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Navigating Dissent by Managing Value Judgments: The Case of Lyme Disease

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Abstract

Recent philosophical literature has highlighted the complexities of handling dissent in science. On one hand, scientific dissent can be very harmful, as when "merchants of doubt" strategically appeal to dissent in order to undermine important environmental and public-health initiatives. On the other hand, scientific dissent can also be beneficial when it helps to promote scientific objectivity, progress, and public engagement. Some authors have responded to this tension by suggesting criteria for distinguishing normatively appropriate and inappropriate dissent, while other authors have suggested that it is more fruitful to alter the social context in which science operates in order to alleviate the negative effects of dissent over the long term. This paper proposes another approach that may be helpful for managing particularly challenging cases of scientific dissent. It argues that instances of scientific dissent often incorporate debates over value judgments, so many difficult cases of dissent can be navigated by: (1) identifying and highlighting those value judgments; and (2) managing those value judgments by drawing strategies from the extensive literature on values and science. The paper illustrates this approach by examining a case study of dissent over the treatment of long-term symptoms associated with Lyme disease.

1. Introduction

The phenomenon of scientific dissent (i.e., the challenging of widely held scientific positions) has recently received extensive attention among scientists, science-studies scholars, and society at large (see e.g., de Melo-Martín and Intemann 2018; Fleming 2020; McIlroy-Young et al. 2021). Philosophers of science have long recognized that the critical evaluation of scientific claims is central to scientific progress and objectivity (e.g., de Melo-Martín and Intemann 2014; Longino 1990; Popper 1963). However, dissent can also be misused by interest groups to challenge well-supported scientific claims and generate confusion for policy makers and publics. For example, it is now commonly recognized that the tobacco, chemical, and fossil fuel industries have deliberately tried to "manufacture doubt" about the harmful effects of their products (see e.g., Michaels 2008; Oreskes and Conway 2010). Thus, scientists, journalists, policy members, and publics face the difficult tasks of deciding how much weight to give dissenting scientific claims and when (if ever) to dismiss dissent as illegitimate and harmful.

Philosophers of science have proposed strategies for navigating this difficult terrain. One of the influential strategies is to develop criteria for distinguishing between dissent that is and that is not problematic (see e.g., Biddle and Leuschner 2015; Le Bihan and Amadi 2017; Leuschner and Fernández Pinto 2021; Miller 2021). This strategy is very helpful in egregious cases where dissenters clearly violate criteria for acceptable dissent. However, this approach can run into difficulties when it is unclear whether particular instances of dissent actually violate those criteria, and it does not specify what to do once problematic forms of dissent have been identified (de Melo-Martín and Intemann 2018). Another approach is to address the root causes that foster problematic dissent and that make it particularly harmful to society; one of the most important suggestions along these lines is to alleviate public distrust

in scientific institutions (de Melo- Martín and Intemann 2018; Goldenberg 2021). Unfortunately, a challenge associated with this strategy is that it is a long-term approach that does not provide clear guidance for handling scientific dissent in the short-term.

This paper argues for a new way of thinking about how to respond to scientific dissent. Specifically, it proposes that many difficult cases of scientific dissent can be analyzed as disputes over value judgments and that strategies for managing value judgments can therefore be used to help manage those instances of dissent. This way of approaching scientific dissent has the virtue of drawing on an extensive recent literature in the philosophy of science that discusses strategies for managing value judgments in scientific research (see e.g., Elliott 2022b; Holman and Wilholt 2022). Indeed, at least some previous efforts to manage dissent (such as those that attempt to distinguish appropriate and inappropriate forms of dissent based on the ways they handle inductive risk) can be regarded as examples of how one can draw on strategies for managing value judgments. This paper argues that it is important to recognize the full array of different strategies for managing dissent that can be drawn from the literature on values and science. To illustrate how these strategies can be applied in a specific case study, the paper examines scientific dissent over the treatment of long-term symptoms associated with Lyme disease. It identifies three ways in which the identification and management of value judgments can help to navigate scientific dissent in this case study.

The next section of the paper introduces the concept of scientific dissent and provides a brief overview of the difficulties associated with responding to it. Section 3 then highlights previous philosophical work on this topic and discusses why it is important to continue looking for creative approaches to handling it. Section 4 describes the approach proposed in this paper (namely, identifying and managing the value judgments associated with scientific dissent) and argues that it has significant potential for helping to navigate scientific dissent productively. Section 5 extends this argument by illustrating in a concrete fashion how this approach can help to work through scientific dissent over Lyme disease.

2. Tensions around Scientific Dissent

This paper draws on the definition of scientific dissent provided by Inmaculada de Melo-Martín and Kristen Intemann (2018) in their book, *The Fight Against Doubt*. They describe scientific dissent as disagreement or criticism directed toward scientific claims that are widely accepted (2018, 5-6). They emphasize that employing the term 'scientific dissent' is not intended to express the normative idea that the dissent is scientifically legitimate but is rather intended to express the descriptive fact that it involves dissent about scientific claims (rather than, say, political claims).

Scientific dissent has recently garnered widespread attention for at least two reasons. First, as mentioned in the Introduction, it has become clear that some industry groups have latched onto scientific dissent as a tool that can be used to advance their financial interests. As the tobacco industry worked with prominent public relations firms to slow down government regulation of their products, they famously declared in an internal memo that "doubt is our product" (Michaels 2008; Oreskes and Conway 2010). In order to foster doubt among policy makers and members of the public about the harmfulness of tobacco, they developed a wide array of strategies designed to challenge scientific findings that threatened their profits while producing and disseminating their own preferred scientific findings (Elliott 2016; Proctor 2011). In their influential book, *Merchants of Doubt*, Naomi Oreskes and Eric Conway (2010) showed how many of the same strategies adopted by the tobacco industry were

later adopted by companies seeking to slow down actions in response to acid rain, the ozone hole, and climate change. Similar strategies have also been adopted by pharmaceutical companies in their efforts to challenge claims about harmful side-effects associated with their products (Holman and Elliott 2018; McGarity and Wagner 2008).

