# The Value-Free Ideal, the Autonomy Thesis, and Cognitive Diversity

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**Abstract.** Some debates about the role of non-epistemic values in science discuss the so-called Value-Free Ideal together with the autonomy thesis, to the point that they may be assumed to be intertwined. As I will argue in this article, the two are independent from one another, are supported by different arguments, and ought to be disentangled. I will also show that the arguments against value-freedom and supporting a value-laden conception of science, are different from the arguments against autonomy and supporting democratized science. Moreover, while some of the arguments against autonomy and for democratized science may actually be consistent with value-freedom, they conflict with some philosophical views about the internal diversity of well-designed epistemic communities. This article distinguishes the Value-Free Ideal and the autonomy thesis, as well as their antitheses, and investigates their relations to some of the socio-epistemological models of the social organization of scientific research. Its aim is to make explicit some incompatibilities between different normative frameworks developed in philosophy of science.

***Keywords:*** Value-Free Ideal; Autonomy; Democratization of Science; Cognitive Labor; Social Epistemology; Political Philosophy of Science

## 1. Introduction

The Value-Free Ideal (VFI) is a normative thesis about the epistemic and justificatory phases of science. Critics of VFI support a value-laden conception of science. The autonomy thesis is a normative thesis about the political relation between science and society. Some critics of autonomy support a democratized conception of science. The debate about values in science often seems to assume that VFI and autonomy are necessarily intertwined. As a consequence, it could be assumed that arguments against one of the two theses are also against the other one. In reality, both supporters and critics of VFI may endorse autonomy, while democratized science could be consistent with a value-free image of science. Furthermore, some versions of democratized science may be in conflict with some philosophical views about the internal structure of well-designed epistemic communities.

In this article, I analyze and assess the relations between VFI, the autonomy thesis, the value-laden conception, and democratized science. I then investigate their compatibility with some of the socio-epistemological models of the social organization of scientific research. My aim is to make explicit some conflicts between different normative frameworks developed in philosophy of science.

In the next section, I spell out the central ideas of VFI and the value-laden conception while, in the following section, I spell out the central ideas of the autonomy thesis and democratized science. In the fourth section, I discuss how some philosophers misleadingly conflate VFI and autonomy whereas, as I will show, the relations between the two are more complex. In the fourth section, I focus on the relations between democratized science, on the one hand, and VFI and value-ladenness, on the other. A further problem, discussed in the sixth section, is that some versions of democratized science may conflict with some socio-epistemological normative frameworks, which are in turn compatible with value-freedom and autonomy. I discuss the implications of my analysis for philosophy of science in the concluding section.

Before I continue, I need to specify that, in what follows, I will refer to a number of philosophers who hold similar but nevertheless different views with respect to some normative theses about science. Although I will try to differentiate them as much as possible, the limited space of this article forces me to lump together arguments and views that have been developed independently. This does not necessarily mean to make naive and sweeping generalizations. It means, rather, focusing on what all these proposals have in common. This allows me to analyze the relations between different, and sometimes conflicting, general normative frameworks in philosophy of science.

## 2. Value-Freedom and Value-Ladenness

The *Value-Free Ideal* (VFI) states that non-epistemic values (such as moral, social, or political values) must play no role in the so-called internal phases of scientific inquiry, such as during theory appraisal. VFI does not deny that epistemic values – like simplicity, coherence, fruitfulness, and so on (see Kuhn 1977; Laudan 1984; McMullin 1983) – play an important role in the internal phases of research. Nor does it deny the role of non-epistemic values in its external phases – for example, during the agenda setting process or during the dissemination and deployment of results in society. VFI only bars non-epistemic values from the epistemic and justificatory stages of science.[[1]](#footnote-0)

For the supporters of VFI, freedom from non-epistemic values is the mark of epistemic integrity, which is in turn the source of the epistemic authority of science. In this view, trust is bestowed upon science on the basis of its ability to provide objective, undistorted, and ethically neutral factual knowledge. Therefore, proper scientific knowledge must be impartial, free from prejudices and ideologies. It is in virtue of its impartiality that science can be regarded as a remedy, or even as the *only* remedy, to superstitions, wishful thinking, and obscurantism.

In the wake of the feminist critique of implicit androcentric biases in science, philosophers have begun to speak about the *untenability* and *undesirability* of VFI. Arguments about the untenability of VFI maintain that, in practice, the distinctions VFI relies on are too unclear to support its normative conclusions. Rooney (1992) has challenged the ‘epistemic’ *vs.* ‘non-epistemic values’ distinction, while Elliott and McKaughan (2009) have questioned the sharpness of the ‘external’ vs. ‘internal phases’ distinction.

Arguments about the undesirability of VFI attempts to show that not only is freedom from non-epistemic values impractical, but that value-freedom is a bad ideal to begin with. Two of the most prominent of such arguments are that from *underdetermination* and that from *inductive risk*. The first is developed from the well-known problem of the underdetermination of theory by data. As Longino (1990) puts it, there is a ‘logical gap’ between empirical evidence and scientific theories. Traditionally, such a gap has been thought to be bridged by epistemic values only. However, as Longino points out, theory appraisal in the face of the available evidence also requires background assumptions, which contain both epistemic and non-epistemic values. While epistemic values are regarded as the necessary (or ‘constitutive’) features of science, Longino considers scientific rationality, and the role that non-epistemic values play in it, as sensitive to specific contexts and problems. Her ‘contextual empiricism’ is therefore grounded on the idea that science may impact and transform society. This means that it is often impossible to distinguish pure scientific knowledge from its social and political implications. At the same time, for Longino, non-epistemic and contextual factors do not taint scientific objectivity. This is so because, in her view, objectivity is not achieved through detachment but, rather, through intersubjectivity; that is, through the mutual critical engagement of individuals holding different values and having different standpoints.

