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Arguments against the Value-Free Ideal

Kevin C. Elliott

Abstract

Debates about the cogency of the value-free ideal (VFI) have been central to the contemporary literature on values and science (see also Brown XXX). This chapter provides an overview of the major arguments that have been leveled against the VFI and concludes on the basis of those arguments that it is very difficult to maintain the VFI in its traditional form. It is possible that alternative characterizations of the VFI could be developed and defended, but any plausible characterization of the VFI would have to allow for values to play significant roles in scientific reasoning and practice. Thus, moving forward it seems more fruitful to focus on exploring the best ways to manage value influences in science responsibly rather than debating the VFI.

Introduction

The value-free ideal has been a central organizing principle for the contemporary literature on values and science. Scholars have been discussing whether or not science should be "value free" for hundreds of years (Proctor 1991), but the recent literature on values and science has formed largely in reaction to a formulation of the value-free ideal (VFI) elucidated by Heather Douglas (2009) based on her historical analysis of twentieth-century debates in the philosophy of science. She describes the VFI as follows: "the value judgments internal to science, involving the evaluation and acceptance of scientific results at the heart of the research process, are to be as free as humanly possible of all social and ethical values" (Douglas 2009, 45; see also Douglas and Branch 2024). The precise nature of values continues to be debated (see Elliott and Korf 2024), but for the purposes of this chapter values can generally be regarded as desirable things or beliefs/attitudes about those desirable things. Therefore, social and ethical values would be things like public health, justice, and environmental sustainability.

It is important to emphasize several aspects of this ideal. First, it is a normative statement and not merely a descriptive one; rather than claiming that values *do not* play a role in science, it claims that they *ought not* influence science. Additionally, the VFI focuses on the *internal* aspects of science. There can be room for disagreement about precisely which aspects of science count as internal as opposed to external (see Elliott 2025), but the internal/external distinction is meant to track something like the distinction between the context of discovery and the context of justification (Brown 2020). In other words, on this account of the VFI, values can play a legitimate role in deciding what scientific hypotheses or theories to investigate, but they are not supposed to influence assessments of whether those hypotheses or theories are justified. Finally, the VFI does not exclude *all* values from influencing the internal aspects of science; rather, it excludes non-epistemic or contextual values. Proponents of the VFI are willing to allow so-called "epistemic" values (e.g., explanatory power, scope, fruitfulness) to influence scientific reasoning (see e.g., McMullin 1983). The main point of the VFI is that scientific justification is supposed to be an epistemic matter, and thus only epistemic considerations are relevant to it (Sheykh-Rezaee and Bikaraan-Behesht 2023). (Of course, opponents of the VFI tend to argue that scientific justification is *not* a purely epistemic matter; see Lusk and Elliott 2022.)

This VFI has come under severe criticism from recent philosophers of science, such that the majority of scholars working on this topic no longer consider the VFI to be tenable (Brown 2024; Douglas and Branch 2024). This chapter provides an overview of the major arguments that have been leveled against the VFI and concludes that it is very difficult to maintain the VFI in its traditional form (see Douglas 2009). It is possible that alternative characterizations of the VFI could be developed and defended (Elliott 2025), but any plausible characterization of the VFI would have to allow for values to play significant roles in scientific reasoning and practice. Thus, moving forward it seems more fruitful to focus on exploring the best ways to manage value influences in science responsibly rather than debating the VFI.

Arguments against the VFI

This section examines six arguments that challenge the VFI: the "Gap," "Inductive Risk," "Conceptual," "Contingency," "Aims," and "Blurred Boundaries" arguments.[1]

The gap argument

The gap argument, which builds on the work of Helen Longino (1990), rests on the notion that there are always evidential gaps between the available data and the conclusions that scientists draw, and those gaps have to be filled by background assumptions. Longino argued that those background assumptions are often value-laden. The concept of value-ladenness can be used in different ways (Ward 2021), but Longino seemed to mean that those background assumptions were partly guided or influenced by values. For example, feminist anthropologists in the 1980s argued that even though the available evidence did not settle whether hunting activities or gathering activities played a more pivotal role in human evolution, anthropologists' value-laden background assumptions generally inclined them toward focusing on allegedly male hunting activities (Zihlman 1985).