A second reason for contemporary concerns about scientific dissent is that misinformation and disinformation about many topics, including science, have become increasingly widespread. For example, Cailin O'Connor and James Weatherall (2019) have discussed the ways in which contemporary social media networks can facilitate the generation and dissemination of misinformation. The COVID pandemic highlighted both the prevalence of scientific misinformation and the significant dangers associated with it. Over the course of the pandemic, misinformation spread about the effectiveness of different treatments, the safety and effectiveness of vaccines, the severity of the disease, and even its very existence (Fleming 2020). Many scientists took efforts to combat this misinformation, and major organizations like the World Health Organization and the American Association for the Advancement of Science also took steps to address it (Orman 2021; World Health Organization 2021). Thus, even though not all scientific dissent is caused by misinformation, contemporary concerns about misinformation have given even more urgency to the related concerns about scientific dissent.

Nevertheless, it is not an easy matter to combat scientific dissent in a responsible fashion. One cannot merely squelch all efforts to challenge widely held scientific views; there is a danger of becoming overly dogmatic and shutting down legitimate differences of opinion. After all, openness to criticism is a hallmark of some conceptions of scientific objectivity; as Helen Longino puts it, "Not only must dissenting scientific voices not be discounted; they must be cultivated" (Longino 2002, 132). Along similar lines, neuroscientist Stuart Firestein (2012) warns that inquiry should always be treated as unfinished, lest potentially valuable questions be shut down. Some scholars working in the field of environmental policy have even coined a new term, 'manufactured consensus', to describe the phenomenon of claiming that there is a scientific consensus even though there are reasonable opposing views (McIlroy-Young et al. 2021). This activity can be detrimental because it shuts out legitimate perspectives that could contribute to more robust, thoughtful scientific research programs and policy decisions.

Responding to scientific dissent in an overly aggressive fashion can also damage relationships between the scientific community and the broader society. When scientists are constantly focused on the public's vulnerability to misinformation, they may be less likely to listen to the perspectives of non-specialists and to engage in community-based research projects. This would be a significant loss because community-based research can help generate science that is of higher quality, more responsive to public needs, and more likely to be accepted by community members (Corburn 2005; Elliott 2017; Ottinger and Cohen 2011). Another problem is that when complex policy disputes involving science are treated as if they are caused primarily by misinformation and inappropriate forms of scientific dissent, this can generate an impoverished, simplistic understanding of the disputes and reduce the opportunities for developing creative solutions to them (Goldenberg 2021; Hicks 2017). Finally, science journalism can also be damaged by dogmatic responses to scientific dissent, insofar as journalists may be less likely to report on legitimate minority viewpoints that merit consideration. For example, some commentators contend that journalists were initially too focused on trying to report a consensus scientific position about the origins of COVID, and as a result they failed to identify the weaknesses of that "consensus" position and the presence of opposing scientific views (Thacker 2021). Interestingly, this situation

further highlights the difficulties of handling scientific dissent responsibly, because science journalists' efforts to focus on a consensus position were probably stimulated at least in part by the criticisms they received previously for being too open to illegitimate dissent when reporting on climate change (see e.g., Boykoff and Boykoff 2004). Journalists can take steps to assess the reliability of dueling sources of testimony (see e.g., Godler et al. 2020), but it is still not always easy to decide which dissenting views to discuss and how to frame them.

In sum, scientists, journalists, policy makers, and publics face serious challenges when responding to scientific dissent. It is clear that powerful interest groups have used scientific dissent as a strategic tool to delay important public policy decisions, and at least some scientific dissent is a result of misinformation and disinformation campaigns. However, there are dangers associated with clamping down too aggressively on scientific dissent: it can foster an unwillingness to consider opposing views, a lack of respect for community members, a narrow-minded approach to public policy decisions, and an impoverished approach to scientific journalism. The next section briefly considers some of the strategies that philosophers have proposed for responding to these difficulties.

3. Two Previous Approaches to Navigating Scientific Dissent

One of the most common philosophical strategies for responding to scientific dissent is to develop criteria for distinguishing between dissent that is appropriate and dissent that is inappropriate. Justin Biddle and Anna Leuschner (2015) developed a particularly influential version of this strategy (see also Leuschner and Fernández Pinto 2021; Leuschner and Fernández Pinto 2022). They introduced the concept of "epistemically detrimental dissent" (EDD), which refers to dissent that impedes knowledge production, in contrast to other forms of dissent that can enhance knowledge production.[1] They ultimately proposed four conditions that are jointly sufficient for dissent about a hypothesis, H, to be epistemically detrimental:

1. The nonepistemic consequences of wrongly rejecting H are likely to be severe.
2. The dissenting research that constitutes the objection violates established conventional standards.
3. The dissenting research involves intolerance for producer risks at the expense of public risks.
4. Producer risks and public risks fall largely upon different parties. (Biddle and Leuschner 2015, 273)

They call this an "inductive risk" account of EDD because some of the conditions focus on the risks associated with accepting dissenting views that ultimately turn out to be wrong.