The premise of the argument from inductive risk (Churchman 1948, Rudner 1953, Douglas 2009) is that, in and by itself, evidence does not speak conclusively either in favor or against a particular conclusion. Scientists, therefore, always face the risk of making erroneous decisions when appraising hypotheses, or when collecting and interpreting data. Such errors may have harmful consequences. Since scientists, like everyone else, have the moral duty of preventing harm, they ought to mitigate the risk of errors by setting the adequate standards of evidence and of their interpretation. These operations require the use of value judgements.

ChoGlueck (2018) considers the argument from inductive risk as ‘nested’ into the argument from underdetermination. For example, the risk of error in the face of available evidence is a consequence of underdetermination, while making value judgements to mitigate such a risk is a special instance of the use of non-epistemic and contextual values in theory appraisal. Both arguments, furthermore, consider the social and political stakes of scientific knowledge production, as well as scientists’ responsibility towards society. Some philosophers, mainly supporting the inductive risk argument, conceptualize scientific responsibility through the approach of traditional ethics, which attempts to establish what individuals ought to do in order to behave responsibly. Others, such as Longino (1990, 2002) and Peters (2021), regard scientific rationality and responsibility as resting with a pluralistic scientific community, rather than with individuals. Despite their differences, these two approaches can also be regarded as nested, since responsible individuals are necessary for responsible collectives.

As pointed out by Havstad (2022), arguments against VFI, such as that from inductive risk, support the conclusion for which non-epistemic values have a legitimate place in the internal stages of research. These kinds of arguments led, in the past few decades, to a new *value-laden conception of science* (from now on, ‘Value-Ladenness’). Rather than being a unified thesis, Value-Ladenness is a collection of different views ranging from the reactions against value-freedom to the formulation of more positive ideals, such as Harding’s (1995) standpoint theory, Kourany’s (2010) socially responsible science, and Brown’s (2020) ideal of moral imagination in science.

Supporters of VFI may respond to Value-Ladenness in two ways. First, by denying that scientists ought to make value judgements to mitigate the risk of error. This argument relies on the idea that scientists’ job is to communicate uncertainties to policy makers, not to make decisions on their own (Levi 1960; Betz 2013; Henschen 2021; Carrier 2022).

Second, by attempting to show how the principles of liberal democracy justify, or even entail, VFI. DuBois (1898) argued that value-free scientific knowledge can be used by everybody in a democracy, but not misused to push specific political agendas (see also Bright 2018). Different versions of this argument are also maintained, among the others, by Levi (1960) and Betz (2013). The argument of the ‘political legitimacy’ of VFI is rarely tackled by the supporters of Value-Ladenness, one of the most notable exceptions being Lusk (2021), who directly responds to it. It is important to stress that the view for which democracy justifies or implies VFI is different from the view for which science ought to be democratized.

## 3. Autonomy and Democratization

The *Autonomy Thesis* (from now on, ‘Autonomy’) states that science must preserve its autonomy from social and political interference. It is a normative thesis regulating the ‘social contract’ between science and society.[[2]](#footnote-1) Supporters of Autonomy believe that attempts to direct scientific research ‘from the outside’ compromise scientific progress and are therefore unacceptable. Autonomy must be maintained to guarantee what Berlin (1969) defines as ‘negative’ and ‘positive freedom’ that, in the case of science, amounts to freedom *from* political ideologies and government control, and freedom *to* steer research towards the ends and with the methods deemed relevant by the community of experts.[[3]](#footnote-2)

Apart from specifying the kinds of freedom Autonomy guarantees to science, it is also important to discuss their *degrees*. Science is an institutionalized organization amidst other institutionalized organizations, and embedded in a larger society which provides funding for its very existence. Autonomy does not claim that science could or ought to exist irrespectively or even without society: the ‘social contract’ aims at regulating the relations between science and society, not at eliminating them. Nor does Autonomy endorse the rather implausible view for which science could be completely detached from society. Scientists, like everyone else, are influenced by their social, cultural, political, and sometimes even ideological milieu. However, ‘influence’ is different from ‘control’, in as much as the former does not determine the outcome of a process as the latter does. The descriptive claim that scientists may, and often are, influenced by society does not lend support to the normative conclusion for which science ought to be directly controlled by the government or by the supporters of an ideology.

In the past few decades, the traditional contract between science and society has been challenged. As a result, a new conception has emerged, for which science ought to be aligned to the needs of society, and welcome the mutual engagement between scientists and other societal actors, such as policy makers, private stakeholders and citizens. The premises of the philosophical argument supporting what I will refer to as *Democratized Science* can be summarized as follows:

* DS.1 - *Demarcation problem:* because science is value laden, we need to find a principled way to distinguish between legitimate and illegitimate values in science; this issue is also known as “the new demarcation problem” (Holman and Wilholt 2022)
* DS.2 - *Demarcating principle:* non-epistemic values are legitimate insofar as they are democratically endorsed (Kitcher 2001, 2011; Inteman 2015; Schroeder 2017; Lusk 2020)
* DS.3 - *Social responsibility:* scientists have the duty not only to prevent harm, but also to contribute to society (Kourany 2010, Brown 2020). The more socially responsible science is, the more the public will trust it (Kitcher 2011)
* DS.4 - *Democratized objectivity:* objectivity and robust knowledge is achieved through the integration of scientists’ expertise with citizens’ values, standpoints, and ‘local’ expertise.

Three considerations are in order. First of all, arguments for Democratized Science have been developed in different contexts, such as in STS or in the science policy literature, and for different motivations. In this article I focus on the philosophy of science literature, in which there is a strong link between Democratized Science and values, to the point that many proposals – such as Kourany’s, Intemann’s, or Brown’s – provide arguments for *both* Value-Ladenness *and* Democratized Science.

Second, as already discussed in the previous section, the argument from inductive risk may be regarded as ‘nested’ into the argument from underdetermination. By contrast, the argument for Democratized Science is not nested into any of those two; rather, it extends some of their aspects.[[4]](#footnote-3) Democratized Science is not limited to the statement for which values have a role in science, but it also provides a way to distinguish between legitimate and illegitimate values. It supports a wider conception of scientists’ responsibility, going beyond preventionist accounts and including more remedial dimensions. For supporters of Democratized Science, furthermore, the achievement of interpersonal scientific objectivity is not only a scientists’ affair.

