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# Concerns about Contextual Values in Science and the Legitimate/Illegitimate Distinction

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(Received 09 October 2023; revised 24 April 2024; accepted 20 May 2024)

## Abstract

Philosophers of science have come to accept that contextual values can play unavoidable and desirable roles in science. This has raised concerns about the need to distinguish legitimate and illegitimate value influences in scientific inquiry. I discuss here four such concerns: epistemic distortion, value imposition, undermining of public trust in science, and the use of objectionable values. I contend that preserving epistemic integrity and avoiding value imposition provide good reasons to attempt to distinguish between legitimate and illegitimate influences of values in science. However, the trust and the objectionable values concerns constitute no good reason for demarcation criteria.

## 1. Introduction

Although not without critics (Betz 2013; Hudson 2016; Cassini 2022), most philosophers of science now accept that science is value laden and that it is all the better for it. True, the value-free ideal of science never precluded all value influences in the core of science. It has never denied that epistemic values play a crucial role in scientific reasoning. But many philosophers of science have gone further and argued that contextual values can also exercise unavoidable and desirable influences at the core of science, that is, in decisions regarding experimental design, choice of methodologies, characterization of data, and interpretation of results (e.g., Longino 1990; Douglas 2000, 2009; de Melo-Martín and Intemann 2007; Elliott 2013; Biddle 2013; Brown 2014; Anderson 2004; Dupré 2007; Wylie and Nelson 2007).<sup>1</sup>

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<sup>1</sup> Although everyone accepts that contextual values play legitimate influences in the so-called contexts of discovery and application, there are also reasons for concern regarding what such influences are. Nonetheless, the legitimate/illegitimate debate has focused on the influence of contextual values in the core of science, or the so-called context of justification. That is my focus here. This does not mean that these different contexts or phases are linear or unrelated. Indeed, at times the legitimate/illegitimate debate mixes concerns about all these different levels, which contributes to the problems pointed out here.

Accepting that contextual values influence scientific reasoning, however, raises concerns about possible negative effects on the scientific knowledge produced.<sup>2</sup> Such concerns have led philosophers of science to a debate now known as “the new demarcation problem” (Holman and Wilholt 2022). While the “old” demarcation problem attempted to find criteria to distinguish between science and pseudoscience (Popper 1963), the new one seeks to distinguish between legitimate and illegitimate influences of contextual values in science (Holman and Wilholt 2022).

Various demarcation criteria have thus been proposed (*ibid.*), with philosophers also debating whether a set of necessary and jointly sufficient criteria or an open-ended list are needed to address the problem (Koskinen and Rolin 2022; Resnik and Elliott 2023). The debate, however, would benefit from some more clarity. This is so because when demarcating legitimate and illegitimate influences of values in science, philosophers of science often fail to distinguish among what are conceptually distinct concerns regarding the value influences in science. Distinguishing among these concerns is important because the reasons for the concerns are different and they require different strategies to address them. Moreover, some of the concerns constitute no good reason for demarcation criteria.

Here I discuss four concerns usually given to distinguish between legitimate and illegitimate influences of contextual values in the core of science<sup>3</sup>: epistemic distortion, value imposition, undermining of public trust in science, and the use of objectionable values.<sup>4</sup> I contend that preserving epistemic integrity and avoiding value imposition provide good reasons for distinguishing between legitimate and illegitimate influences of contextual values in science. However, the undermining of trust and the objectionable-values concerns constitute no good reason for demarcation criteria. This is so because neither of them provides additional grounds for concern. Furthermore, to the extent that the latter problem is properly understood as one involving conflict of values, the distinction between legitimate and illegitimate values is unhelpful as at stake are disagreements about which values should be influencing research.

## 2. Contextual Values in Science: Why Worry?

One could worry about the influence of contextual values in science for various reasons. I do not claim that the ones discussed here are either the only reasons or the

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<sup>2</sup> My discussion centers on contextual values because those have been the terms of the demarcation debate. Other types of contextual influences might be relevant to scientific research (see Hillgardt 2022).

<sup>3</sup> Those who want to return to a value-free ideal of science and those who believe that such ideal is mistaken can share the concerns discussed here. However, those who defend the value-free ideal use the concerns as reasons to keep values out of science while for those who believe that science is unavoidably value-laden, the concerns provide reasons to appropriately manage the values used. I thank an anonymous reviewer for pointing this out.

<sup>4</sup> In their recent paper, Holman and Wilholt (2022) also use some of these worries as reasons for demarcation criteria. They put the worries in terms of desiderata that must be addressed for a demarcation criterion to be satisfactory. Their “veracity” desideratum expresses the “epistemic distortion” worry that I discuss; their “universality” could be understood as my “value imposition” concern; and their “authority” is comparable to my “undermining of public trust” worry. Contrary to Holman and Wilholt, my argument is that this last worry does not call for demarcation criteria. Holman and Wilholt do not directly discuss what I call the “objectionable value” concern and their discussion seems to suffer from the problems I point out here regarding that problem.

only appropriate ones. My claim is that some of those reasons call for demarcation between legitimate/illegitimate value influences while others do not. Also, I am not arguing that the problems discussed here are wholly unrelated. Indeed, I believe a reason why it is difficult to address these various problems is their connections. My argument is that the problems discussed are conceptually distinct and call for different solutions.<sup>5</sup> Failing to distinguish them when trying to find demarcation criteria is therefore bound to provide wrong answers, that is, inadequate criteria or ineffective solutions. Moreover, when I include some authors as concerned with one or another problem mentioned in the discussion below, I do not mean to suggest that they are concerned only with one of those problems. Indeed, my claim is that, whether implicitly or explicitly, several of the authors discussed are trying to attend to several of these problems without differentiating them.

### 2.1. The Epistemic Distortion Concern

Perhaps the most obvious reason for worrying about the influence of values in science is that they can distort research results.<sup>6</sup> At least one of the primary motivations for the value-free ideal of science is precisely to protect the epistemic integrity of science against problems such as wishful thinking or confirmation bias (Haack 1998; Betz 2013; Douglas 2009). The worry is that if contextual values are allowed to influence scientific reasoning, this could lead scientists to accept or assert hypothesis, theories, models, or interpretations of data based on how they wished the world to be or what their prior beliefs are rather than on how the world really is.<sup>7</sup> Values might then promote our social, ethical, or political aims at the expense of our epistemic ones. The case of Trofim Lysenko is often seen as a paradigm case of how political values can thwart the epistemic integrity of science (Gordin 2012). Science scholars have documented many other cases where sexist, androcentric, heterosexist, racist, and classist assumptions adversely influenced the epistemic soundness of research results (e.g., Gould 1981; Hrdy 1986; Martin 1991; Fausto-Sterling 1992; Longino 2013; Richardson 2013; Lloyd 2005).

Epistemic distortions can involve forms other than those affecting the reliability of scientific results. Some philosophers are concerned about “disconnected expectations.” In these cases, values can bias methodological choices in ways that lead audiences of the research to have a systemically distorted understanding of what the research has shown (Holman and Wilholt 2022). Values here influence not the conduct of research per se, but the degree to which methodological choices align with the expectations placed on them by others. This can be because some scientists simply flaunt conventions about epistemic risks without explicit indication, thus confusing other scientists (Wilholt 2009) or the public (John 2015), or because there is a

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<sup>5</sup> See (Wagner 2022), who also argues that concerns about value influences in science call for distinct solutions. I thank an anonymous reviewer for bringing this article to my attention.