Others have developed a variety of different accounts of problematic dissent that either build on Biddle and Leuschner's conditions or that suggest other conditions. For example, Le Bihan and Amadi (2017) distinguish between "contingent enabling factors," which can contribute to EDD only under specific conditions, from "stable difference makers," which cause EDD under a very wide variety of conditions (see Woodward 2010 for a discussion of this distinction). They argue that only Biddle and Leuschner's second condition is a stable difference maker, whereas the other three conditions are

[1] Throughout this paper, I will typically refer to "appropriate" and "inappropriate" dissent rather than using Biddle and Leuschner's language of "epistemically detrimental" dissent. I think it is at least possible that dissent could be inappropriate for reasons other than being epistemically detrimental, and dissent could potentially be appropriate in some cases even if it is epistemically detrimental. See also de Melo-Martín and Intemann's (2018) concept of "normatively inappropriate dissent."

contingent enabling factors. Miller (2021) also builds on Biddle and Leuschner's account and suggests three conditions, each of which is sufficient for dissent to be problematic: "(1) its generation process is politically illegitimate; (2) it imposes an unjust distribution of inductive risks; (3) it adopts evidential thresholds outside an accepted range" (Miller 2021, 920). Other potential criteria for problematic dissent focus on whether it was generated in bad faith (e.g., Oreskes and Conway 2010), whether it abides by rules for productive criticism (e.g., Longino 1990, 2002), and whether it reflects appropriate expertise or background knowledge (e.g., Oreskes 2019).

Despite the apparent benefits of developing criteria for distinguishing between appropriate and inappropriate forms of scientific dissent, de Melo-Martín and Intemann (2018) suggest two reasons for thinking that this approach will not always be adequate. First, they contend that it can be very difficult to distinguish between appropriate and inappropriate forms of scientific dissent. In their book (2018), they argue that none of the available criteria are entirely successful; in practice, the criteria invariably end up allowing some inappropriate forms of dissent or excluding some appropriate forms of dissent. Second, de Melo-Martín and Intemann (2018) argue that even if one could reliably identify inappropriate forms of scientific dissent, it would not always be very helpful for addressing the scientific and social problems caused by problematic scientific dissent. One might still face very difficult decisions about what to do with problematic forms of dissent—for example, would one ban them, or challenge them, or try to discredit those spreading the dissenting views? De Melo-Martín and Intemann (2018) suggest that none of these solutions are particularly promising.

Of course, one could argue that de Melo-Martín and Intemann have overestimated the difficulties involved in developing criteria for distinguishing between appropriate and inappropriate dissent. For example, Miller (2021) specifically developed his three criteria in an effort to address de Melo-Martín and Intemann's (2021) concerns with previous criteria. However, although it may in fact be possible to use criteria like Miller's to identify egregious forms of dissent that are clearly problematic, there are still likely to be numerous cases that are difficult to classify. For example, there have been fierce debates about whether endocrine disrupting chemicals like bisphenol A (BPA) are harmful at the levels to which most people are currently exposed to them. Some commentators have worried that those who adopt dissenting views about the harmfulness of endocrine disruptors are heavily influenced by the chemical industry and that they ignore compelling evidence from independent sources (e.g., Horel and Foucart 2020). Thus, one might regard this as a case similar to that of tobacco or climate change, where dissenting views are illegitimate. However, others have argued that the situation is more complex than it seems and that dissenting views about endocrine disruptors should not be dismissed out of hand (see e.g., McIlroy-Young et al. 2021). In cases like this, people are likely to disagree about whether Miller's criteria are met. This paper is focused particularly on these "difficult" or "challenging" cases of dissent where it is somewhat unclear whether or not they cross the line and meet the criteria for being inappropriate.

Given the difficulties that can arise when distinguishing between appropriate and inappropriate forms of scientific dissent, de Melo-Martín and Intemann (2018) suggest a very different strategy for responding. They argue that it is better to shift focus from scientific dissent itself to the root causes that make dissent problematic, and the root cause on which they focus is distrust. They contend that when the public believes that scientific institutions are trustworthy, then dissenting scientific views are much less likely to gain traction and cause social problems. Thus, they contend that those who are concerned about scientific dissent should focus their attention on promoting efforts to alleviate distrust in science,

such as by addressing the commercialization of academic research, scientific misconduct, and problematic value influences on science.

Others have proposed similar approaches to handling scientific dissent. For example, in her analysis of vaccine hesitancy, Maya Goldenberg (2021) argues that it is a mistake to approach this phenomenon as a "war on science" characterized by scientific misinformation that needs to be combated. Instead, like de Melo-Martín and Intemann, she argues that it reflects a lack of trust in scientific institutions and that the solutions lie in forging more healthy relationships between scientists and publics. In a similar vein, Megan Halpern and I argue that the key to fostering more effective scientific communication about controversial topics like vaccination is not to focus on correcting erroneous scientific claims but rather to attend to the underlying meanings and experiences that different groups associate with the controversial scientific issues (Halpern and Elliott 2022). By fostering opportunities for developing shared meanings and experiences, we suggest that opposing groups can eventually move forward more productively and alleviate the social conditions that make scientific dissent so problematic.

Although there is much to be said for this second category of approaches for navigating dissent (i.e., those that attempt to address the root causes of social problems associated with dissent), they face an important limitation. Fostering trust and creating opportunities for shared meaning making typically require a great deal of time, effort, and institutional change. Thus, even though these efforts might ultimately be worthwhile, they do not address the difficult decisions that frequently need to be made about how to manage scientific dissent in the short term. In the midst of disputes over scientific dissent, scientists need guidance about when to challenge dissenting views, policy makers need help figuring out which views to consider when making decisions, journalists need guidance about how to discuss dissenting views responsibly, and publics need guidance for deciding who to trust and what to do. Although approaches that focus on long-term changes to the scientific community can occasionally offer short-term suggestions as well, such approaches are not ideally placed to provide that kind of advice.