Third, although they extend Value-Ladenness, there is one crucial aspect in which the relation between Democratized Science and Value-Ladenness is not clear, namely the issue of *when* and *how* (democratically legitimate) values ought to play a role in research. As I will discuss in section 5, the compatibility between Value-Ladenness and Democratized Science depends on how one interprets democratization on this issue.

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## 4. Value-Freedom and Autonomy

From what it has been said so far, it appears that VFI and Autonomy are about different things, have different aims, and are supported by different arguments. VFI prescribes how scientific reasoning ought to proceed, Autonomy regulates the relations between science and society. Nevertheless, sometimes VFI and Autonomy risk being misleadingly conflated. To be clear: the problem is not that, in some cases, VFI (or Value-Ladenness) can be used in favor of Autonomy (or Democratized Science). The problem is treating VFI and Autonomy as being necessarily linked, or even as the same thesis.

For Hugh Lacey (1999), for example, VFI is constituted by three main ideas: the Galilean idea of *impartiality*, grounded on the metaphysical divorce of facts and values; the methodological/epistemological idea of *neutrality*, for which inferences and justification are guided only by empirical data, and cannot favor any particular value outlook over others; and the idea of *autonomy*, which, as Lacey himself defines it, is a political thesis science and society. He then proposes his own version of VFI, which includes some modifications to impartiality and neutrality, but which deems autonomy as untenable. In his view, the ‘core phase’ of science includes different steps, such as the adoption of methodological strategies and theory appraisal, and traditional philosophy of science has developed context-free norms for both. However, he accepts the idea that social and political values may guide the external phase of science as well as the adoption of methodological strategies, while defending the value-freedom of theory appraisal. This amounts to the contemporary version of VFI, which admits the use of non-epistemic values in the external phases of inquiry only. In the end, however, it appears like Lacey separates what he did not need to mix together to begin with, that is VFI and Autonomy. Indeed, it is even questionable whether Lacey needs to reject Autonomy, or even to talk about Autonomy at all, in order to present his modified version of VFI.

Heather Douglas (2009:ch.3) argues that there are two ways to defend VFI against the argument from inductive risk. The first is to follow Levi (1960) and others in claiming that scientists do not have to make choices under uncertainties, but only to communicate uncertainties to the relevant decision makers. The second is by describing the scientific community as insulated from the rest of society, as Kuhn (1962) suggested. It is easy to see why the insulation of the scientific community can be regarded as a defense of VFI: in some versions of such a view, the scientific community is considered as autonomous *and* as internally driven by epistemic values only. Yet, such a conjunction is not necessary: a scientific community could be autonomous *and* as internally driven by both epistemic and non-epistemic values. Douglas does not consider this option and she even refers to a “*classic Kuhn-Levi view*” (Douglas 2009:64, *my emphasis*), thus conflating a methodological argument about the role of values in science with a political view about the science-society relations. Surprisingly enough, in a more recent work, she openly defends scientists’ autonomy. After analyzing the relation between autonomy and social responsibility, and recovering some early insights of the *Society for Freedom in Science*, she concludes that “[c]urtailing the freedom of scientists through central planning is not a good way to get at the societal responsibilities of scientists” (Douglas 2021:83).

Perhaps, neither Lacey nor Douglas are really talking about Autonomy. Rather, their actual target seems to be scientists’ disinterestedness and detachment from social concerns. That scientists have such a lack of interest towards social problems is of course debatable. Lacey and Douglas, however, are not criticizing actual scientists, but some particular ideals of how scientists ought to conduct research. The problem is that the ideal of scientists’ disinterestedness and detachment is not necessarily related to the political autonomy of science. It is possible to imagine a scientific community permeated by social and political concerns, yet autonomous from political pressure (and this is actually what Douglas seems to point at).

Dan Hicks (2011) targets the actual autonomy thesis. They argue that the philosophical and ideological background of Autonomy is the libertarian tradition in political and economic thought, for which the state ought to play a minimal and non-intrusive role (for example, it should establish and implement laws to maintain order and to prevent harms), and it should not interfere with individuals’ freedom. They then criticize such a philosophical background with the aim of showing that “The ideal of value-free science is not, in itself, value free” (Hicks 2011:1236). It is not clear how Hicks ends up talking about VFI in the context of a critique of the philosophical presuppositions of Autonomy. In their view, Autonomy is a thesis involving the set of value-free standards for producing good science. However, this is a non sequitur: it is possible to accept the idea that the state should not interfere with science, in a *laissez-faire* fashion, while also accepting the idea that science is engaged in the production of (value-laden) ‘goods’, to be put in the market of ideas (and not only). While examining the hidden ideologies of some normative frameworks is commendable, what one could contest to Hicks is treating Autonomy and VFI as the same thesis, to the point that it may be difficult to understand what their actual target is.

The idea that science should proceed autonomously with respect to social and political planning could be interpreted as suggesting that scientists ought also to be free of social concerns and responsibilities, their only duty amounting to the production of impartial, reliable, and value-free knowledge. Ultimately, however, autonomy does *not* mean, or imply, freedom from responsibility. Quite the contrary: being uncoerced is regarded as one of the necessary conditions for the attribution of responsibility to an agent (in other words, we would not attribute responsibility to someone who could not have done otherwise because of, for example, external constraints or threats). If science has to be socially responsible, and if responsibility requires autonomy, then autonomy is necessary for a socially responsible science, as Douglas (2021) seems to suggest. In other words, instead of absolving scientists of their social responsibilities, Autonomy can actually be viewed as the precondition for a socially responsible science.