<sup>6</sup> This is a reasonable concern. However, the excessive worry the science and values literature expresses with the potential biasing effects of contextual values betrays an unwarranted view of such values as inherently problematic. See (Brown 2020) for a detailed discussion on this.

<sup>7</sup> Some have challenged the claim that wishful thinking or confirmation bias are always epistemically detrimental and argued that confirmatory values and dogmatism can have epistemic benefits (Peters 2021).

mismatch between the methodological choices used and how the research is presented (Carrier 2013). Take, for instance, studies evaluating the health risk of exposure to low doses of bisphenol A, which exhibits hormone-like properties that mimic the effects of estrogen in the body (Wilholt 2009). Some industry studies used the CD-SD strain of rat, which is particularly insensitive to any estrogen. Some of those studies included positive control groups that were exposed to the well-known estrogenic drug DES, where both the positive and negative controls failed to show differences. This should have alerted investigators to the unsuitability of the CD-SD strain, but they simply failed to mention the positive control in their publications. Industry researchers, arguably influenced by financial interests, thus flaunted conventions about epistemic risks without explicit indication, leading others to believe that the risks of bisphenol A were lower than warranted (*ibid.*)

That contextual values can sometimes lead to biased science seems uncontroversial. Similarly, a significant amount of evidence shows that value-laden methodological choices can lead others to misunderstand what research results show (Wilholt 2009; Carrier 2013). Nonetheless, as the work of feminist scientists in various scientific fields have shown, contextual values can also be used in ways that enrich the epistemic soundness of the research (Hrdy 1986; Fausto-Sterling 1992; Wylie 2001; Haraway 1989; Anderson 2004; Wylie and Nelson 2007). Because value influences can have positive and negative effects on the epistemic integrity of research, protecting such integrity calls for demarcating uses of value influences in science that are legitimate, that is, those that enhance or do not undermine the epistemic value of research, and those that are illegitimate, that is, those that produce epistemic distortions.

Various demarcation criteria have been proposed to address this concern. I will not assess their success here, but simply briefly describe some of them. An influential criterion has been proposed by Douglas (2009, 2000). She calls for distinguishing between the kinds of roles that values can play in a variety of decisions. For her, contextual values can legitimately play an indirect role in determining how much evidence is needed to accept a hypothesis. They ought not play direct roles in determining whether a hypothesis is warranted by evidence (Douglas 2000, 2009). The direct/indirect distinction would putatively protect research from the wishful thinking or confirmation bias problems because judgments about what the evidence is, or whether a hypothesis is warranted, are insulated from contextual values.

Philosophers of science have also offered proposals to address concerns regarding the influence of values that can distort people's expectations of research results. Such proposals defend coordinating strategies for setting methodological standards (Holman and Wilholt 2022) and amount to a call for "truth in advertisement" (Carrier 2013). Scientific communities must collectively propose appropriate methodological standards to communicate with each other (Wilholt 2009) or should be governed by fixed, high standards so that lay people can make sense of the information provided (John 2015). Although, of course, those standards can be open to scrutiny and change, scientists challenging the conventional standards must be explicit about the changes.

Identifying uses of values that systematically, or more likely than not, lead to epistemic problems could help prevent such uses. But whether the concern is about biased research results or disconnected expectations, the problem with contextual values in these cases is about *how* they are used or *how* they influence reasoning. It is

not, I contend, a problem about *which* particular values are used. That is, ethically, socially, and politically unobjectionable values, for example, equality, safety, solidarity and objectionable ones, for example, racists or sexist values, could all be used in ways that negatively affect the epistemic integrity of the research. Of course, it might be the case that some values—such as sexist and racist ones—are more likely to be used in epistemically damaging ways, but still the epistemic problem is about *how* they are used or influence reasoning rather than with the particular values themselves.

Addressing the epistemic distortion concern calls, then, for determinations about the mechanisms by which contextual values result (or are likely to result) in bias. Perhaps values are used in place of evidence (Douglas 2009), lead people to disregard contrary evidence (Anderson 2004), or direct people to use rigged methods (Elliott 2017).

This problem also calls for methods that can minimize or eliminate biasing mechanisms. This might involve, for instance, procedural strategies, such as the existence of avenues for criticism, the presence of shared standards, requirements for uptake of criticism, and for equality of intellectual authority. When followed by scientific communities these strategies can neutralize the biasing effects some uses of contextual values can have, thus preserving the objectivity of inquiry (Longino 2002, 1990). With these mechanisms, scientific decision making negatively influenced by values or interests is likely to be caught and corrected by others in the community who have different values, interests, and perspectives. These mechanisms do not make value influences disappear, but they ensure that the use of values receive critical scrutiny and that any negative influence such values have on scientific reasoning will be identified and corrected.

## 2.2. The Value Imposition Concern

A second reason grounding worries about the influence of contextual values in science is political (McMullin 1983; Lacey 1999; Mitchell 2004; Betz 2013). Science informs public policy and personal decisions and thus has significant implications for everyone. Even if the epistemic integrity of science is protected, if scientists use value judgments when conducting or communicating research, this gives them power in shaping policy and influencing personal decisions (John 2019; Pielke 2007; Betz 2013). Scientists can thus impose their values on everyone else, whether or not others share those values, hence violating democratic principles and infringing on personal autonomy. It becomes a form of coercive paternalism (Alexandrova 2017). For example, when conducting research, scientists who judge public health a priority might conclude, in the face of uncertainty, that certain substance is toxic. Such conclusion can then lead policy makers to limit or prohibit its use. Alternatively, scientists more concerned with economic losses, might conclude, when facing uncertainty, that the substance is safe. This information can encourage regulators to allow its use. In both cases, the scientists' values affect the scientific conclusions they reach and with them the policies that might be implemented, whether or not the public shares the scientists' preferences for some values over others when facing uncertainty. Because scientific conclusions are also relevant to many personal decisions, for example, whether to consume certain products or engage in particular

activities, science laden with value judgments that might not be shared by, and are quite likely hidden from, individuals would also jeopardize personal autonomy. It denies people access to relevant information about the grounds for scientific conclusions, hence leading people to rely on values to which they may have good reasons to object.

Scientists having this power is problematic for several reasons.<sup>8</sup> First, they have no special expertise or authority in making ethical, political, and social value judgments, and thus, this task should not be left to them alone. Second, scientists as a group are not representative of the values held by members of pluralistic societies. Because scientific results can affect many people in significant ways, in pluralistic societies stakeholders should have some say in determining which values to endorse when conducting research. In a context where increasing numbers of scientists have commercial interests (Benea et al. 2020), this concern is even more relevant as such interests might directly conflict with promoting knowledge that benefits the common good or with interests held by large sections of the public. Third, there are some reasonable disagreements about social, political, and ethical values. Those disagreements can be about whether certain values should be promoted or undermined when conducting research or about how to interpret the values in question. In pluralistic societies relevant stakeholders should have an opportunity to determine which social, political, or ethical values to endorse in cases of conflict, for example, whether when facing uncertainty, one should prioritize some risks over others, or risks affecting some groups over others. Arguably, in democratic societies, deciding collective goals and values should not be left to a handful of unelected scientists. Fourth, to the extent that scientists' values are not widely shared by the public, that they are using their own values in their reasoning can undermine warranted public trust in science (Douglas 2023; Wilholt 2013). This does not mean that publics can justifiably trust only research influenced by values they share, but it calls attention to the fact that the interests of scientists and those of at least some publics might conflict.