In sum, existing philosophical approaches for navigating scientific dissent offer valuable insights for addressing some situations, but further work is needed to address the full array of challenges posed by scientific dissent. In some cases, it may be feasible to use criteria like those of Biddle and Leuschner (2015) or Miller (2021) to identify dissenting views that are clearly inappropriate or detrimental. In other cases, it may be possible to alleviate the harmful social effects of dissenting views by fostering trust and forging better relationships between scientists and publics. However, there are also difficult cases where decisions need to be made in the short term about how to navigate dissenting views, and there is considerable room for disagreement about whether the dissenting views are inappropriate or not. The goal of this paper is to offer additional strategies that may prove helpful in these particularly difficult cases.

4. A Way Forward: Navigating Scientific Dissent by Managing Value Judgments

This paper proposes a way forward for handling difficult cases that cannot be handled easily using existing strategies for navigating scientific dissent. It argues that these difficult cases of scientific dissent can often be fruitfully analyzed as disputes over value judgments, so these cases can potentially be managed by employing strategies that have already been developed for managing value judgments in science. Thus, the approach proposed in this paper has two parts: (1) identifying and highlighting key value judgments that underlie dissenting views; and (2) managing those value judgments by drawing on

strategies from the literature on values and science. This general approach is appealing because the vibrant philosophical literature on values and science provides a wide array of resources for those seeking to navigate scientific dissent. This section defends this approach by first clarifying how cases of scientific dissent can be treated as disputes over value judgments and then by showing how the literature on managing value judgments in science can provide promising resources for responding to scientific dissent. The following section then provides a concrete illustration of the contributions that this approach could make to addressing scientific dissent in a specific case study.

First, to defend the position that difficult cases of scientific dissent can often be treated as disputes over value judgments, one need only consider the kinds of arguments that dissenters generally offer to counter widely accepted views. They almost invariably appeal either to evidence that favors a dissenting view, or to evidence that seems to conflict with the widely accepted view, or to theoretical considerations that favor a dissenting view, or to theoretical problems that afflict the widely accepted view (see e.g., Harker 2015). For example, those who challenge evolutionary theory have often argued that there are not as many "transitional forms" in the fossil record as one would expect if evolutionary theory were correct. They also sometimes argue that it is unlikely that natural selection would be sufficient to transform one species into another one, and they argue that we do not typically observe such transformations in "real time." Or consider those who have questioned the safety of childhood vaccines. Some have pointed to cases where children appeared to develop autism very soon after being vaccinated. The medical community has engaged in epidemiological studies that vindicate the safety of vaccines, but there are always value judgments involved in assessing the strength of these sorts of studies. For example, one has to consider whether the studies had sufficient statistical power, whether the inclusion and exclusion criteria for study participants were reasonable, and whether the data analysis and interpretation were compelling. Of course, those who maintain mainstream scientific views about evolutionary theory and vaccine safety reject the argumentative moves made by dissenters. In the evolutionary case, the mainstream view is that there is overwhelming evidence for common ancestry and that the theoretical objections posed by the dissenters are not convincing. In the autism case, the mainstream view is that there have been enough high-quality epidemiological studies to provide compelling evidence that there is no connection between vaccines and autism. Ultimately, one could probably resolve these cases by showing that the dissenting views violate the sorts of criteria developed by Biddle and Leuschner (2015) or Miller (2021). However, we can see that even in these relatively "easy" cases there are often disputes about value judgments, and these disputes end up being all the more significant in the difficult cases where it is more challenging to assess whether or not the dissent is appropriate.

Broadly speaking, a value judgment can be defined as a choice that involves weighing or assessing desirable features of something (i.e., values) rather than following fixed rules (Elliott 2022b). In Thomas Kuhn's (1977) classic analysis of value judgments in science, he argued that theory assessment rests on two kinds of value judgments: (1) assessing the extent to which particular theories display particular values; and (2) deciding how much weight to place on different values when rival theories display them to differing extents. Since then, scholars have pointed out that scientists also make value judgments when assessing whether particular sets of data provide evidence for particular conclusions (Longino 1990), when deciding how much evidence is sufficient for drawing conclusions (Douglas 2009), when choosing what counts as a good theory or model (Elliott and McKaughan 2014; Intemann 2015), and when deciding how to conceptualize scientific phenomena (Alexandrova 2018; Ludwig 2016).

Thus, debates over how to weigh conflicting evidence and theoretical considerations (the kinds of debates typically associated with scientific dissent) can be characterized as disputes about value judgments. Those who challenge evolutionary theory on the basis of the fossil record are making the value judgment that the paucity of transitional forms constitutes a compelling form of evidence against the theory, whereas the mainstream view is that it either does not count as countervailing evidence at all or that it is not sufficient to override the vast body of evidence in favor of evolutionary theory. The same argumentative dynamics are present in the case of scientific dissent about vaccine safety. Proponents of the dissenting view adopt the value judgment that cases of autism that manifest after children are vaccinated count as evidence against the safety of childhood vaccines, while those who accept the mainstream view either do not regard this as a convincing form of evidence or they claim that it is overridden by the randomized controlled trials (RCTs) indicating that there is no correlation between childhood vaccinations and the incidence of autism. In other words, when scientists debate how much weight to place on particular pieces of evidence or particular theoretical considerations as part of their disputes over dissenting views, they are making value judgments.