Not only VFI and Autonomy are two separate theses but, historically, Autonomy has been endorsed by supporters of *both* VFI *and* Value-ladenness. For example, even though they held opposite views on the issue of values in science, Michael Polanyi and Robert Merton both defended the autonomy of the scientific enterprise. For Polanyi (1958), science possesses a ‘tacit’ dimension that includes intuitions, creative acts, but also passions and unspoken commitment to social and moral values. His work is regarded as one of the earliest rejection of the logical-positivist image of the detached and disinterested scientist capable of applying the universal scientific method to get at objective knowledge. Therefore, he may be considered as an early critic of VFI. At the same time, he regarded the projects for the political control of science as ill-conceived for a number of reasons. To begin with, such projects are based on the erroneous idea that the state is the sole representative of citizens’ interests and welfare, which is debatable, if not questionable. As Polanyi explains, moreover, the outcomes of ‘politicized science’ are not assessed by scientific experts, but by the current government, with the risk that only the results confirming the dominant political views will be deemed as ‘scientific’. Rather than scientific knowledge, therefore, the politicization of science would foster an anti-scientific attitude. For Polanyi, science and other institutions should interact yet maintain their autonomy, following a ‘polycentric’ model of society (Polanyi 1951, 1961; see also Mullins 2021). More generally, following Polanyi’s insights, it is possible to conceive a scientific community that is indeed free from external political control and yet, at the same time, internally driven by non-epistemic values(in virtue of some of the very arguments against VFI).

Merton notoriously held a rather value-free image of science, which, in his view, ought to be driven only by what appear like epistemic values such as, for example, ‘disinterestedness’. Yet, like Polanyi, he also endorsed Autonomy. He believed that impartial and value-free science did not require social and political control but, rather, it represented a model to which democracies should be inspired by and conform to. On discussing the cases of Nazi experiments and fascist totalitarian regimes, Merton argued for the necessity of scientific autonomy and concluded that “The social stability of science can be ensured only if adequate defenses are set up against changes imposed from outside the scientific fraternity itself” (Merton 1938:328). Ultimately, in Merton’s view, the autonomy of science guarantees democratic freedom, and must be therefore preserved (see also Hartl 2021).

Of course, both Polanyi and Merton worked at a time when the fear of totalitarian governments was still strong in Europe and the US. Contemporary critics of Autonomy, of course, do not argue in favor of a central social planning of science like that instantiated by authoritarian regimes. As already explained, they propose models for democratizing science. Nevertheless, this section has shown how the arguments for VFI and Autonomy are independent, with the latter being endorsed by both supporters and critics of VFI.

## 5. Value-ladenness and Democratization

As in the case of VFI and Autonomy, the relations between Value-Ladenness and Democratized Science are not straightforward. As defined in section 3, one of the premises of the argument for Democratized Science is the recognition that science is value-laden. This does not mean, however, that Value-Ladenness in and by itself implies Democratized Science. Even though they have to do with values in science, in fact, Value-Ladenness and Democratized Science are supported by different arguments.

As recently pointed out by Schroeder (2022a), arguments about the role of non-epistemic values in science can be either ethical or political. Ethical arguments are developed from an individualistic perspective, in the sense that they focus on the rules that an individual moral agent ought to follow. Political arguments, by contrast, are developed from a collective and institutional perspective. Not only are ethical and political arguments different, but they may also lead to incompatible conclusions. For example, what would be deemed as an unethical behavior for an individual could be deemed as permissible for a collective, such as an institutionalized organization or a nation. Schroeder also stresses that, in the context of the philosophy of science debate on values, the two kinds of arguments rely on different methods: ethical arguments rely on the conceptual analysis of idealized norms, whereas political arguments, which put a major emphasis on the analysis of the social context, often require the integration of empirical studies. It follows that ethical arguments in favor of Value-Ladenness are not necessarily compatible with the political arguments in favor of Democratized Science.

It may even be the case that arguments for Value-Ladenness could be used in support of Autonomy. For Douglas, a closer look at the uncertainties endemic in several internal stages of research and at how they are mitigated *via* value judgments should lead to a re-examination of the role of science and society. This, in turn, would help us question “the presupposition that science is a distinct and autonomous enterprise developed by a community of scientists largely in isolation from public questions and concerns” (Douglas 2009:5). As already mentioned in the previous section, however, Douglas mainly challenges scientists’ (supposed) isolation from public questions and concerns, *not* the political autonomy of science, which she actually defends in her (2021). In her view, in fact, it is the scientist *qua* scientist on her own that makes value judgments in order to prevent societal harm. Even though she is moved by a deep concern over the implications of science in society, sometimes Douglas appears to grant a sort of ‘moral authority’ to scientists, while also restating their epistemic authority. She admits that “elucidating the proper roles and proper values for science is part of what makes science authoritative, rather than undermining the authority of science” (Douglas 2021:31).

Most of the time, then, Douglas could be read as defending the idea that the source of value judgments lies within individual scientists, who can therefore be regarded as autonomous from political pressures, yet concerned with society. In some of her works, however, she appears closer to the kind of mutual engagement between scientists and citizens promoted by Democratized Science (see, for example, Douglas 2005, 2017). For example, in her (2005) article, she claims that there are at least three ways in which citizens may give their inputs in technical assessments and analyses, namely: in framing the problems to be addressed and the range of potential solutions to consider; in providing local knowledge; and in providing values to weigh uncertainties and the potential consequences of errors. While the first two ‘points of entry’ for citizens in science may be regarded as involving the external phases of inquiry, the third seems to advocate for citizens to have an active role in the more internal phases. Douglas specifies:

“This last point of input is both crucial and often overlooked. Because values are needed to shape analyses, whose values are important. Traditionally, the values have been both hidden and those of the experts making the judgments. Many experts think that citizens are unable to understand the technical complexities of analyses, much less provide guidance at points of expert judgment. Yet the examples below suggest ways in which citizens can do precisely that, with the result that experts think the analyses are strengthened and the citizenry trusts the study’s results” (Douglas 2004: 158-159)

For the rest of her paper, Douglas provides examples that seem to support Democratized Science and attempts to develop prescriptive norms for strengthening the role of the public into science. From the last two sections, in short, Douglas emerges as defending Value-ladenness but with oscillating if not ambiguous views about Autonomy and Democratized Science.