Taken on their own, these observations establish only that values *do* play a role in scientific reasoning, not that they can *legitimately* influence scientific reasoning (Intemann 2005). Thus, Douglas (2016) has labeled this argument as the "Descriptive Challenge" to the VFI. Proponents of the VFI could respond to this descriptive argument by insisting that scientists should try to resist the influences of values by suspending their judgment and not drawing conclusions until their background assumptions can be justified solely on the basis of evidence and epistemic values. Nevertheless, Justin Biddle (2013) has argued that it would be highly impractical for scientists to operate in this way. He notes that scientists often face situations of transient underdetermination, meaning that evidence and epistemic values are insufficient to determine which background assumptions to adopt. Moreover, he argues that it does not make sense for scientists to suspend their judgment in all these situations; it is better for them to depend on non-epistemic values in order to resolve these pervasive situations of uncertainty.

[1] Another potential argument against the VFI is that it rests on a problematic, noncognitivist conception of values, and so it illegitimately presumes that values cannot stand in evidential relationships with scientific claims (see e.g., Anderson 2004; Brown 2020; Clough 2008).

The argument from inductive risk (AIR)

The precise definition of the AIR is subject to debate,[2] but its basic idea is that scientists have ethical responsibilities to consider the social effects of how they respond to inductive risk (i.e., the risk of making a mistake when accepting or rejecting a hypothesis; Elliott and Richards 2017a), and this requires bringing social and ethical values into scientific reasoning. This argument has roots in the work of Churchman (1948) and Rudner (1953), was developed in a particularly influential way by Heather Douglas (2000; 2009; 2021), and has been formalized by Havstad (2022) and Brown and Stegenga (2023). In Heather Douglas's (2000) classic account of the AIR, she illustrates the argument by considering a case where scientists are assessing the evidence that a potentially toxic chemical causes cancer. She points out that the scientists face the risk of drawing a false positive conclusion (i.e., claiming that the chemical is carcinogenic when it is actually safe) or a false negative conclusion (i.e., claiming that the chemical is safe when it is actually carcinogenic). She argues that scientists have ethical responsibilities to demand more evidence when they can see that the social costs of drawing a false positive conclusion are likely to be high and the social costs of drawing a false negative conclusion are likely to be low, whereas scientists should demand less evidence when the social costs of drawing a false positive conclusion are lower and the social costs of drawing a false negative conclusion are higher. Importantly, Douglas (2000) points out that scientists make choices throughout the course of inquiry (e.g., about how to collect, analyze, and interpret data) that influence their potential to draw false positive or false negative conclusions, and so the ethical responsibility to grapple with inductive risk permeates their work.

This argument has attracted extensive scrutiny (see Brown 2024, Brown XXX, and Elliott 2022 for more detailed discussion of it). Perhaps the most influential response to this argument is that scientists can "defer" value-laden decisions about responding to inductive risk to others, such as policy makers (e.g., Betz 2013; Hudson 2021). For example, rather than making the value-laden choice that there is sufficient evidence to conclude that a chemical is carcinogenic, scientists could simply report the evidence to policy makers and let them decide whether the evidence is sufficient. This approach could be fruitful in some cases, but it is doubtful that it would be effective for completely removing values from scientific reasoning. As Joyce Havstad and Matt Brown (2017) have emphasized, scientific research projects incorporate a host of different choices that involve considerations of inductive risk, and it is unrealistic to think that scientists could defer them all. For example, even if scientists were able to defer the ultimate decision that there was enough evidence to declare a chemical to be carcinogenic, it is doubtful that they could defer all their other choices about how to collect, analyze, and interpret the data (which in turn make one more or less likely to draw a false positive or false negative conclusion; see Douglas 2000). Proponents of the VFI might still respond that scientists could endeavor to hedge their claims in order to make them so general and uncontroversial that there would be no risk of drawing a false conclusion (e.g., Betz 2017). So, for example, a scientist could say something

[2] The debate over the AIR includes what elements of science are subject to the argument as well as what range of consequences to take into account (see Elliott and Richards 2017b, 263–5). I thank Arnon Levy for pointing out that my tendency in the past to refer the AIR as the "error argument" (see Elliott 2011; Elliott 2022) could misleadingly suggest that only the consequences of error need to be taken into account, but I am not committed to that position.

like, “This particular set of data provides evidence that this chemical might possibly be carcinogenic.” However, these highly hedged claims would be of limited use for policy makers, so scientists would likely face a trade-off between the goal of providing useful information and the goal of eliminating values from their reasoning (Brown 2024; Elliott 2011, 55). Thus, deciding when, whether, and how much to hedge would itself be an important value-laden decision (see Brown XXX).