The value imposition concern thus expresses the worry that using values in science gives scientists *disproportionate* power in shaping policy and personal decisions and deprives policy makers and individuals of their right to partake in such decisions. This is inconsistent with democratic ideals and notions of personal autonomy. Thus, proposals to address this problem should primarily ensure that scientists *alone* are not making decisions about which values to use. This concern then also calls for demarcating legitimate and illegitimate value influences in science. From this perspective, if values are chosen by procedures that disregard recognition of the diversity of values espoused by relevant communities, then those values are illegitimate. If the selection of values follows procedures that consider the variety of relevant value interests, they are legitimate.

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<sup>8</sup> Although I refer to scientists as the ones imposing their values on others that might not share them, this does not mean that the problem is only of concern when the values at stake are those of scientists. Scientists are simply the ones doing the valuing when conducting science, but the values in question could be those of others, e.g., funders. The value imposition concern is about whose values are the ones shaping scientific inquiry and whether the values used have been chosen in ways that attend to the interests of relevant stakeholders.

Importantly, the value imposition concern pertains to whether the values influencing scientific research have been selected following *procedures that attend to the values of relevant stakeholders*. It is also *not* an issue about *which* particular contextual values are used or imposed. That is, what the values are, for example, profit, efficiency, safety, equity, is not what is at stake. The issue is whether the social, political, or ethical values in question have been selected by procedures that are attentive to the interest of relevant communities. Addressing the value imposition concern then calls for identification of procedures that maximize the possibility that values shaping scientific investigations—or communicating the results of those investigations (John 2019)—are shared, agreed upon, or scrutinized by relevant communities.

A variety of proposals have been offered to address the value imposition concern. Generally, they focus on identifying democratic and deliberative processes that facilitate that relevant parties, and not just scientists, have a say in what values should guide research (Intemann 2015; Schroeder 2021; Kitcher 2011; Lusk 2021; Elliott 2017) or that scientists communicate their value-influenced findings to communities that share those values (John 2019). Often the proposals call for engaging relevant stakeholders in various ways, including community-based advisory boards, citizen panels, deliberative polling from relevant communities, seeking consensus, or identifying features of epistemic practices that allow for political debate and are not easily influenced by interested parties (Intemann 2015; Douglas 2009; Schroeder 2021; John 2021; Elliott 2017). In some cases, rather than offering specific ways of engaging with relevant publics, philosophers have proposed ideal democratic procedures where value judgments are accepted under conditions of ideal endorsement (Kitcher 2011). Value judgments would thus be accepted if and only if they would be endorsed by an ideal conversation among all humans, under conditions of perfect mutual engagement, and aimed at serious equality of opportunity for all people to have a worthwhile life.

These procedures can be used in different ways. For some, they help select values with which to make or assess inductive risk decisions (Douglas 2017). For others, they can set the epistemic and social aims of research (Intemann 2015). The value judgments made by scientists when conducting research would need to promote those democratically endorsed aims. In other cases, value judgments that pass the test of ideal endorsement can be used in determining that a scientific claim is true enough and significant enough (Kitcher 2011). Usually, these proposals are underdeveloped and call for further theoretical work on the meaning of democratic practices and values.

Many of the proposals to address the value imposition concern have been criticized on various practical and theoretical grounds (Havstad and Brown 2017; Brown 2020; Le Bihan 2023). Proponents of strategies to address the imposition concern usually recognize the challenges in determining the relevant population whose values must be considered, deciding how to engage relevant communities, and establishing how to address complexities involved in reaching agreements in context where stakeholders espouse a plurality of values. However, the difficulties, or even the impossibility, of developing and implementing procedures to ensure that shared values are used in conducting research have no bearing on whether the imposition problem gives us a reason for attempting to distinguish between legitimate and illegitimate value influences.

### 2.3. *The Undermining of Public Trust Concern*

Another reason given to worry about the influence of contextual values in science appeals to the importance of public trust in science (Bright 2018; Elliott 2022; Holman and Wilholt 2022). That trust, moral and epistemic, is central to producing science is uncontroversial. Scientists much place trust in the testimony of colleagues, their techniques, experiments, data, results, and theories to be able to carry out research (Hardwig 1985, 1991; Wilholt 2013; Frost-Arnold 2013). When scientific projects involve teams of researchers from multiple disciplines, working at various institutions, and in different countries, researchers are epistemically dependent on one another. This makes trust all the more important (Andersen 2016). But epistemic trust is also significant to the interactions between science and society (Scheman 2001; Wilholt 2013; Grasswick 2010; Anderson 2011). People must trust scientific experts and rely on the information they provide to make sense of complex scientific phenomena about which they lack expertise. Likewise, because science is essential in policy decisions, the public must trust scientists to be able to participate in democratic discussions involving scientific knowledge. Fully realizing science's goal of benefiting society thus requires warranted trust on the side of the public regarding scientific testimony.

Liam Kofi Bright (2018) has recently called attention to the trust-based arguments W. E. B. du Bois offered to defend the value-free ideal of science. The concern is that people will not trust science if they think scientists are motivated by goals other than the pursuit of truth, that is, if their research is influenced by contextual values. Given the importance of public trust in science, du Bois concluded that scientists should avoid incorporating contextual values in their reasoning (Bright 2018).

Does the undermining of public trust concern call for demarcation criteria to distinguish between legitimate/illegitimate influences of contextual values in science? I do not think it does. This is so for two reasons. First, as conceptualized by du Bois, this concern simply calls for the exclusion of contextual value influences altogether, rather than for demarcation criteria between legitimate/illegitimate value influences. I will put this conceptualization aside, given that I take value influences in science to be unavoidable and often desirable. Second, understood in a way that accepts the value-laden nature of science, whatever concerns we might have about the undermining of trust in science result from the problems covered by the epistemic distortion and the value-imposition concerns. Let me explain.

Normatively speaking, we ought to be concerned with preserving *warranted* trust in science or avoiding *warranted* distrust rather than with simply preserving public trust. Trust is a complex, multifactorial phenomenon (Jones 1996; Baier 1986; Hardin 2002; Hollis 1998; Holton 1994; O'Neill 2002; Potter 2002). In general, people do not trust others completely, but trust others to do certain things. For example, people may trust investigators to conduct research according to appropriate scientific standards, but not to take care of their children. They may trust investigators to produce reliable knowledge, but not to fix their house. In trusting, we presuppose that the person trusted is competent in some regard, such as conducting research or communicating scientific information. We also presuppose that the person trusted will be rightly motivated to do what we are entrusting them with doing. Both competency and willingness or motivation are central elements of warranted



trust—though scholars disagree about the exact nature of such motivation (Baier 1986; Hardin 2002; Holton 1994; O’Neill 2002).

People could indeed fail to trust scientists and their testimony if they believed scientists’ motivations are other than the truth, that is, if they believed that the research is influenced by contextual values. Whether this would be the case is an empirical question (Hicks and Lobato 2022; Elliott et al. 2017).<sup>9</sup> But regardless of what the empirical evidence could say, this worry is problematic for two reasons. First, it seems to incorrectly presuppose that any focus on contextual values would be *at the expense of truth*. However, this constitutes a false dichotomy as, doubtlessly, science could be focused—and presumably it is—on both truth and other contextual values, for example, truths that are of relevance to human beings, serve to advance the wellbeing of particular entities, or contribute to environmental health. Moreover, it could also be that the epistemic soundness of at least some research would be enhanced by the influence of other important values. For instance, perhaps a commitment to equality leads to research results that are more generalizable.