A similar ambiguity can be found in the work of other philosophers supporting Value-Ladenness. For example, Longino (1990) argues about the cognitive benefits deriving from values diversity within the scientific community. Such a plurality of values, however, needs to be ‘managed’. To ensure the harmonization of different individual preferences and values and, therefore, the achievement of objectivity through intersubjectivity, Longino proposes the so-called ‘value management ideal’. In this view, the practice of an ideal scientific community ought to be constrained by four criteria: publicly recognized venues for scientific disputes, uptake of criticisms, shared standards, and tempered equality of intellectual authority. Stated in this way, Longino’s value management ideal represents the scientific community as the locus of the plurality of values, with scientists being the *only* moral agents involved in their harmonization. To say that scientific disputes have to take place in publicly recognised venues, in fact, does not mean assigning any active role to the public. In the same way, the criticisms that must be uptaken may come from the scientists themselves, as in the case of disagreements internal to the scientific community. In short, value management may be a scientific community’s internal affair.

In other works, however, Longino proposes to ‘open up’ the scientific community to public scrutiny and to criticisms coming from outside the scientific community (see, for example, Longino 2002). As with Douglas, it is possible to interpret some of Longino’s works as supporting Value-Ladenness and as compatible with Autonomy, while other works may be read, to some extent, as an endorsement of Democratized Science. No matter where Longino and Douglas stand when it comes to Autonomy and Democratized Science, it is important to show how some of their arguments for Value-Ladenness do not imply Democratized Science and may even be compatible with Autonomy.

It may also be the case that some versions of Democratized Science actually *conflict* with Value-Ladenness. Some arguments for Value-Ladenness, like Longino’s contextual empiricism, are a call for the *plurality* of values and standpoints in science. Instead, by focussing on the *consensus* as the (ideal) end result of democratic deliberation, some supporters of Democratized Science seem to auspicate, if not an erasure, at least a resolution of value pluralism into a sort of ‘value monism’ achieved through democratic mechanisms. Schroeder (2016) would even go as far as claiming that scientists ought to adopt democratically held values even when they conflict with their own. Prima facie, this may look like a way of depriving scientists of their rights of opinion and freedom of choice. Schroeder argues, however, that although scientists have the same moral obligations as everybody else, they are not like anyone else. In virtue of the special place they have in society, scientists may even enjoy fewer rights than the rest of citizens. The situation would be analogous to that of a Prime Minister who, as a representative of the state, has to accept a law passed by the democratically elected parliament even if she personally disagrees with its content. If, on the one hand, this view could be interpreted as overburdening scientists, on the other hand, Schroeder maintains that the benefits for the public as a whole surpass the loss of scientists’ political freedom.

While, as discussed above, Value-Ladenness does not imply Democratized Science, Schroeder shows how a political argument in support of Democratized Science actually conflicts with the individualistic ethical arguments in support of Value-Ladenness. At the same time, this line of argument is problematic, as it appears to simply suggest that scientists’ values ought to be substituted with the values upheld by the civil society, which would be more ‘politically legitimate’ than those upheld by the scientific community. That something has been legitimated by a democratic procedure, however, does not mean that it is also the right thing to do.

One of the issues with the various proposals for Democratized Science is that it is not always clear which theory of democracy they rely on. Different conceptions of democracy, fairness, representation, and consensus, in fact, may lead to different versions of Democratized Science. For instance, Kitcher (2001, 2011) develops the ideal of Well-Ordered Science (WOS) – which can be considered as a version of Democratized Science – from a different perspective than Schroeder’s. For Kitcher, in fact, simply following the position upheld by the majority corresponds to a ‘vulgar’ version of democratic principles. He therefore characterizes the democratic process that ought to govern the science-society relations in terms of an ‘engaged conversation’ between experts and tutored members of the public. The latter ought to represent the values and interests of every social class and group, including the well-being of future generations. They have to be tutored by the experts, mainly about the available research lines and methods, because their opinions and preferences ought not to be uninformed (otherwise WOS would relapse into a form of vulgar democracy that does not recognise the existence of expertise). At the same time, however, scientists have the duty to take into account the views of the tutored representatives of the public (otherwise WOS would relapse into a form of elitism). Scientists and tutored representatives of the public should act like the ideal deliberators theorized by Rawls (1999). Their ideal conversation may go on for a long time, or even forever. Its end result is not the victory of a brute majority, but the finding of a common ground capable of satisfying everybody’s values and needs and, above all, to respect and to reserve a fair treatment to the marginalized minorities.

Closer to Kitcher’s view is the so-called ‘aims approach’. In this view, value judgments about the aims of a research must be set through democratic mechanisms that guarantee the representation of the interests of societal stakeholders. Moreover, scientists must be transparent about the values they use in making methodological decisions. Only those values that advance the stakeholders’ interests will be considered legitimate. In short, the aims approach amounts to the idea that value judgements in science are legitimate insofar as “they promote democratically endorsed epistemological and social aims” (Intemann 2015:219; see also Intemann and de Melo-Martín 2010, Elliott and Resnick 2014, Elliott 2017).

Unlike Schroeder’s proposal, Kitcher’s WOS and the aims approach allow scientists to be part of the democratic deliberation process. They also put a major emphasis on the needs of representation for the values and needs of minorities. Nevertheless, they still hold consensus-based decisions as the mark of democratization. Such a view could be contested. For instance, Rolin (2021) argues that the consensus achieved through deliberative procedures may actually end up reinforcing injustice and inequality. In fact, minorities risk not to be taken into consideration, or to become even more marginalized, if the democratic mechanism in place is designed to award the majority. For these reasons, she challenges the theories of democracy informing Democratised Science and she advocates for the kind of scientific research pursued by ‘social intellectual movements’. Moreover, Hilligardt (2023) argues that requiring science to use only democratically held values does not consider the importance of ‘partisan’ science, such as that pursued by politicized research foundations or think tanks. This kind of research clearly does not reflect the values and interests of a democratic majority and yet it may contribute in important ways to both the epistemic aims of scientific research and to social progress. Both research conducted by social intellectual movements and partisan science are animated by the dissatisfaction with the democratically established status quo and aim at creating dissensus, rather than consensus, in order to widen the pool of values and alternatives. This kind of argument shows how it is possible to reject Autonomy without endorsing Democratised Science.