The conceptual argument

A third argument against the VFI rests on the value-ladenness of scientific concepts. Anna Alexandrova (2018) has formulated this argument in a particularly compelling way by analyzing the nature of “mixed” claims, which include both descriptive and normative components. In other words, they are claims about empirical relationships, but they also include one or more variables that incorporate normative judgments. For example, consider the hypothesis that having multiple friendships is associated with greater human well-being than having no friendships. Deciding how to define well-being requires normative judgments about what well-being consists in. Therefore, according to the conceptual argument, one cannot assess the hypothesis that friendships are associated with greater human well-being without incorporating non-epistemic values in the assessment process.

It turns out that the conceptual argument applies widely across many different fields of science. Because the social sciences study human practices, they are particularly prone to employing value-laden concepts like well-being, cost of living, poverty, economic welfare, or economic inequality (Thoma 2023). All these concepts incorporate normative judgments in decisions about how to properly define them. But even in other fields, such as biology, value-laden concepts are common (see e.g., Dupré 2007). David Ludwig (2016) has extended the reach of the conceptual argument by pointing out that many concepts that do not immediately appear to be value-laden (e.g., species, memory, intelligence) end up being subject to normative decisions about how to define them in ways that best serve our practical interests (see also Brigandt 2022). More broadly, I have argued (Elliott 2009; 2017) that whenever there are social consequences associated with the use of scientific concepts, they qualify as value-laden in the sense that the choice of concepts has impacts on things we value (Ward 2021). As a result, non-epistemic values become relevant to deciding which concepts to employ and how to define them.

An influential objection to the conceptual argument is that scientists could evade it either by avoiding the use of value-laden concepts altogether or by making any claims that incorporate such concepts conditional on a particular way of defining them (see e.g., Alexandrova 2018; Stegenga and Menon 2023). But avoiding the use of value-laden concepts altogether seems misguided; it would make it much more difficult to study things that matter to us (e.g., well-being, poverty, or economic inequality), which generally involve such concepts (see Dupré 2007). Moreover, attempting to conditionalize the use of value-laden concepts on particular ways of defining them still forces scientists to make value-laden choices about which concepts or definitions to use. For example, an economist could carefully conditionalize their claims about a country’s gross domestic product (GDP) so that they depend on a particular definition of GDP. However, the decision to use that particular definition of GDP, or the decision to use GDP rather than an alternative measure like the UN’s Human Development Index (HDI), would still be a value-laden choice (Thoma 2023). One could argue that these value-laden decisions to use particular definitions or concepts would be "external" to the core of scientific reasoning, and so they would not threaten the VFI, but Tim Lewens (2025) argues that sometimes the case for defining concepts in particular ways is both evaluative and "internal" to science, insofar as it is grounded in scientific reasoning.

The contingency argument

The contingency argument, which has been formalized by Matthew Brown (2020), rests on the notion that scientists make numerous unforced choices in the course of their work. For example, logic and evidence are often insufficient to settle how they should collect and interpret data, design studies, categorize the phenomena under investigation, develop models, and set standards of evidence for drawing conclusions. Moreover, depending on how these contingent choices are handled, they can have profound social effects (Elliott 2017; Ward 2021), including "feedback effects" on which values are held and prioritized by society (Ratti and Russo 2024). Thus, given that scientists arguably have ethical responsibilities to consider the major foreseeable impacts of their actions on society (Douglas 2009), they ought to incorporate ethical and social values into their decisions about how to handle all the contingent choices associated with their work.