Second, this worry seems to conflate trust with *warranted* trust—or failing to trust with doing so *warrantedly*. But surely, we can be mistaken about placing or failing to place our trust. That is, sometimes people place their trust on those who are not trustworthy and fail to trust or even distrust those who are in fact trustworthy. Trust and distrust are in those cases unwarranted. Hence, concerns about whether the public trusts science that is influenced by contextual values must consider whether the public’s trust or their failure to trust science is *warranted*. However, if contextual values are unavoidable and are—at least sometimes—also desirable, then, people’s failure to trust scientists who use them would be unwarranted.

What could damage public trust justifiably in this context is the use of contextual values in ways that undermine the epistemic integrity of the research, or of values selected in ways that fail to be representative of, or are unconcerned with, the various public interests. After all, people entrust researchers with the production of reliable knowledge and with doing so in ways that consider the interests of relevant stakeholders. If values are used in ways that disregard such goals, then people would be warranted in not trusting scientists. But this is precisely what grounds the epistemic and the value-imposition concerns, respectively. Hence, the undermining of trust concern provides no additional reasons to find demarcation criteria.

Could public warranted trust not be damaged on grounds that scientists use values that some publics find ethically or politically objectionable? Provided that the values in question are not used in ways that undermine the epistemic integrity of the research and that they have been selected following procedures that attend to the interests of relevant stakeholders, it is not clear on what justifiable grounds they would do so. After all, the particular values that some publics might find ethically or politically objectionable might be welcomed by other publics. Certainly, in pluralistic societies people might ultimately disagree with research results that has been shaped by legitimate value influences, that is, attend to the epistemic and the

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<sup>9</sup> Note that were this the case, and assuming that contextual values are unavoidable, people’s failure to trust could provide reasons to ensure that people do not know that non-epistemic values play a role in science. See (John 2018).

value-imposition concern. In these cases, people would be justified in disagreeing with the results and in calling for research that uses other values they share<sup>10</sup>

The discussion in the literature regarding this worry also evinces that epistemic and political concerns ground the worry about undermining trust. Indeed, those who have called attention to the problem (Bright 2018) and those who have explicitly attempted to address it (Elliott 2022; Schroeder 2021; John 2021; Boulicault and Schroeder 2021) have placed the discussion squarely in the context of ensuring that science production includes values selected in ways that attend to the interests of relevant parties and that those values do not undermine the epistemic integrity of the research. Hence, some (John 2015, 2021), for instance, focus on the epistemic aspect of the problem and argue that addressing the trust concern requires that scientists employ high epistemic standards. Others (Schroeder 2021; Boulicault and Schroeder 2021) call attention to idiosyncratic values as the source of the trust concern and contend that addressing this worry requires that scientists appeal to the values of the public or its representatives.

It seems then, that concerns about undermining public trust in science provide no additional reasons to find demarcation criteria between legitimate/illegitimate influences of values in science. Solutions to the epistemic distortion and the value-imposition problems would also address the undermining of trust concern.

#### 2.4. *The Objectionable Value Concern*

Another reason for concern regarding the influence of values in science focuses on the particular values utilized. The worry is that *some* contextual values are simply the, ethically or politically, wrong—or right—values to use when conducting research (Clough and Loges 2008; Kourany 2010; Goldenberg 2015; Leuschner and Fernandez Pinto 2021, 2022; Brown 2020). This concern is based on the recognition that contextual values can have significant effects on what knowledge is produced. For instance, values can influence the framing of research questions and thus lead to different and even incompatible results. Contextual values can influence ways of weighting the consequences of error or of determining what impacts to assess and which are (most) important.

Contrary to the epistemic and value imposition worries, what I call the objectionable value concern is precisely about *which* particular values influence research. Instead of an issue about how values are used, or whether they have been chosen by procedures that attend to relevant interests, this concern calls for the identification of some values as illegitimate because they are ethically or politically objectionable ones, and of others as ethically or politically good, and thus legitimate values to influence science.

Importantly, many of those worried about the objectionable value concern, do so in terms of epistemic failures of the research using such values (e.g., Biddle and Leuschner 2015; Leuschner and Fernandez Pinto 2021, 2022). Their worry, however, is with the particular values that influence the research, that is, *which* values rather than with *how* the values are used. They fail to separate, I contend, what are relevantly different problems that are grounded on distinct worries and that call for different solutions.

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<sup>10</sup> Thanks to an anonymous reviewer for bringing up this point. See, also, Hillgardt (2023) and John (2019) for proposals about conducting or communicating science influenced by values shared by particular communities.

Proposals attending to this concern seek to demarcate legitimate from illegitimate values on the basis of some values. Hence, values, such as racist and sexist ones that are widely recognized as unethical (Leuschner and Fernandez Pinto 2021, 2022; Kourany 2016) are illegitimate and should be excluded. Values that are widely shared or are consistent with certain conceptions of the good are legitimate and should be allowed to influence scientific reasoning. For instance, some have argued that only values that contribute to human flourishing, that meet the needs of society, or that promote public rather than private interests are legitimate values that should be allowed to influence scientific reasoning (Kitcher 2011; Kourany 2010). For others, the values guiding research should be those likely to meet the needs of marginalized communities (Harding 2008), or should be specific values such as equality (Kourany 2010). Others have proposed a Rawlsian solution to ascertain which values must influence scientific inquiry (Cabrera 2023). Still others defend the need for a plurality of mandates in science so as to allow for partisan science (Hillgardt 2023).

Is the objectionable value concern one that calls for demarcation criteria to distinguish between legitimate/illegitimate value influences? I doubt it. Under some conceptualizations, this concern, like the trust-undermining one, provides no additional grounds for worry. Under others, what is at stake is value conflicts. For this, demarcation criteria between legitimate/illegitimate value influences in science are misplaced as what is at stake is precisely what values should be influencing science.

In some instances, the objectionable values concern focuses on the influence in scientific reasoning of what are thought to be uncontroversially ethically or politically objectionable values, such as racist and sexist ones (Kourany 2010; Leuschner and Fernandez Pinto 2021, 2022). Clearly, there are good reasons to worry about such influences, but they are covered by the epistemic and the value imposition concerns. First, although some have argued that these types of values can produce epistemically sound science (Kourany 2010), this is not obvious. At least some evidence suggests that such ethically or politically objectionable values can lead to biased research or to research that is empirically weaker (Clough 2003; Anderson 1995). This might be the case because the objectionable values are unsupported by empirical evidence (Clough and Loges 2008), they are less fruitful, or work as heuristics that lead researchers to ignore relevant data, disregard particular phenomena, or attend to irrelevant evidence (e.g., Anderson 2004; Douglas 2009; Elliott 2017). The many instances documented by feminists and race theorist scholars where these values have in fact resulted in biased science corroborates this. But insofar as this is the case, concerns about epistemic integrity rather than about the values themselves serve as reasons to distinguish between the illegitimacy or legitimacy of these value influences.