Apart from questioning the very political theories it relies on, there are other problems with Democratized Science. For instance, Lusk (2021) maintains that the connection with Democratized Science and values is often left inarticulate. On the one hand, scientists and the public may agree on the pursuitworthiness of some general aims, but not on the values to be held. On the other hand, a shared set of values, by itself, is not sufficient to guide methodological choices, which are therefore left either to further debate or to scientists who, under this respect, would remain autonomous.

My criticisms of Democratized Science, especially in the version of Kitcher’s WOS and the aims approach, are complementary to Lusk’s. Although both WOS and the aims approach concern values in science, it is not entirely clear whether they are compatible with an image of scientific research as *internally* value-laden. As already explained, VFI forbids the intrusion of values in the internal and justificatory phases of science, but it does not deny them a role in the external phases. One of the premises of Democratized Science is that science is value-laden. What many supporters of Democratized Science do not specify, however, is at which stages of research such value-ladenness is encountered. Indeed, for WOS and the aims approach, the setting of research aims and priorities ought to be settled democratically, through scientists’ engagement with the public. Fixing aims and priorities, however, is part of the so-called external phases of science. Since WOS and the aims approach do not make evident the role of value judgments in the internal phases of science, they could even be interpreted as compatible with VFI, or as implicitly accepting it.

It is possible to respond to this argument in at least two different ways. First, as briefly mentioned in section 2, some philosophers challenge the sharpness of the ‘external’ vs. ‘internal’ distinction. For example, Elliott and McKaughan (2009) maintain that value-laden decisions taken in the so-called external phases may filter down into the internal phases and alter theory appraisal. In their views, epistemic and non-epistemic values, as well as internal and external phases, interact in complex ways. This is also why Elliott (2017:ch.2) speaks about Kitcher (2001) as being interested in research agenda setting *and* as someone who contributes to debate about the value-ladenness of science.

Second, even though it is true that Kitcher (2001) is mainly concerned with agenda setting, in his (2011) he distinguishes three steps in scientific research that require the democratic dialogue of ideal deliberators: the allocation of resources to significant research projects, the choice of research methods, and the translation of scientific results into social policies for the benefits of society at large. The second step Kitcher speaks about belongs to the internal phase of science. However, democratizing the internal stages of science poses a whole different set of problems, as I will discuss in the next section.

## 6. Cognitive diversity, values, and democracy

VFI and Value-Ladenness are not the only normative theses about how science ought to be conducted. In the past few decades, in fact, social epistemologists have developed formal models of epistemically efficient scientific communities.

Years before his recent works on WOS, Philip Kitcher developed one of the first of such models, with the aim of showing how to solve the “mismatch between the demands of individual rationality and those of collective (or community) rationality” (Kicher 1990:6). From the community perspective, it is rational to keep many research options alive, even when it is known that one of them is more likely to succeed: in the long run, less likely methods may still produce useful results. From an individual perspective, however, no scientist would voluntarily choose to work on approaches that are not very likely to succeed. In Kitcher’s model of the ‘distribution of cognitive labor’, scientists are not driven only by epistemic reasons. Rather, they are self-interested individuals seeking their own profit, which may come in terms of peer recognition, prestige, and career advancement. Their choice is not determined by the probability of success of a particular research method, but by the probability of *their own* success. In Kitcher’s model, for some individuals it is actually more rational *not* to follow the majority of their colleagues in choosing the method with highest probability of success, opting for the one with a lower probability. In a less crowded and less competitive sub-community, in fact, making a relevant contribution could be easier and faster. Self-interest and competition help the scientific community to maintain a healthy internal pluralism, thus serving collective epistemic purposes. In this way, individual and collective rationality are harmonized.

Kitcher’s model has influenced the emergence of more sophisticated socio-epistemological formal models of the scientific community. Some computer-based models of the social organization of science, such as the epistemic network (Zollman 2007, 2010) or the ‘epistemic landscape’ (Weisberg and Muldoon 2009), can be regarded as expanding on Kitcher’s framework while attempting to overcome some of its limitations and questionable presuppositions (see also Weisberg 2010).

In the intentions of their developers, these models could provide policy advice on how to design optimal scientific communities (Avin 2018; Petrovich and Viola 2018). However, not every philosopher is convinced about the possibility of using formal models as a basis for making policy decisions. Some of them argue that such models do not represent adequately their target (that is, real scientific communities) and should therefore be intended as having other, more speculative functions instead (see, for example, Martini & Pinto 2017; Frey & Šešelja 2018; Thicke 2020; Aydinonat, Reijula & Ylikoski 2021; Šešelja 2021). Although the question of the use of formal socio-epistemological models in science policy is not settled, it still makes sense to assess whether the epistemological norms they provide are compatible with some of the other normative frameworks discussed so far.

To begin with, these models appear to miss a ‘moral dimension’. As already pointed out by Politi (2021), in formal socio-epistemological models, the epistemic objective the agents are trying to achieve is assumed to be a piece of ‘significant truth’. While the notion of significant truth is clearly value-laden, the models do not represent how scientists establish and assess significance: the significant epistemic objective is a ‘given’, which has been fixed and accepted *before* individual agents begin to pursue it. Once the objective is fixed, the agents make their choices for epistemic reasons (i.e., the desire of discovering the truth), or for selfish reasons (i.e., the desire of recognition and success), or a mixture of both. Their moral and social value-judgments, as well as their way of dealing with the risk of error, are not represented.