One way of thinking about this argument is that it is a broad umbrella that can encompass the gap argument, the AIR, the conceptual argument, and any other arguments that appeal to the ethical responsibilities of scientists to consider how the unforced choices associated with their work impact society (see also ChoGlueck 2018 for discussion about how these arguments relate to each other). Admittedly, Douglas (2000) showed that one can regard many other contingent choices in science as falling under the AIR, insofar as the other choices ultimately contribute to the downstream decision to accept or reject a hypothesis. Nevertheless, there may be some socially significant choices, such as those involved in developing and assessing models, that do not directly influence the acceptance or rejection of hypotheses (see e.g., Biddle and Kukla 2017; Harvard and Winsberg 2022). Therefore, it may be fruitful to think of these choices as falling under the umbrella of the contingency argument but not the AIR. As with the gap, AIR, and conceptual arguments, the contingency argument can be challenged by calling for scientists to defer value-laden decisions or hedge their claims. However, a strength of the contingency argument is that it emphasizes the full range of contingent choices that scientists are forced to make (see also Havstad and Brown 2017), and thus it highlights how unrealistic it would be for scientists to fully purge their work of all value-laden decisions while still generating meaningful results.

The aims argument

Another argument against the VFI relies on the notion that scientific research often has non-epistemic aims in addition to epistemic ones. For example, Elliott and McKaughan (2014) point out that when scientists are engaged in research projects to inform regulatory decisions, they need to obtain results that are not only accurate but also that are usable by regulators. Therefore, when scientists assess different risk assessment methods, they need to incorporate non-epistemic values (e.g., the speed with which results can be generated and the extent to which they can be standardized) alongside epistemic ones (e.g., the accuracy of results). Similarly, Manuela

Fernández Pinto and Dan Hicks (2019) argue that regulatory science has aims like protecting human health and promoting environmental justice, which means that it is appropriate to make choices about what methods to use and how to interpret ambiguous data in ways that support those values. Along similar lines, Intemann (2015) points out that when scientists develop and assess models, they need to consider society's non-epistemic aims as well as their epistemic aims. For example, in order to develop a climate model that predicts local precipitation patterns as accurately as possible, scientists might have to sacrifice some of the model's accuracy for predicting global temperature changes. Thus, Intemann insists that non-epistemic criteria or values are relevant for making these sorts of decisions.

The aims argument is distinct from the other arguments that can be brought under the umbrella of the contingency argument because it focuses not on scientists' general ethical responsibilities but rather on non-epistemic goals that are intrinsic to scientific practice. Thus, it is closely related to an argument that Matt Brown (2020) calls the "practical reason" argument. According to Brown, scientific inquiry is a pragmatic form of inquiry that fundamentally involves taking action: "*choosing* concepts, … *proposing* hypotheses, … *collecting* evidence, … *accepting*, *rejecting*, *inferring*, *asserting*, or *endorsing* hypotheses" (Brown 2020, 65, italics added). Because scientists are involved in taking action, Brown insists that it is appropriate for them to incorporate practical reasons, such as non-epistemic values, in the course of their inquiry. Brown's practical reason argument coincides with the aims argument insofar as both appeal to the practical nature of scientific practice as a way of justifying the relevance of non-epistemic values. According to the aims argument, non-epistemic values are relevant because science sometimes incorporates non-epistemic aims, and non-epistemic values help to achieve those aims. The practical reason argument extends this point by affirming that even when science might seem to be focused on epistemic tasks, scientists are still typically engaged in practical forms of reasoning where non-epistemic values are relevant (see also Lusk and Elliott 2022).

A potential worry about the aims argument is that it seems to leave science open to epistemic corruption (Steel 2017), and therefore it seems too permissive. If non-epistemic aims could potentially take priority over epistemic aims, then it seems like a scientist could justify ignoring evidence or drawing unwarranted conclusions for the sake of achieving non-epistemic aims such as making money or promoting their preferred political causes.[3] Lusk and Elliott (2024) have provided several responses to this worry. One response is that epistemic aims and non-epistemic aims can often be *jointly* satisfied (Kourany 2010). Thus, one can often incorporate non-epistemic aims in scientific reasoning without violating epistemic aims. A second response is that efforts to use science to achieve non-epistemic aims without respecting epistemic aims are typically self-defeating. In other words, the benefits of appealing to science typically rely on its authority and reliability, but that authority and reliability is likely to be lost if the epistemic aims of science are not satisfied. A final response is that even if the aims argument does not require scientists to prioritize epistemic aims over non-epistemic aims, scientists still have ethical responsibilities to be honest. Thus, if the recipients of scientific information expect epistemic

[3] One response to this objection would be to insist, along the lines of Brown's practical reason argument, that there are no purely epistemic aims of science. For the sake of argument, however, I will assume that it is coherent to distinguish epistemic aims of science from non-epistemic aims.

aims to be prioritized when doing science, then scientists have ethical responsibilities to abide by those expectations unless they can make it abundantly clear that they are prioritizing different aims. In other words, scientists should avoid "false advertising" (Carrier 2018; Wilholt 2009).