Moreover, to the extent that sexist and racist values can be rejected on democratic grounds, then such ethically or politically objectionable values would be excluded as illegitimate by appropriate value selection procedures.<sup>11</sup> Indeed, some of the proposals to address the imposition concern explicitly call for strategies that put

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<sup>11</sup> I am not suggesting that uncontroversially unethical values are easily recognized as such by everyone. For the most part, scientists—even if they espouse racist and sexist values—do not openly claim that their research is guided by such objectionable values. The disagreements are often about whether the particular values influencing their research, e.g., about gender or racial differences, or about the values they want to advance are in fact racists and sexists.

constrains on democratic procedures to ensure that those types of values are not chosen. For some, the constraints are provided by commitments to feminist principles, which would preclude the influence of sexist or racist values in the conduct of research (Intemann 2011). Others have proposed mechanisms such as filtering to remove objectionable values or laundering to clean-up values based on false assumptions and prevent their use in science (Schroeder 2021).<sup>12</sup> In any case, the political concern about imposition of values grounds exclusion of ethically or politically uncontroversially objectionable values as illegitimate. If so, worries about such values provide no additional reasons to demarcate between legitimate and illegitimate value influences in research.

In other instances, discussions regarding the objectionable value concern involve value conflicts; that is, the problem is not about uncontroversially unethical values influencing science but about the use of values that are arguably contested.<sup>13</sup> Take, for instance, the Klamath Project (KP) case used by Holman and Wilholt (2022) in their discussion of the new demarcation problem. The KP is a federal water-management project that supplies water to thousands of acres of farmland in the upper Klamath Basin. The Upper Klamath Lake (UKL) is the primary source of KP irrigation water, and it is also home to two species of federally endangered sucker fishes. In 2001, fears that the KP threatened the survival of the sucker led to two conflicting scientific assessments. One, by the U.S. Fish and Wildlife Service (FWS) called for a complete suspension of the KP water deliveries from UKL and thus would have resulted in significant financial losses to farmers. Another, by the National Research Council (NRC), and commissioned by the U.S. Department of Interior (DOI), concluded that there was no sound scientific basis for accepting the FWS 2001 report recommendation for UKL water levels and thus provided justification for a continuation of irrigation. Values clearly played a role in both scientific assessments. The FWS report was guided by the Endangered Species Act requirement not to take actions that could jeopardize the continued existence of the endangered species of sucker or result in the destruction or adverse alteration of their habitat. However, the NRC assessment did not prioritize protection of the sucker. Values—the public interest of biodiversity or the private interests of farmers—led the reports to weighing the negative impacts of the KP and the risks of error in conflicting ways.

Now, assuming that both the FWS and the NRC studies are epistemically sound, the values they espouse are consistent with appropriate attention to the values of relevant stakeholders—those of the farmers, and those of protecting endangered species and of the Klamath Tribes for whom the fish was tribal trust species—arrived

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<sup>12</sup> Democratic procedures are imperfect, hence, knowing this, one can put constraints—that have been democratically agreed upon—on the procedures used for value selection to ensure that some values that are undemocratic cannot be selected. This is not a way to bake the objectionable value problem into the value-imposition concern as what those ethically or politically objectionable values might be is not stipulated—it would be decided by democratic procedures. I thank two anonymous reviewers for forcing me to clarify this point.

<sup>13</sup> Again, those worrying about this problem present it as one involving epistemic worries, but their concern is with *which* values are used rather than *how* they are used and thus they seek to exclude particular contested values as illegitimate. Much of the discussion on industry bias instantiates this problem. See, for instance, de Melo-Martín (2019) for a discussion of this issue. I take it that commercial values are not uncontroversially unethical ones.

at by politically legitimate procedures.<sup>14</sup> If so, it would not be surprising that none of the demarcation strategies considered by Holman and Wilholt (2022) provide an answer about whether one of these studies involved illegitimate value influences.<sup>15</sup> The case simply involves a conflict of values.

In pluralistic societies value conflicts are not only common but inevitable given people's different conceptions of the good or different understandings of what constitute just societies. This is not to say, of course, that we cannot offer reasons to accept one of those studies rather than the other. What I am saying is that those reasons would be grounded on weighting various competing goods, values, and interests rather than on declaring some of them simply illegitimate and thus in need of exclusion.

If I am correct then, rather than a demarcation between legitimate/illegitimate values, this version of the objectionable value concern calls for transparency and openness regarding the values influencing scientific inquiry (Douglas 2009; Elliott 2013; Intemann and de Melo-Martín 2023). Clearly, these do not constitute ways to solve value conflicts, but they would allow for careful consideration of those values and for their critical evaluation. The problem also calls for conflict resolution strategies (Laursen et al. 2021). I am not claiming that such strategies are either easy to develop or—much less—easy to put into practice. But we would do better developing conflict resolution strategies instead of seeking demarcation criteria to declare particular values illegitimate on grounds that those values are ethically or politically objectionable.

Further support for my claim that the objectionable value problem often involves value conflicts comes from the evaluations of cases dealing with the different concerns discussed here. Few disagree about instances where the influence of values is illegitimate on epistemic or value-imposition grounds. I am unaware, for example, of anyone who has argued that Lysenko's case constitutes a case in which values played legitimate influences. Likewise, much of the work feminists have done calling attention to illegitimate value influences in many areas of science has not been contested. However, many of the cases used to discuss the objectionable value problem, that is a problem regarding *which* values should influence science, are contested. Consider for instance the heated debates about many instances of scientific dissent (de Melo-Martín and Intemann 2018), the various reasonable interpretations about cases involving what some consider objectionable values, that is, financial profit (Hicks 2014; Cabrera 2023), or the difficulty determining what exactly is wrong with cases in which presumed objectionable values are at stake (Holman and Wilholt 2022).

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<sup>14</sup> Both the NRC Committee and the FWS acted in accordance with federal mandates.

<sup>15</sup> Holman and Wilholt are unclear about what their evaluation of the demarcation strategies they discuss does regarding the Klamath dispute. They explicitly say that they are not claiming that one of the two groups has “crossed a line between epistemically admissible and inadmissible forms of value influences—or that a ‘good’ demarcation criterion should bear this out.” (p. 216). However, they also explicitly say that it is precisely in cases like the Klamath dispute—where private and public interest conflict—“that a demarcation criterion would be especially helpful.” What I am arguing is that, provided the use of those values avoid the epistemic and the value-imposition concerns, there are no grounds for a demarcation criterion to be helpful in resolving the dispute.

### 3. Conclusion

The values and science literature is often described as needing more clarity and precision on various issues: what it means for science to be value free (de Melo-Martín and Intemann 2016; Elliott 2022), what kinds of things values are (Brown 2020; Rooney 2017), what they do or how they influence judgment (Ward 2021), or what constitutes socially responsible science (de Melo-Martín and Intemann 2023). Debates in science and values would also benefit from more clarity on what constitutes compelling reasons to find criteria to distinguish between legitimate and illegitimate influences of contextual values in science.

I have argued here that concerns about the distorting effect of contextual values on knowledge and about undermining democratic ideals and personal autonomy are appropriate worries that call for ways to distinguish between legitimate and illegitimate contextual value influences. Worries about these two problems might go hand in hand, but these two problems call for different strategies. Safeguarding epistemic integrity requires strategies to identify *how* values are used in biasing ways or how they negatively influence scientific reasoning. The value imposition concern, however, requires finding *procedures* that ensure that whatever values are influencing science are appropriately representative or can be scrutinized. Given the different types of solutions required, discussions on the new demarcation problem would do well to distinguish on what grounds the legitimacy/illegitimacy distinction is needed. Importantly, neither of these are problems is about *which* particular values are used. Ethically or politically objectionable and unobjectionable values could, in principle at least, be considered legitimate or illegitimate on either of these grounds.