The missing moral dimension of the formal models of the scientific community is evident in the way in which Weisberg and Muldoon (2009) describe their own model. After defining the ‘peaks’ of the epistemic landscape as pieces of significant truths that the scientists/agents are attempting to discover, they feel compelled to add:

“An important and foundational debate in philosophy of science concerns the source of scientific significance. A classical perspective holds that some facts have intrinsic scientific significance. A radical alternative holds that all judgments of scientific significance are merely the result of dominant ideologies and other political and social forces that influence scientists and scientific consumers as much as anyone else. Moderate positions acknowledge both the social origin of much of what we take to be important in scientific knowledge, but also that some questions and answers have significance internal to the goals and structures of science. *Our model makes no commitment about the source of significance judgments. It only requires that the community of scientists working on the same topic would make the same or nearly the same judgments about significance*” (Weisberg & Muldoon 2009:229, *my italics*).

Such judgments are made only in the agenda setting phase. Therefore the Weisberg-Muldoon model, as well as other models, are consistent with the view thatnon-epistemic values may play a role during the external phases of scientific research (which these models do not represent), but not in its internal stages (which the models represent). This means that formal socio-epistemological models are consistent with, and maybe even implicitly support, VFI.

Politi (2021) argues that one way to respond to the charge of value-freedom is to claim that, even though these models do not represent the value-ladenness of the internal stages of scientific research, they *could* do so potentially. The same Kitcher recognises that seeking personal gains is only one of the many possible drivers of the distribution of cognitive labor. He does not exclude that collective and individual rationality could be bridged by other factors, such as “Perseverance, personal investment, personal and national loyalties, and devotion to political causes” (Kitcher 1990:18). Perhaps it is possible to ‘correct’ the models by adding further parameters or functions, although one may wonder whether and how their introduction may alter the distribution of cognitive labor.

To explain this point, Politi uses the following example. Let’s imagine that the aimof a project in the field of agricultural science is to find a way to produce more food in an underdeveloped country suffering from hunger issues. Let’s assume that there are two possible research methods to reach such an objective: M₁ investigates biotechnological venues for the production of genetically modified food, M₂ analyzes the characteristics of the local land in order to develop and implement better agricultural methods. Let’s assume, as Kitcher would, that the likelihood of success of M₁ is higher than that of M₂, and that all the scientists involved in the pursuit of the same objective already know that. In Kitcher’s original model, after calculating the best way to increase their own expected utility, the majority of scientists would choose M₁ (biotechnological innovation), with some of them opting for M₂ (study of the local land and agricultural practices). In this way, the community as a whole can maintain a beneficial and fruitful pluralism. In its current form, Kitcher’s model is consistent with VFI. It is however possible to imagine the scientists of the example being driven by (among other things) moral or social values. For instance, not all of those choosing M₁ may do so for the desire of professional recognition, or for the financial reward coming from the private biotechnological sector. Some or even the majority of them may choose M₁ because they genuinely aim at providing a fast solution to a pressing problem. Similarly, not all of those choosing M₂ do so for personal convenience, many of them could simply follow their moral and political persuasions about the importance and long-term benefits of sustainable agriculture. Representing the scientific community as driven by epistemic, selfish *and* moral reasons maybe could result in a different distribution of cognitive labor. Yet, even though it is not clear *how* it would translate in the mathematical language of Kitcher’s original analytical framework, it is possible to conceive a value-laden representation of the internal dynamics of the scientific community.

From what it has been said so far, socio-epistemological models may be read as implicitly supporting VFI or as in need to be integrated with Value-Ladenness. Since, as shown in previous sections, Value-Ladenness may support Autonomy, and Democratized Science may conflict with Value-Ladenness, whether formal models of the scientific community support VFI or Value-Ladenness is independent from their relation with Democratized Science, which must therefore be considered as a separate issue.

As discussed in the last section, many arguments for Democratized Science may be read as targeting the external phases of scientific research, especially the agenda setting (and, for this reason, they are compatible with VFI). Formal socio-epistemological models are about methodological choices at the internal stages of scientific research (and they are also compatible with VFI). However, some versions of Democratized Science, like Kitcher’s (2011), target the internal phases of scientific research too. It is therefore legitimate to wonder: how much and up to which point should the internal stage of research be democratized? Moreover, could a full democratization of the internal stage of research lead to undesirable consequences?

To answer these questions, let’s go back to Politi’s example. This time, unlike the scenario in which scientists choose their research strategy on the basis of a mixture of epistemic and selfish reasons (as in Kitcher’s original model), and unlike the scenario in which they are also driven by value judgements (as in Politi’s proposed amendment of the model), let’s assume that, once the epistemic objective has been democratically set, a conversation about methodological choices begins among mutually engaged ideal deliberators. It cannot be ruled out that the outcome of such a democratic conversation would be the rejection of M₁, that is, of the method with the highest likelihood of success. It is possible, in fact, that the citizens’ representatives agree that the field of biotechnological innovation is driven by private and financial interests, that its impacts on the land and natural environment are too unpredictable, and that such impacts may even be dangerous for the local population. For this reason, they deliberate that the only acceptable method is M₂, which is also less likely to succeed. Choosing M₂ over M₁, in short, runs against the collective rationality of the scientific community. In a less extreme scenario, the deliberators may decide to keep both approaches alive, but to allocate the majority of scientists to M₂, while keeping only a few them to develop something democratically acceptable with M₁. Even this scenario, however, would lead to a suboptimal, if not inadequate, distribution of cognitive labor.

In short, socio-epistemological models seem not only to be compatible with VFI, but also to be incompatible with Democratized Science. This incompatibility makes it difficult to understand what Kitcher’s position on these issues is. When he talks about the distribution of cognitive labor, he claims that the internal diversity of the scientific community has to be preserved, even at the cost of exploiting scientists’ self-regarding motivations. When he talks about WOS, he claims that a democratic conversation has to be had about many phases of scientific research, including methodological choices. Yet the outcome of such a democratic conversation may hamper the epistemically beneficial diversity maintained by an optimal distribution of cognitive labor. As in previous cases, the point is not to force Kitcher to tell us where he stands. The point is to analyze the clash among philosophical normative frameworks for science.