The blurred boundaries argument

A final argument against the VFI is what I will call the "blurred boundaries" argument. This argument rests on the fact that the VFI is typically formulated in such a way that it relies on sharp distinctions between different kinds of values and different aspects of science. For example, it allows only a narrow range of values (e.g., epistemic ones) to influence the "internal" aspects of scientific reasoning, whereas a broader range of values (e.g., non-epistemic ones) are allowed to influence the "external" aspects of science. The internal aspects of scientific reasoning are typically interpreted to involve the assessment and acceptance of hypotheses, whereas the external aspects involve activities like choosing research questions, setting ethical guidelines about how studies should be conducted, and applying scientific results to public policy.

The blurred boundaries argument questions one or more of these distinctions on which the VFI relies. As a result, the VFI becomes incoherent because the value influences that are supposed to be prohibited end up being indistinguishable from the value influences that are supposed to be allowed. Historically, the most common way to develop the blurred boundaries argument has been to challenge the distinction between epistemic and non-epistemic values. For example, Longino (1996) famously argued that there was not a convincing basis for distinguishing so-called epistemic or "constitutive" values (e.g., consistency, simplicity, and fruitfulness) from alternative feminist values (e.g., ontological heterogeneity, novelty, and applicability). Similarly, Phyllis Rooney (1992) argued that the application of supposed epistemic values is often influenced by non-epistemic values, and more recently she has pointed out that values often operate in a fuzzy "borderlands" between the epistemic and the non-epistemic (Rooney 2017).

Daniel Steel (2010) has attempted to shore up the distinction between epistemic and non-epistemic values by defining epistemic values as those that promote the attainment of truth and by clarifying that any particular value (e.g., explanatory power, simplicity, ontological heterogeneity, or novelty) can be truth-promoting in some contexts but not in others. However, the problem with Steel's approach is that it facilitates a clear distinction between epistemic and non-epistemic values *in principle*, but it does not provide clear guidance for scientists *in practice.* As they go about their work, scientists cannot be entirely sure which values are actually truth-promoting in the context in which they are working. Some values that typically count as epistemic might not actually be truth-promoting in a particular context, and some values that typically count as non-epistemic might actually be truth-promoting. Thus, Steel's argumentative strategy could perhaps save the VFI from this form of the Blurred Boundaries argument if the VFI were interpreted as describing an ideal state that ought to be achieved, but Steel's move does not work if the VFI is to serve as a practical guideline for working scientists (Elliott 2025).

More recently, the blurred boundaries argument has been extended so that it challenges not only the epistemic/non-epistemic value distinction but also the distinction between the internal and external aspects of science (see e.g., Resnik and Elliott 2023). Kathleen Okruhlik (1994) pioneered this argumentative move by showing how scientists' assessments of which theory is most compelling in a particular domain depends on the range of alternative theories under consideration, which is in turn influenced by the values of those developing and proposing the theories. Elliott and McKaughan (2009) similarly emphasized that scientists' assessment of the evidential support for theories (which is generally regarded as an "internal" aspect of scientific reasoning) is influenced by the kinds of data that scientists collect and the kinds of theories that they propose (which are generally regarded as "external" aspects of scientific reasoning). Thus, Elliott and McKaughan argued that when values influence the external aspects of science, those influences bleed into the internal aspects of science. Along the same lines, Holman and Bruner (2017) have discussed the process of "industrial selection," whereby private companies selectively fund investigators who employ methods that tend to generate results that favor their preferred theories. By doing so, they can influence the overall body of evidence in a particular research area even without biasing the reasoning of any individual scientist (see also O'Connor and Freeborn 2025). Based on these observations, it seems difficult to maintain a form of the VFI that allows values to influence external aspects of science (like choosing which research questions to prioritize or which studies to pursue) while insisting that values should not influence internal aspects of science (like assessing the evidential support in favor of a theory or hypothesis).[4]