One might object, however, that even if difficult cases of scientific dissent often involve disputes about value judgments, there are still many instances of scientific dissent that do not fit this pattern. In other words, one might think that scientific dissent is often generated by ignorance, error, corruption, or misinformation rather than by disagreements about value judgments. For example, in cases of scientific dissent about the safety and effectiveness of COVID vaccines, one might think that most dissenters simply accept false claims that they see on social media or trust unreliable sources of information rather than making value judgments about the nature of the available evidence.

One can develop a three-pronged response to this objection. The first prong is to acknowledge that there are likely to be some clear cases in which dissent can be ruled out as unacceptable based on criteria like those developed by Biddle and Leuschner (2015) or Miller (2021), so appealing to disputes about value judgments will not always be necessary or helpful. The second prong of the response is to emphasize that even if there are some cases in which the approach proposed in this paper is either unnecessary or unhelpful, there are still a number of difficult cases of dissent that can be fruitfully addressed by seeking to manage disputed value judgments. The third prong is to argue that disputes about value judgments play a role in more cases of scientific dissent than one might initially think. For example, disputed value judgments can still have an important role to play in some cases of scientific dissent even if not all dissenters are aware of them. In the example of the COVID vaccines given above, for instance, the average person who accepts false claims on social media might not be making value judgments about evidence, but if one wanted to rationally reconstruct the arguments and determine whether COVID vaccines were actually safe and effective, there might indeed be important value judgments at stake. Moreover, the dissenting physicians who help to peddle questionable claims and give them legitimacy on social media might very well be arriving at their views based on some of these underlying value judgments about how to interpret the available evidence. Those accepting false claims on social media might also be making implicit value-laden judgments about what sorts of information sources and experts are trustworthy (Miller 2014). In addition, when the underlying factors at play in a case of scientific dissent are debated, there are often “higher-level” value judgments to be made about how to interpret the situation. For example, one commentator looking at the case of scientific dissent about COVID vaccines might insist that there are not really any legitimate value judgments at stake and that the dissent is solely the product of ignorance, error, and corruption. In contrast, another

commentator might make a different value judgment about how to interpret the situation and contend that there really are legitimate value judgments to be made, even if many of the dissenting parties are actually influenced by factors like misinformation or corruption.

If one can indeed interpret many difficult cases of scientific dissent in terms of disputes about value judgments in science, then one can look to the literature on managing value judgments as a source of resources for navigating scientific dissent. There are currently a wide variety of management approaches on offer, as illustrated by a recent special issue on this topic that was edited by Bennett Holman and Torsten Wilholt. In their introduction to the special issue (Holman and Wilholt 2022), they distinguished five different categories of approaches for distinguishing between "legitimate" and "illegitimate" influences of values in science: (1) axiological approaches that focus on identifying the "right" values that ought to influence value judgments in science; (2) functionalist approaches that focus on the "roles" that values play and that distinguish appropriate roles for values from inappropriate roles; (3) consequentialist approaches that focus on the consequences that particular values and value judgments have on science; (4) coordinative approaches that focus on whether the value judgments being made align properly with the expectations of other scientists or decision makers; and (5) systemic approaches that focus on whether the overall scientific community is structured in an appropriate way to critically assess value judgments.

When applying these sorts of management approaches to cases of scientific dissent, it is helpful to make four clarifications. First, one does not have to frame the management of value judgments in difficult cases of dissent as a binary issue of distinguishing between *legitimate* and *illegitimate* value judgments. One could instead frame the management of value judgments as a matter of assessing whether value judgments are *more* or *less* appropriate and employing strategies for dealing with judgments when there is disagreement about how appropriate they are. Second, when managing value judgments in cases of scientific dissent, the key questions at issue are likely to be somewhat different from the questions involved in managing value judgments in other contexts. For example, in cases of scientific dissent, one might be interested in determining whether particular value judgments made by dissenters achieve a *minimum* level of acceptability; in contrast, other discussions about managing value judgments typically focus on how to achieve the *best* or *optimum* judgments (for more on this distinction, see Douglas 2014). A third clarification is that one need not focus on only one of the five management categories proposed by Holman and Wilholt (2022). For example, I have suggested managing value judgments in science by developing a set of norms for good science (Elliott 2022b; see also Resnik and Elliott 2019; Koskinen and Rolin 2022), and I have suggested that those norms can be drawn from a variety of the categories. Finally, there are many insights in the literature on managing value judgments that are not explicitly captured by these five kinds of management strategies; thus, when drawing from this literature one should maintain an open posture toward the full array of conceptual resources available.

When the literature on managing value judgments in science is interpreted in accordance with these four clarifications, it suggests a wide variety of strategies for navigating dissent. For example, consider at least six different "strands" of this literature that could be helpful to pursue in future work. First, one could draw on previous scholarship that has emphasized the importance of pursuing transparency about value judgments (Douglas 2008; Elliott and Resnik 2014; Stanev 2017). One might find that dissenting views are more likely to be acceptable when the questionable value judgments underlying them are clearly communicated so that the recipients of the dissenting views can decide how

they want to respond. This literature concerning transparency about value judgments might also provide guidance for science journalists who have to decide how to communicate responsibly about dissenting scientific views (Elliott 2019). Second, one could draw on the literature that discusses procedural approaches for managing value judgments. For example, a number of philosophers have suggested ways to foster engagement between community members and scientists in order to reflect together on the best ways to handle disputed value judgments (see e.g., Douglas 2005; Elliott 2017; Schroeder 2021). Some of these same procedures could potentially be useful for deciding how to handle instances of scientific dissent. Third, one could draw from the literature that discusses ways of structuring scientific communities in order to foster transformative criticism of value judgments (see e.g., Longino 2002; Rolin 2017). When a scientific community has this kind of structure and has reached something approaching a consensus, it might be relatively safe to ignore dissenting views coming from outside the scientific community, whereas it might be less safe to set aside dissenting views when the scientific community is not as well structured (Miller 2013; Oreskes 2019).