Two other worries about values in science often mixed with the two previous one, the public trust and the objectionable values concerns, are not appropriate grounds for demarcation criteria between legitimate/illegitimate influences of values in science. On some conceptualizations, they provide no additional grounds for concern. The worries are already covered by the epistemic and the value imposition concerns. Additionally, insofar as the objectionable value problem involves conflicts of values, finding demarcation criteria between legitimate/illegitimate value influences is misguided as what is at stake is disagreements about which values should be shaping research. Discussions on the new demarcation problem would do well to clearly separate this problem from the others. This concern calls for transparency and openness regarding the values guiding research, not as a solution to addressing disputes, but as a way to ensure that values are appropriately identified and critically assessed. It also requires the development of strategies for value conflict resolution.

As important a role as science has in modern societies, I fear that the debate on value influences in science simply grants excessive power to it and seems to presuppose that we have no mechanisms other than science to ensure (more) just societies. But we have other ways to influence what science is produced. We also have other social and political mechanisms to improve our societies. To accomplish this goal, we do not need to—and if I am right, we cannot—rely on finding criteria to eliminate some ethically or politically objectionable values from the core of science.

**Acknowledgments.** I am grateful to Kristen Intemann and David Teira for helpful comments on prior versions of this manuscript.

## References

- Alexandrova, Anna. 2017. *A Philosophy for the Science of Well-Being*. New York: Oxford University Press. <https://doi.org/10.1093/oso/9780199300518.001.0001>.
- Andersen, Hanne. 2016. "Collaboration, Interdisciplinarity, and the Epistemology of Contemporary Science." *Studies in History and Philosophy of Science* 56:1–10. <https://doi.org/10.1016/j.shpsa.2015.10.006>.
- Anderson, Elisabeth. 1995. "Knowledge, Human Interests, and Objectivity in Feminist Epistemology." *Philosophical Topics* 23 (2):27–58. <https://doi.org/10.5840/philtopics199523213>
- Anderson, Elisabeth. 2004. "Uses of Value Judgments in Science: A General Argument, with Lessons from a Case Study of Feminist Research on Divorce." *Hypatia* 19 (1):1–24. <https://doi.org/10.1111/j.1527-2001.2004.tb01266.x>.
- Anderson, Elisabeth. 2011. "Democracy, Public Policy, and Lay Assessments of Scientific Testimony." *Episteme* 8 (2):144–64. <https://doi.org/10.3366/epi.2011.0013>.
- Baier, Annette. 1986. "Trust and Antitrust." *Ethics* 96 (2):231–60. <https://doi.org/10.1086/292745>.
- Benea, Carla, Kimberly A. Turner, Michelle Roseman, Lisa A. Bero, Joel Lexchin, Erick H. Turner, and Brett D. Thombs. 2020. "Reporting of Financial Conflicts of Interest in Meta-Analyses of Drug Trials Published in High-Impact Medical Journals: Comparison of Results from 2017 to 2018 and 2009." *Systematic Reviews* 9 (1):77–77. <https://doi.org/10.1186/s13643-020-01318-5>.
- Betz, Gregor. 2013. "In Defense of the Value Free Ideal." *European Journal of the Philosophy of Science* 3 (2):207–20. <https://doi.org/10.1007/s13194-012-0062-x>.
- Biddle, Justin. 2013. "State of the Field: Transient Underdetermination and Values in Science." *Studies in History and Philosophy of Science* 44 (1):124–33. <https://doi.org/10.1016/j.shpsa.2012.09.003>.
- Biddle, Justin, and Leuschner, Anna. 2015. "Climate skepticism and the manufacture of doubt: Can dissent in science be epistemically detrimental?" *European Journal of the Philosophy of Science* 5 (3): 261–78. <https://doi.org/10.1007/s13194-014-0101-x>.
- Boulicault, Marion and Andrew Schroeder. 2021. "Public Trust in Science: Exploring the Idiosyncrasy-Free Ideal." In *Social Trust: Foundational and Philosophical Issues*, edited by Kevin Vallier and Michael Weber, 102–21, New York: Routledge. <https://doi.org/10.4324/9781003029786>
- Bright, Liam Kofi. 2018. "Du Bois' Democratic Defence of the Value Free Ideal." *Synthese* 195 (5):2227–45. <https://doi.org/10.1007/s11229-017-1333-z>.
- Brown, Matthew J. 2014. "Values in Science beyond Underdetermination and Inductive Risk." *Philosophy of Science* 80 (5):829–39. <https://doi.org/10.1086/673720>.
- Brown, Matthew J. 2020. *Science and Moral Imagination: A New Ideal For Values in Science*. Pittsburgh: University of Pittsburgh Press. <https://doi.org/10.2307/j.ctv18b5d19>.
- Cabrera, Frank. 2023. "A Rawlsian Solution to the New Demarcation Problem." *Canadian Journal of Philosophy* 52 (8):810–27. <https://doi.org/10.1017/can.2023.19>.
- Carrier, Martin. 2013. "Values and Objectivity in Science: Value-Ladenness, Pluralism and the Epistemic Attitude." *Science & Education* 22 (10):2547–68. <https://doi.org/10.1007/s11191-012-9481-5>.
- Cassini, Alejandro. 2022. "Simulation Models and Probabilities: A Bayesian Defense of the Value-Free Ideal." *Simulation-Transactions of the Society for Modeling and Simulation International* 98 (2):113–25. <https://doi.org/10.1177/00375497211028815>.
- Clough, Sharyn. 2003. *Beyond Epistemology: A Pragmatist Approach to Feminist Science Studies*. Lanham, MD: Rowman & Littlefield Publishers. <https://doi.org/10.1353/hyp.2005.0132>.
- Clough, Sharyn, and William E. Loges. 2008. "Racist Value Judgments as Objectively False Beliefs: A Philosophical and Social-Psychological Analysis." *Journal of Social Philosophy* 39 (1):77–95. <https://doi.org/10.1111/j.1467-9833.2007.00412.x>.
- de Melo-Martín, Inmaculada. 2019. "The Commercialization of the Biomedical Sciences: (Mis) Understanding Bias." *History and Philosophy of the Life Sciences* 41 (34). <https://doi.org/10.1007/s40656-019-0274-x>.
- de Melo-Martín, Inmaculada, and Kristen Intemann. 2007. "Can Ethical Reasoning Contribute to Better Epidemiology? A Case Study in Research on Racial Health Disparities." *European Journal of Epidemiology* 22 (4):215–21. <https://doi.org/10.1007/s10654-007-9108-3>.
- de Melo-Martín, Inmaculada, and Kristen Intemann. 2016. "The Risk of Using Inductive Risk to Challenge the Value-Free Ideal." *Philosophy of Science* 83 (4):500–20. <https://doi.org/10.1086/687259>.