Moving forward

The upshot of these arguments is that the "traditional" VFI described by Douglas (2009) is very difficult to defend. As Brown (2024) points out, to maintain the VFI would require challenging the AIR, which appears to be valid and has been defended as sound, as well as overcoming the variety of other arguments that form "a cable of arguments pulling against the VFI" (2024, 26). Nevertheless, it is important to recognize that the VFI can be characterized in different ways, and there is currently renewed interest in developing new formulations of it that allow values to influence science but that strive to minimize those influences (see e.g., Menon and Stegenga 2023; Menon and Stegenga XXX; Sikorski 2024; Stamenkovic 2024). Brown rejects this move by arguing that to accept or reject the VFI is an "all-or-nothing question" (2024, 26); he insists that those who try to defend "weaker" versions of the VFI are really just discussing strategies for managing values (Brown XXX). However, this response rests on the assumption that Brown's notion of the VFI—what I have been calling the "traditional" notion developed by Douglas (2009)—is the only legitimate formulation of it. I think this assumption is questionable.

One can legitimately disagree about what kinds of value influences in science are the most significant or important for scientists to consider, and thus what kinds of value influences should be enshrined in the VFI (Elliott 2025). The formulation of the VFI that Douglas (2009) developed based on twentieth-century philosophical debates is in fact quite nuanced because it is informed by the failure of more stringent efforts to exclude values from science. As a result, one might think that Douglas's formulation of the VFI has already caved in and abandoned "real"

[4] Yet another potential way to extend the blurred boundaries argument would be to argue that it is impractical for scientists to distinguish between their different cognitive attitudes (e.g., belief, acceptance, endorsement, or pursuit) and to point out that non-epistemic values are relevant to at least some of these attitudes (see Elliott 2022, 36).

value-freedom for science. In other words, one might insist that a truly comprehensive formulation of the VFI should prevent ethical or social values from influencing *any* part of (basic) science, or one might insist that *all* values (not just ethical and social values) should be excluded from scientific reasoning. Thus, one could argue that those who are trying to develop new formulations of the VFI are just continuing a previous tradition of gradually loosening up the standards for the VFI while insisting that some value influences should still be excluded or minimized.

Brown might reply that Douglas's formulation of the VFI obviously captures what really matters because it excludes social and ethical values from the "heart" of the research process. However, this begs the question of what should count as the heart of the research process. For example, one could insist that values do not really enter the heart of the research process unless they play the role of scientific evidence, and Douglas (2009) would actually maintain this formulation of the VFI rather than rejecting it. Thus, deciding how to formulate the VFI is not a straightforward matter; it depends on assumptions about what sorts of value influences are significant enough and controversial enough to try to prohibit (Elliott 2025), and these assumptions change over time depending on contingent historical debates and concerns (Proctor 1991). For example, Philip Kitcher recently proposed this formulation of the VFI, which is quite different from the traditional formulation that most philosophers have been discussing: "In a scientist's scheme of values, epistemic values should outrank all other values" (Kitcher 2024, 233).

Nevertheless, even though decisions about how to define the VFI are contingent and subject to change, the arguments discussed in this chapter indicate that any reasonable contemporary formulation of the VFI will have to allow values to play pervasive roles in science. Therefore, even though one could, in theory, reformulate the VFI so as to make it worthy of contemporary debate, this seems likely to be more confusing than helpful, especially for those outside the philosophical community. In sum, Brown (2024) might be wrong *in principle* when he says that debates about the VFI are really just debates about value management, but he is probably correct *in practice* that it would be better to shift the terms of the debate in this way. Rather than framing future discussions about values and science as debates about the VFI, it seems more fruitful to focus on exploring the best ways to manage value influences responsibly (see e.g., Holman and Wilholt 2022; Lusk 2025). The approaches being promoted to try to save some form of the VFI (see e.g., Menon and Stegenga 2023; Menon and Stegenga XXX; Parker 2024; Parker XXX; Sikorski 2024; Stamenkovic 2024) could then be interpreted as strategies for responsibly managing values in science.

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