A fourth way to draw on the literature about managing value judgments would be to explore how attention to the aims of inquiry could help guide responses to scientific dissent (for more about the aims of inquiry, see Fernández Pinto and Hicks 2019; Lusk and Elliott 2022; Intemann 2015). For example, when dissenting views run counter to the overall aims of an applied field of science (e.g., conservation biology or environmental health) or a particular institution (e.g., the U.S. Centers for Disease Control or the U.S. Environmental Protection Agency), one might give it less attention than when the dissenting view could help to support those aims. Fifth, one could draw on the literature that discusses how attention to cognitive attitudes could help with managing value judgments. Some authors have drawn distinctions between the cognitive attitudes of *believing* a hypothesis to be true as opposed to *accepting* it as a basis of action or *entertaining* it as a possibility worth investigating (DiMarco and Khalifa 2020; Elliott and Willmes 2013; Lacey 2017). This literature could be used to clarify the fact that a dissenting view might be acceptable to consider or pursue even if it were not appropriate to believe or employ as a basis for public policy making. Sixth, along a similar vein one could draw on the literature that discusses how to manage value judgments when deciding what to say or communicate in various contexts (Franco 2017; John 2019). For example, Stephen John (2019) argues that it would be more fruitful to explore the role of values in decisions about what to *communicate* rather than focusing on the role of values in assessing the *justification* of scientific claims. Building on this literature, one might find that there are fruitful distinctions to be made between the contexts in which particular dissenting views are appropriate to communicate and the contexts in which they are not.

One might even be able to conceptualize some of the existing proposals for handling scientific dissent under the general framework proposed here. For example, one could regard Biddle and Leuschner's (2015) or Miller's (2021) accounts of epistemically detrimental dissent as a form of what Holman and Wilholt (2022) call the axiological strategy for managing value judgments. In other words, these figures argue that some forms of dissent employ such ethically problematic values (namely, the acceptance of unacceptable tradeoffs between risks to producers and risks to publics) that those forms of dissent are simply unacceptable. However, my contention is that we needlessly limit ourselves in responding to scientific dissent if we focus on this strategy alone. There may be many cases of scientific dissent where it is less clear that the dissent is entirely inappropriate, and yet the dissenting view could still cause social harm if careful efforts are not taken to manage it in a thoughtful fashion. Moreover, there may be many cases of dissent that do not lend themselves to being analyzed in terms of Holman

and Wilholt's axiological strategy. By focusing more broadly on the full range of ways that value judgments can be managed in science, we open the door to a richer array of strategies for managing scientific dissent.

Nevertheless, despite the potential promise of all the approaches for managing value judgments listed in this section, these suggestions are still somewhat general and superficial. They are intended largely to highlight the potential value of this way forward and to chart out potential opportunities for future scholarship. To strengthen the argument that the literature on managing value judgments can help to navigate cases of scientific dissent, it is helpful to examine in more detail how some of these suggestions could play out in a concrete case. The next section of the paper turns to this task.

5. A Case Study: Lyme Disease

To illustrate how the general approach described in this paper could prove fruitful for addressing scientific dissent in specific cases, this section briefly examines a case study involving the treatment of long-term symptoms associated with Lyme disease. Lyme disease is a bacterial infection spread by particular species of ticks, and when it is untreated it can cause a range of serious symptoms including arthritis, heart problems, memory loss, confusion, and headaches. Medical guidelines call for the disease to be treated with short courses (10-28 days) of antibiotics, and the standard view accepted by major medical organizations and the U.S. Centers for Disease Control (CDC) is that relatively few patients experience ongoing symptoms after treatment (Auwaerter et al. 2011b). According to the mainstream view, patients who do continue to have symptoms can be treated with another short course of antibiotics, but they should not be given long-term courses of antibiotics (Lantos 2011; Stanek et al. 2012). On this view, most cases of long-term symptoms following treatment are probably attributable to other ailments, such as chronic fatigue syndrome or fibromyalgia (Auwaerter et al. 2011a). However, some patients, clinicians, and researchers dissent from this widely accepted view. They claim that a relatively large number (perhaps 10-20%) of treated patients experience long-term symptoms associated with Lyme disease (ILADS 2020). Moreover, many of these dissenters argue that the long-term symptoms could be associated with an ongoing bacterial infection and that long-term antibiotic treatment can sometimes be helpful for these patients (Berndtson 2013; ILADS 2020).

These "Lyme Wars" are very complex, and they incorporate a wide range of disputed claims about the behavior of the bacterium that causes Lyme disease and the ticks that spread it, the best methods of diagnosing the disease, the geographic distribution of the disease, the causes of long-term symptoms, and of course the best methods for treating those symptoms (Dumes 2020; Fallon and Sotsky 2017; Pfeiffer 2018). For the purposes of this case study, I will focus only on a single topic of dissent, namely, whether long-term antibiotic treatment could be appropriate for those suffering from persistent symptoms. The mainstream view on this issue is based largely on several randomized, controlled trials (RCTs) that are generally interpreted as showing no benefit for patients (Fallon et al. 2008; Klempner et al. 2001; Krupp et al. 2003). Given that long-term antibiotic use, especially when administered intravenously, can have serious side effects for patients, mainstream medical guidelines advise against this form of treatment (Lantos et al. 2021). Those who dissent from this view argue that the evidence provided by these RCTs is not compelling and that there is at least some suggestive evidence indicating that long-term antibiotic treatment, including intravenous treatment, could be helpful for some patients (DeLong et al. 2012; Maloney 2016). These dissenters lament that physicians

who prescribe this form of treatment for desperate patients risk being censured by state medical boards for acting against the established medical guidelines (Johnson and Stricker 2009).