- de Melo-Martín, Inmaculada, and Kristen Intemann. 2018. *The Fight against Doubt: How to Bridge the Gap between Scientists and the Public*. New York: Oxford University Press. <https://doi.org/10.1093/oso/9780190869229.001.0001>.
- de Melo-Martín, Inmaculada, and Kristen Intemann. 2023. "Socially Responsible Science: Exploring the Complexities." *European Journal for Philosophy of Science* 13 (3). <https://doi.org/10.1007/s13194-023-00537-6>.
- Douglas, Heather. 2000. "Inductive Risk and Values in Science." *Philosophy of Science* 67 (4):59–79. <https://doi.org/10.1086/392855>.
- Douglas, Heather. 2009. *Science, Policy, and The Value-Free Ideal*. Pittsburgh: University of Pittsburgh Press. <https://doi.org/10.2307/j.ctt6wrc78>.
- Douglas, Heather. 2017. "Science, Values, and Citizens." In *Eppur Si Muove: Doing History and Philosophy of Science with Peter Machamer: A Collection of Essays in Honor of Peter Machamer* 81:83–96. [https://doi.org/10.1007/978-3-319-52768-0\\_6](https://doi.org/10.1007/978-3-319-52768-0_6).
- Douglas, Heather. 2023. "The Importance of Values for Science." *Interdisciplinary Science Reviews* 48 (2):251–63. <https://doi.org/10.1080/03080188.2023.2191559>.
- Dupré, John. 2007. "Fact and Value." In *Value-Free Science? Ideals and Illusions*, edited by Harold Kincaid, John Dupre, and Alison Wylie, 27–41. Oxford: Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195308969.003.0003>.
- Elliott, Kevin. 2013. "Douglas on Values: From Indirect Roles to Multiple Goals." *Studies in History and Philosophy of Science* 44 (3):375–83. <https://doi.org/10.1016/j.shpsa.2013.06.003>.
- Elliott, Kevin. 2017. *A Tapestry of Values: An Introduction to Values in Science*. New York: Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780190260804.001.0001>.
- Elliott, Kevin. 2022. *Values in Science*. Cambridge: Cambridge University Press. <https://doi.org/10.4324/9780203000502-36>.
- Elliott, Kevin, Aaron M. McCright, Summer Allen, and Thomas Dietz. 2017. "Values in Environmental Research: Citizens' Views of Scientists Who Acknowledge Values." *PLOS ONE* 12 (10):e0186049. <https://doi.org/10.1371/journal.pone.0186049>.
- Fausto-Sterling, Anne. 1992. *Myths of Gender: Biological Theories about Women and Men*. 2nd ed. New York: BasicBooks.
- Frost-Arnold, Karen. 2013. "Moral Trust and Scientific Collaboration." *Studies in History and Philosophy of Science* 44 (3):301–10. <https://doi.org/10.1016/j.shpsa.2013.04.002>.
- Goldenberg, Maya J. 2015. "How Can Feminist Theories of Evidence Assist Clinical Reasoning and Decision-Making?" *Social Epistemology* 29 (1):3–30. <https://doi.org/10.1080/02691728.2013.794871>.
- Gordin, Michael D. 2012. "How Lysenkoism Became Pseudoscience: Dobzhansky to Velikovsky." *Journal of the History of Biology* 45 (3):443–68. <https://doi.org/10.1007/s10739-011-9287-3>.
- Gould, Stephen Jay. 1981. *The Mismeasure of Man*. New York: Norton.
- Grasswick, Heidi E. 2010. "Scientific and Lay Communities: Earning Epistemic Trust Through Knowledge Sharing." *Synthese* 177 (3):387–409. <https://doi.org/10.1007/s11229-010-9789-0>.
- Haack, Susan. 1998. *Manifesto of a Passionate Moderate: Unfashionable Essays*. Chicago: University of Chicago Press.
- Haraway, Donna. 1989. *Primate Visions: Gender, Race, and Nature in the World of Modern Science*. New York: Routledge.
- Hardin, Russell. 2002. *Trust and Trustworthiness*. New York: Russell Sage Foundation.
- Harding, Sandra. 2008. *Sciences from Below: Feminisms, Postcolonialities, and Modernities*. Durham: Duke University Press. <https://doi.org/10.2307/j.ctv11smmtn>.
- Hardwig, John. 1985. "Epistemic Dependence." *Journal of Philosophy* 82 (7):335–49. <https://doi.org/10.2307/2026523>.
- Hardwig, John. 1991. "The Role of Trust in Knowledge." *Journal of Philosophy* 88 (12):693–708. <https://doi.org/10.2307/2027007>.
- Havstad, Joyce, and Matthew Brown. 2017. "Inductive Risk, Deferred Decisions, and Climate Science Advising." In *Exploring Inductive Risk*, edited by K. C. Elliott and T. Richards, 101–23. Oxford: Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780190467715.003.0006>.
- Hicks, Daniel J. 2014. "A New Direction for Science and Values." *Synthese* 191 (14):3271–95. <https://doi.org/10.1007/s11229-014-0447-9>.
- Hicks Daniel J., and Emilio J. C. Lobato. 2022. "Values Disclosures and Trust in Science: A Replication Study." *Frontiers in Communication* 7:1017362. <https://doi.org/10.3389/fcomm.2022.1017362>



- Hillgardt, Hannah. 2022. "Looking beyond Values: The Legitimacy of Social Perspectives, Opinions and Interests in Science." *European Journal for Philosophy of Science* 12 (58). <https://doi.org/10.1007/s13194-022-00490-w>.
- Hillgardt, Hannah. 2023. "Partisan Science and the Democratic Legitimacy Ideal." *Synthese* 202:135. <https://doi.org/10.1007/s11229-023-04370-5>
- Hollis, Martin. 1998. *Trust within Reason*. New York: Cambridge University Press.
- Holman, Bennett, and Torsten Willholt. 2022. "The New Demarcation Problem." *Studies in History and Philosophy of Science* 91:211–20. <https://doi.org/10.1016/j.shpsa.2021.11.011>.
- Holton, Richard. 1994. "Deciding to Trust, Coming to Believe." *Australasian Journal of Philosophy* 72:63–76. <https://doi.org/10.1080/00048409412345881>.
- Hrdy, Sarah B. 1986. "Empathy, Polyandry and the Myth of the Coy Female." In *Feminist Approaches to Science*, edited by R. Bleier, 119–46. New York: Pergamon.
- Hudson, Robert. 2016. "Why We Should Not Reject the Value-Free Ideal of Science." *Perspectives on Science* 24 (2):167–91. [https://doi.org/10.1162/posc\\_a\\_00199](https://doi.org/10.1162/posc_a_00199).
- Intemann, Kristen. 2011. "Diversity and Dissent in Science: Does Democracy Always Serve Feminist Aims?" In *Feminist Epistemology and Philosophy of Science: Power in Knowledge*, edited by Heidi Grasswick, 111–32. Dordrecht, Netherlands: Springer. [https://doi.org/10.1007/978-1-4020-6835-5\\_6](https://doi.org/10.1007/978-1-4020-6835-5_6).
- Intemann, Kristen. 2015. "Distinguishing between Legitimate and Illegitimate Values in Climate Modeling." *European Journal of Philosophy of Science* 5:217–32. <https://doi.org/10.1007/s13194-014-0105-6>.
- Intemann, Kristen, and Inmaculada de Melo-Martín. 2023. "On Masks and Masking: Epistemic Harms and Science Communication." *Synthese* 202 (93). <https://doi.org/10.1007/s11229-023-04322-z>.
- John, Stephen. 2015. "Inductive Risk and the Contexts of Communication." *Synthese* 192 (1):79–96. <https://doi.org/10.1007/s11229-014-0554-7>.
- John, Stephen. 2018. "Epistemic Trust and the Ethics of Science Communication: Against Transparency, Openness, Sincerity and Honesty." *Social Epistemology* 32 (2):75–87. <https://doi.org/10.1080/02691728.2017.1410864>.
- John, Stephen. 2019. "Science, Truth and Dictatorship: Wishful Thinking or Wishful Speaking?" *Studies in History and Philosophy of Science* 78:64–72. <https://doi.org/10.1016/j.shpsa.2018.12.003>.
- John, Stephen. 2021. "Science, Politics and Regulation: The Trust-Based Approach to the Demarcation Problem." *Studies in History and Philosophy of Science* 90:1–9. <https://doi.org/10.1016/j.shpsa.2021.08.006>.
- Jones, Karen. 1996. "Trust as an Affective Attitude." *Ethics* 107 (1):4–25. <https://doi.org/10.1086/233694>.
- Kitcher, Philip. 2011. *Science in a democratic Society*. Amherst, NY: Prometheus Books.
- Koskinen, Inkeri, and Kristina Rolin. 2022. "Distinguishing between Legitimate and Illegitimate Roles for Values in Transdisciplinary Research." *Studies in History and Philosophy of Science* 91:191–98. <https://doi.org/10.1016/j.shpsa.2021.12.001>.
- Kourany, Janet A. 2010. *Philosophy of Science after Feminism*. New York: Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780199732623.001.0001>.
- Kourany, Janet A. 2016. "Should Some Knowledge Be Forbidden? The Case of Cognitive Differences Research." *Philosophy of Science* 83 (5):779–90. <https://doi.org/10.1086/687863>.
- Lacey, Hugh. 1999. *Is Science Value Free? Values and Scientific Understanding*. New York: Routledge. <https://doi.org/10.4324/9780203983195>.
- Laursen, Bethany K., Chad Gonnerman, and Stephen J. Crowley. 2021. "Improving Philosophical Dialogue Interventions to Better Resolve Problematic Value Pluralism in Collaborative Environmental Science." *Studies in History and Philosophy of Science* 87:54–71. <https://doi.org/10.1016/j.shpsa.2021.02.004>.
- Le Bihan, Soazig. 2023. "How to Not Secure Public Trust in Science: Representative Values v. Polarization and Marginalization." *Philosophy of Science* 1–11. <https://doi.org/10.1017/psa.2023.119>
- Leuschner, Anna, and Manuela Fernandez Pinto. 2021. "How Dissent on Gender Bias in Academia Affects Science and Society: Learning from the Case of Climate Change Denial." *Philosophy of Science* 88 (4):573–93. <https://doi.org/10.1086/713903>.
- Leuschner, Anna, and Manuela Fernandez Pinto. 2022. "Exploring the limits of Dissent: The Case of Shooting Bias." *Synthese* 200:326. <https://doi.org/10.1007/s11229-022-03783-y>.
- Lloyd, Elisabeth Anne. 2005. *The Case of the Female Orgasm: Bias in the Science of Evolution*. Cambridge, MA: Harvard University Press. <https://doi.org/10.4159/9780674040304>.

