, even if that definition is problematic in an ethical sense (e.g., because it distinguishes cases that are ethically on a par, or lumps together cases that are ethically very different). Or, there may be certain types of knowledge (e.g., knowledge about individuals' private lives or religious views) that may appropriately factor into ethical reasoning, but which would be illegitimate for a government actor to appeal to. So the most obvious reason it is important to distinguish ethics-based approaches from political philosophy–based approaches is that they may offer different guidance to scientists.[10]

That, though, isn't the only reason it is important to distinguish them. The details of an ethics-based or political philosophy–based approach will of course depend on the particular ethical and political principles one endorses. But the discussion so far suggests a crucial methodological difference. Ethics-based approaches tend to proceed mainly through the sort of reasoning familiar from work in normative and practical ethics. Someone seeking to find an ethically ideal approach to managing inductive risk or classifying toxins is likely to begin by looking to the practical ethics literature for concrete principles, or by employing the sort of case-based, analogical reasoning common to that literature. Approaches grounded in politics, though, tend to work from the public's values—either the values of the public as a whole, or the values expressed by bodies (such as legislatures) designated to act on the public's behalf. Those values, of course, are only a starting point. Few if any political philosophers endorse simple majority rule or uncritically accept the validity of legislatures' actions, and so assessing political legitimacy requires much philosophical

[10]And, accordingly, when two scholars appear to be disagreeing, they may not be. One scholar could be right that some particular balance of inductive risk is ethically optimal, while another scholar could also be correct that a very different balance of inductive risk would be politically legitimate.

https://doi.org/10.1017/can.2020.41 Published online by Cambridge University Press

analysis.[11] But that analysis will typically take the public's values as its starting point, or as a key input. That means that a political approach to assessing scientific value judgments often must begin with an *empirical* investigation to determine what the public actually values—a step that is absent from the primarily normative analysis common to ethics-based approaches. Thus, the distinction between ethics-grounded and political philosophy–grounded approaches isn't important just because the two approaches may end up reaching different conclusions; it is also crucial because the two approaches require very different starting points and different kinds of expertise.

In light, then, of the importance of the distinction I've identified, I conclude with two recommendations for future work on values in science. The first is quite simple: philosophers and other scholars writing about how scientists should make value judgments need to be clear and explicit about whether they are taking an approach grounded in ethics, an approach grounded in political philosophy, or some hybrid of the two. Are they seeking to determine which choice by scientists would be best in a substantive ethical sense? Or are they seeking to determine which choice by scientists would be politically legitimate? If they're proposing a hybrid view, how are substantive ethical considerations supposed to be combined with concerns about legitimacy, representation, process, and so forth since they can potentially come into conflict?

Of course, the ultimate question that needs to be answered is: Which of these potentially conflicting normative standards should we ultimately use to evaluate scientists' value judgments? Or—since the answer is presumably dependent on contextual details—which scientific value judgments should we evaluate using an ethics-based approach, and which scientific value judgments should we evaluate using an approach grounded in political philosophy? When should scientists seek to employ ethically superior approaches to inductive risk, concept definition, and so forth; and when should they seek to resolve those issues in ways that are politically legitimate?

My second recommendation, accordingly, is that philosophers of science—working with ethicists and political philosophers—tackle this problem directly. It is, I think, a difficult and complicated problem. Initially, there may seem to be an obvious solution. Private actors typically should aspire to live up to ethical norms, while government agents typically should be bound by norms of political legitimacy. Can't we just apply that to scientists? In some cases, we can. An EPA toxicologist or a NOAA forecaster probably should aim at political legitimacy, while a self-funded scientist working on a project of personal interest should be governed by ethical norms. Unfortunately, though, cases like those are exceptional. Agents don't come neatly divided into government versus private actors. Consider, for example, the private tweeting of a government official, the research of a professor at a public university, or the actions of a nonprofit organization receiving a tax exemption. Cases like these lie in an unclear middle ground: not government actions, but also not fully private actions. Most scientific research, it seems to me, lies in this complex territory. Most scientists are not government employees, and principles of academic freedom grant autonomy to many of the ones who are. That would seem to suggest treating scientists much like we treat private citizens. However, much scientific research is funded by the government (through public universities and government grants), and nearly all research builds on prior research that was publicly funded. In addition, scientists and scientific research are accorded a privileged place in many public contexts, including court proceedings, regulatory decisions, and policymaking. As several philosophers have argued, this arguably means that scientists have an obligation to work for the common good and to abide by certain political norms.[12] Indeed, the critical importance of scientific research to so many aspects of our lives may itself be enough to place special political obligations on scientists in much the same way others in positions of power acquire special obligations (Schroeder 2017a, 1052–53).

[11]For example, certain values (perhaps those grounded in empirical ignorance) may need to be discounted, other values (those illegitimately suppressed by the majority) may need to be amplified, and some values (such as the desire to violate another's rights) shouldn't be given any weight at all.

[12]See, for example, Shrader-Frechette (1994, 25) and Elliott (2006).

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My own view is that scientists should be guided by political norms in most, though not all, of the value judgments they make in the course of their research. But whether my view is correct or not, the issue is one that philosophers of science need to discuss. Its resolution will dictate not just what we ultimately conclude about how scientists should make the value judgments their work requires, but also how we should frame and begin exploring those issues in the first place.

Acknowledgments. Versions of this paper were presented at the "Engaging with Science, Values, and Society" workshop at the University of Alberta; the 2019 Values in Medicine, Science, and Technology conference at the University of Texas at Dallas; and the 16th International Congress on Logic, Methodology, and Philosophy of Science and Technology. I thank the participants at those events for their feedback, as well as Paul Hurley and Alex Rajczi for conversations on related issues. I am grateful to Ingo Brigandt and two reviewers for this journal for extensive written comments which improved the paper significantly. The central idea of this paper was inspired by my engagement with Dan Hausman's work on health measurement, especially Hausman (2015), which shows how a health measurement system designed for political decision-making may look very different from a health measurement system designed to facilitate private decision-making.

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Cite this article: Schroeder, S. A. 2022. Thinking about Values in Science: Ethical versus Political Approaches. *Canadian Journal of Philosophy* 52: 246–255, doi:10.1017/can.2020.41