This case clearly illustrates how value judgments can be crucial to difficult cases of scientific dissent. High-profile experts responsible for advising the medical community about how to respond to Lyme disease label the dissenting view as "antiscientific, baseless and unethical" (Auwaerter et al. 2011b, 68; see also Auwaerter et al. 2011a). Thus, they would presumably dismiss dissenting views in this case based on criteria like those propounded by Miller (2021). Nevertheless, there are reasons to think that this could be a difficult case where there is room for disagreement as a result of multiple value judgments that need to be assessed. First, there are numerous case reports of Lyme patients who made dramatic improvements on this form of therapy (Pfeiffer 2018), so one must decide how much weight to give this form of evidence relative to the evidence from RCTs. Second, some of the RCTs did find evidence that long-term antibiotic therapy provided benefits on some endpoints (e.g., fatigue) for particular periods of time (Fallon and Sotsky 2017); therefore, one must consider how much significance to place on those improvements. Third, one must consider a variety of potential weaknesses in the study designs of the RCTs and evaluate whether they still provide adequate evidence for the conclusion that long-term antibiotic therapy is ineffective (Maloney 2016). One of these weaknesses is that the patients included in at least some of the studies had already received fairly extensive treatment with antibiotics, so they might have been less likely to benefit than other patients (Fallon and Sotsky 2017). Another weakness is that the RCTs focused solely on treatment with a single antibiotic, whereas the clinicians who engage in long-term antibiotic therapy often use combinations of different drugs and other therapies designed to maximize the effectiveness of the antibiotics against what these clinicians consider to be highly recalcitrant infections (Pfeiffer 2018). Some critics of the RCTs also consider them to be statistically underpowered (DeLong et al. 2012). Thus, even though high-profile experts appear to dismiss dissent in the Lyme case as inappropriate, this seems to be a difficult case where the management approach proposed in this paper could be helpful.

As discussed in the previous section, physicians, patients, and policy makers could attempt to manage these disputed value judgments in a number of different ways, depending on which management strategies from the literature on values and science seemed most helpful and feasible. This section briefly considers three specific approaches that could potentially help to navigate dissent in the Lyme case: (1) reflection on cognitive attitudes and communicative strategies, (2) transparency about the value judgments and major considerations underlying them, and (3) engagement between stakeholders and community members. Although none of these approaches provide simple solutions that resolve all difficulties, they do provide avenues for moving forward in productive ways.

First, let us consider how attention to cognitive attitudes and communicative strategies could be helpful. The central idea of these sorts of approaches is that physicians, clinical researchers, and policy makers seeking to navigate dissent could employ nuanced cognitive attitudes toward the dissenting view and employ different approaches to communicating about it in different contexts (see e.g., Franco 2017; John 2019; McKaughan and Elliott 2015). For example, suppose a clinical researcher studying Lyme disease concluded that there was not enough evidence for the dissenting view about long-term antibiotics to believe it or even to accept it under most circumstances. If they took this view, they might conclude that it would generally be inappropriate to communicate about the dissenting view. Thus, they might advise government agencies like the CDC and the National Institutes of Health (NIH) to focus on communicating the mainstream view in their messaging and on their websites. They might also advise

that clinical practice guidelines be formulated in such a way that the guidelines focus solely on describing the mainstream view.

However, the benefit of exploring ways to navigate dissent with creative cognitive attitudes and communicative strategies is that it suggests the possibility of communicating about or entertaining or acting on the dissenting view in some contexts. For example, in some unique situations the risk/benefit profile of acting on or communicating about the dissenting view might be different from more typical situations. In cases where patients were suffering from severe long-term symptoms that could not be alleviated by other means, it might make sense for clinicians to discuss the dissenting view with them so they could decide whether the (admittedly speculative) potential benefits might outweigh the known risks. If the patients concluded that they were willing to face the risks for the sake of the possible benefits, it might also be appropriate for their clinicians to act on the dissenting view and provide the patients with long-term antibiotics (even if the clinicians did not believe the dissenting view to be correct; Elliott and Willmes 2013). However, even if it were appropriate to provide this form of treatment for patients, further deliberation would be needed in order to determine whether health insurance companies or government-run health systems should pay for the treatment despite the limited evidence in support of it. And even if one concluded that there was not enough evidence to reimburse such treatment, one might still think that there was enough evidence to pursue further research related to it (DiMarco and Khalifa 2019), especially given the desire to find new strategies to help patients struggling with debilitating long-term symptoms that might be associated with Lyme disease.

Even the communications provided in clinical practice guidelines for treating Lyme disease could be nuanced in a variety of ways. For example, the guidelines could include the explicit caveat that they should be treated as default options that can legitimately be overridden under some circumstances. This kind of nuance is important because those who hold dissenting views contend that the current guidelines are treated more like rigid rules than guidelines. According to proponents of the mainstream view, these guidelines are exactly that—guidelines—and physicians are able to deviate from them in order to meet the unique needs of specific patients (Auwaerter et al. 2011b). However, those who hold the dissenting view argue that the guidelines are actually employed in a much more coercive manner in practice (Johnson and Stricker 2009). They contend that physicians have been brought before medical licensing boards and threatened with losing their medical licenses because of their willingness to prescribe long-term antibiotics in contravention of the guidelines. Moreover, they emphasize that insurance companies are often unwilling to reimburse medical procedures that do not accord with the guidelines.