- Longino, Helen E. 1990. *Science as Social Knowledge: Values and Objectivity in Scientific Inquiry*. Princeton, NJ: Princeton University Press. <https://doi.org/10.1515/9780691209753>.
- Longino, Helen E. 2002. *The Fate of Knowledge*. Princeton, NJ: Princeton University Press. <https://doi.org/10.1515/9780691187013>.
- Longino, Helen E. 2013. *Studying Human Behavior: How Scientists Investigate Aggression and Sexuality*. Chicago: University of Chicago Press. <https://doi.org/10.7208/chicago/9780226921822.001.0001>.
- Lusk, Greg. 2021. "Does Democracy Require Value-Neutral Science? Analyzing the Legitimacy of Scientific Information in the Political Sphere." *Studies in History and Philosophy of Science* 90:102–10. <https://doi.org/10.1016/j.shpsa.2021.08.009>.
- Martin, Emily. 1991. "The Egg and the Sperm: How Science Has Constructed a Romance Based on Stereotypical Male-Female Roles." *Signs* 16 (3):485–501. <https://doi.org/10.1086/494680>.
- McMullin, Ernan. 1983. "Values in Science." In *PSA 1982: The Proceedings of the 1982 Biennial Meeting of the Philosophy of Science Association*, edited by Peter Asquith and Thomas Nickels, 3–28. East Lansing, MI: Philosophy of Science Association.
- Mitchell, Sandra. 2004. "The Prescribed and Proscribed Values in Science Policy." In *Science, Values and Objectivity*, edited by Peter Machamer and Gereon Wolters, 245–55. Pittsburgh: University of Pittsburgh Press. <https://doi.org/10.2307/j.ctt5vkg7t.16>.
- O'Neill, Onora. 2002. *A Question of Trust*. Cambridge: Cambridge University Press.
- Peters, Uwe. 2021. "Illegitimate Values, Confirmation Bias, and Mandevillian Cognition in Science." *British Journal for the Philosophy of Science* 72 (4):1061–81. <https://doi.org/10.1093/bjps/axy079>.
- Pielke, Roger A. 2007. *The Honest Broker*. Cambridge and New York: Cambridge University Press.
- Popper, Karl. 1963. *Conjectures and Refutations: The Growth of Scientific Knowledge*. London: Routledge.
- Potter, Nancy Nyquist. 2002. *How Can I Be Trusted?* Lanham, MD: Rowman & Littlefield.
- Resnik, David B., and Kevin C. Elliott. 2023. "Science, Values, and the New Demarcation Problem." *Journal for General Philosophy of Science* 54 (2):259–86. <https://doi.org/10.1007/s10838-022-09633-2>.
- Richardson, Sarah S. 2013. *Sex Itself: The Search for Male and Female in the Human Genome*. Chicago: University of Chicago Press. <https://doi.org/10.7208/chicago/9780226084718.003.0001>.
- Rooney, Phyllis. 2017. "The Borderlands between Epistemic and Non-Epistemic Values." In *Current Controversies in Values and Science*, edited by K. C. Elliott and D. Steel, 31–45. New York: Routledge. <https://doi.org/10.4324/9781315639420-3>.
- Scheman, Naomi. 2001. "Epistemology Resuscitated. Objectivity and Trustworthiness." In *Engendering Rationalities*, edited by N. Tuana and S. Morgen, 23–52. Albany, NY: SUNY Press. <https://doi.org/10.1093/acprof:osobl/9780195395112.003.0012>.
- Schroeder, Andrew. 2021. "Democratic Values: A Better Foundation for Public Trust in Science." *British Journal for the Philosophy of Science* 72 (2):545–62. <https://doi.org/10.1093/bjps/axz023>.
- Wagner, Wendy E. 2022. "No One Solution to the 'New Demarcation Problem'? A View from the Trenches." *Studies in History and Philosophy of Science* 92:177–85. <https://doi.org/10.1016/j.shpsa.2022.02.001>.
- Ward, Zina B. 2021. "On Value-Laden Science." *Studies in History and Philosophy of Science* 85:54–62. <https://doi.org/10.1016/j.shpsa.2020.09.006>.
- Wilholt, Torsten. 2009. "Bias and Values in Scientific Research." *Studies in History and Philosophy of Science* 40 (1):92–101. <https://doi.org/10.1016/j.shpsa.2008.12.005>.
- Wilholt, Torsten. 2013. "Epistemic Trust in Science." *British Journal for the Philosophy of Science* 64 (2):233–53. <https://doi.org/10.1093/bjps/axs007>.
- Wylie, Alison. 2001. "Doing Social Science as a Feminist: The Engendering of Archaeology." In *Feminism in Twentieth Century*, edited by Angela N. H. Creager, Elizabeth Lunbeck, and Londa Schiebinger, 23–45. Chicago: University of Chicago Press.
- Wylie, Alison, and Lynn Hankinson Nelson. 2007. "Coming to Terms with the Values of Science: Insights from Feminist Science Studies Scholarship." In *Value-Free Science? Ideals and Illusions*, edited by Harold Kincaid, John Dupre, and Alison Wylie, 58–86. Oxford: Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195308969.003.0005>.