Perhaps one may get out of this impasse by stressing, as Kitcher would do, that the ideal conversation has to be had between experts, on the one hand, and *tutored* representatives, on the other. Apart from explaining the virtues and potentialities of different theories and approaches, the tutoring process could also be about the distribution of cognitive labor and the importance of hedging the scientific community’s bets by keeping different research strategies alive. One may fear, however, that in this way the representatives are just tutored to make the same decisions that the experts would make on their own. In this way, one may wonder what the ideal deliberators are supposed to ‘deliberate’ about, apart from leaving the scientific community to distribute its own cognitive labor.

Another possibility is to bite the bullet and just accept that the optimal distribution of cognitive labor could be compromised by democratic deliberation about some internal stages of scientific research. Such an acceptance presupposes that the respect of democratic mechanisms is more valuable than collective scientific rationality. In this way, a political argument about the relation between science and society would trump some epistemological considerations about the necessity of methodological pluralism.

Kitcher’s work is exemplary of some tensions between different normative frameworks in philosophy of science. On the one hand, social epistemologists do not seem to reflect explicitly on whether their models of the scientific community support VFI or Autonomy, or conflict with Democratized Science. On the other hand, Schroeder (2022b) has pointed out the potential tensions between epistemic, ethic, and political dimensions in so-called ‘citizen science’ programs, which are a way of realizing Democratized Science. In his view, these tensions call for some difficult to make trade offs, even though he does not enter in details about what the potential results of such trade offs could be. What I have shown in this section expands on Schroeder’s observations. I have argued, in fact, that democratic deliberation about methodological choices are in conflict with socio-epistemological normative frameworks about cognitive pluralism. Such a conflict cannot be solved with a trade off: either we exclude democratic deliberation and restate scientists’ autonomy in some internal steps of research, or we give up cognitive pluralism. No guidance is offered on what to choose.

## 7. Concluding remarks: incompatible norms, incompatible philosophies of science?

In this article, I have argued that VFI and Autonomy are two different normative theses, and that Autonomy could be endorsed by both the supporters and the critics of VFI. I have also argued that, on the one hand, some versions of Democratised Science may conflict with Value-Ladenness and be compatible with VFI; while, on the other hand, those versions of Democratised Science that do not conflict with Value-Ladenness are incompatible with the socio-epistemological models about the internal structure of well-designed epistemic communities.

The complex relations between these different normative frameworks are often overlooked in the philosophy of science literature. Some philosophers, for example, conflate value-freedom with Autonomy. Others do not notice that, although both Value-Ladenness and Autonomy are concerned with the issue of values in science, the former does not imply the latter, which, in turn, may conflict with some views about values in the internal phases of science. Social epistemologists seem to end up developing idealized models of the scientific community that are consistent with, or even supporting, VFI and Autonomy. There are also philosophers who maintain ambiguous positions with respect to these issues, in the sense that their works are open to multiple interpretations about how they conceive the relations among different normative views about science.

This situation is symptomatic of the fact that some debates in philosophy of science run in parallel, with little or no critical interaction. The most glaring case is the debate about the formal models of the scientific communities, which mainly focuses on their adequacy and functions, but which shows scarce concern for the image of science these models support more or less implicitly. But it is also the case for the debate about the use of democratic values, which is growing separate from the debate about value-ladenness. In short, philosophers have developed different and sometimes incompatible normative frameworks, without tackling the problem of how to choose between them. Since conceptual clarity is necessary to solve some philosophical problems, the critical map of the different normative theses about science presented in this article may be a first step for guiding philosophers in such an endeavor.

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1. Different philosophers have developed different classifications of the kinds of values that may play a role in science. Some have distinguished between ‘cognitive’ and ‘non-cognitive values’ (Longino 1996), or between ‘constitutive’ and ‘contextual values’ (Longino 1990, 2002). Kitcher (2011) distinguishes between ‘broad’, ‘cognitive’, and ‘probative schemes of values’. For the sake of brevity, in this article I speak of VFI as an ideal about the role of ‘epistemic’ and ‘non-epistemic values’, with the previous being those values traditionally accepted as good scientific standards and believed to be conducive to objective knowledge, and the latter being those traditionally associated with moral, social, and political standpoints. [↑](#footnote-ref-0)
2. In this article, I mainly focus on the issue of the political control of science. Of course, many would want science to be autonomous not only from political agendas, but also from other external intrusions, such as private financial interests. However, those who argue for the autonomy of science from corporations may also argue in favor of a stronger control of the state on science (this would be the case, for example, of Brown 2008). In order not to overcomplicate my argument too much, in this paper I take Autonomy to be about the autonomy of science from political control. [↑](#footnote-ref-1)
3. The terms ‘autonomy’ and ‘freedom’ are often used as synonyms, although some philosophers disentangle their underlying concepts. Dworkin (1998) argues that the fact that some agents are autonomous does not imply their right to freedom. For example, criminal organizations make decisions autonomously, but that does not mean that they have the right to do so. In this article I will not discuss whether autonomy and freedom are the same concepts or, if different, how and up to which point they are linked. For the present purposes, I will use the expressions ‘Autonomy Thesis’ and ‘Autonomy’ (rather than ‘Freedom Thesis’) mainly to avoid confusion with value-*freedom*. Finally, it is also worth reminding that many discussions about the concepts of freedom and autonomy have been developed by moral and political philosophers with regard to individuals, and then later applied to discuss the autonomy of institutions. This last point leads us to wonder whether Autonomy is about the autonomy of science as an institution or of scientists as individuals. For the moment, I can only acknowledge this issue without delving into it any further. [↑](#footnote-ref-2)
4. Compare DS1-DS4 with the premises of the argument from underdetermination, or ‘gap argument’ (G1-G4), and the premises of the argument from inductive risk, or ‘error argument’ (E1-E4), as analyzed by ChoGlueck (2018). [↑](#footnote-ref-3)