A second strategy for navigating dissenting views in the Lyme case is to explore ways to incorporate transparency into communications about it. As discussed earlier, transparency helps account for the differing values that different individuals and communities bring to situations of dissent (Elliott 2022a). For example, most people are likely to respond to the inductive risk associated with accepting the claim that long-term antibiotics are helpful by concluding that there is far too little evidence to accept it; however, some chronically ill patients might be so desperate that they would weigh the risks and benefits differently. By providing some information about the dissenting view, communicators could help those patients to make decisions that accord with their own values. For example, even if government websites were to focus on communicating the mainstream view, they could still provide enough information about the dissenting view to alert desperate patients to the

possibility that they might want to investigate it further or ask their clinicians about it. For example, the NIH website provides the following information: “Multiple clinical trials, funded by NIH and others, have shown no benefit to additional IV antibiotic treatment in patients with Lyme disease, although the interpretation of those results have been challenged by some” (NIH 2018). By notifying readers about the presence of dissenting voices, the NIH provides them the opportunity to seek out additional information.

Of course, there are dangers associated with transparency as well as benefits. In cases of dissent, one of the most important dangers is that people could develop the inaccurate impression that the dissenting view is more plausible than it really is. For this reason, some critics might argue that it is better in most situations to avoid being transparent about dissenting views. However, I have emphasized that transparency can take many different forms, and it may be possible to be transparent in ways that achieve many of the ethical benefits of transparency without generating too many harms (Elliott 2022a). For example, the NIH website acknowledged the presence of dissenting views while making it clear that the mainstream view is to avoid long-term antibiotic therapy. Although it is a complex matter to decide when there is enough evidence to justify discussing dissenting views, there seems to be enough disagreement among legitimate researchers in this case to justify some acknowledgment of the dissenting view (Fallon and Sotsky 2017). However, it is also important for transparency to go both ways. If clinicians communicate to desperate patients about the possibility of employing long-term antibiotics, it is also crucial to be transparent about the fact that most experts recommend against employing treatment of this sort.

A third strategy for navigating dissenting views in the Lyme case is to pursue engagement between different stakeholders and community members in a procedural effort to arrive at reasonable responses to the dispute. This strategy can, of course, be employed in conjunction with other strategies. For example, given the complex issues involved in deciding when to communicate about or act on the dissenting view about antibiotic therapy, engagement provides important opportunities to help gather differing perspectives about these issues and reason through their strengths and weaknesses (Douglas 2005; Elliott 2011). And, in fact, this strategy has been implemented. In response to persistent complaints from dissenters about the hegemony of the mainstream view regarding Lyme disease, the U.S. Congress created a Tick-Borne Disease Working Group (TBDWG) in 2016 as part of the 21st Century Cures Act.[2] Designed to guide the federal government in its response to tick-borne diseases, the group consists of fourteen voting members, with seven of them coming from the public and seven from government agencies. The public members are supposed to represent a range of perspectives, including those of clinicians, researchers, and patients. Ideally, a deliberative approach like the TBDWG could arrive at reasonable strategies for navigating many different facets of the Lyme dispute: (1) deciding how to allocate research efforts between the mainstream view and the dissenting view; (2) choosing when and how to communicate about the dissenting view; and (3) determining whether to reimburse treatment performed in accordance with the dissenting view.

Although it remains to be seen how the TBDWG will ultimately affect the debate over Lyme disease, the strengths and weaknesses of these sorts of deliberative bodies have been widely discussed. On one hand, they provide opportunities to foster deliberation about difficult decisions in a manner that is ideally both ethically sound and practically helpful. When these deliberative bodies incorporate lay

[2] See https://www.hhs.gov/ash/advisory-committees/tickbornedisease/index.html

people as well as experts, they can generate better decisions by incorporating not only expert knowledge but also the lay expertise and lived experiences of non-specialists (Douglas 2005; Elliott 2011). On the other hand, these sorts of deliberative bodies also have weaknesses (e.g., Kourany 2018; Harvard and Werker 2021). For example, the outcomes of a working group's deliberations are likely to be heavily dependent on the makeup of the group itself (e.g., Miller and Pinto 2022). One can shift a group toward being more or less accepting of a dissenting view like long-term antibiotic therapy by altering who has the opportunity to participate in it. And even when the participants do not have preconceived notions about the appropriateness of the dissenting view, the educational materials provided to the group will invariably be framed in ways that incline the participants toward particular perspectives. Thus, questions about how to communicate about the dissenting view and what forms of transparency to provide arise even in the course of efforts to foster engagement about it.

Conclusion

This paper has argued that many cases of scientific dissent can be analyzed as disputes over value judgments and that approaches to managing value judgments can provide an array of strategies for navigating scientific dissent. Thus, rather than providing a single answer about how to respond to scientific dissent, this paper is a call to explore an array of approaches gleaned from the literature on values in science. This way of moving forward can complement other ways of responding to dissent, such as the long-term approach of fostering greater trust in the scientific community (de Melo-Martín and Intemann 2018). It also has the potential to subsume other strategies, such as the inductive risk approach for identifying epistemically detrimental dissent (Biddle and Leuschner 2015). The discussion of the Lyme disease case study illustrates that there do indeed appear to be promising ways of applying the literature on managing values in science in order to handle cases of scientific dissent in a more sophisticated fashion.

A potential concern with this way of responding to dissent is that even if it could prove helpful in cases where dissent seems potentially legitimate (e.g., Lyme disease), it does not seem particularly helpful for handling more severe cases where dissent appears to be caused largely by corruption, ignorance, or error (e.g., dissent over climate change or vaccines). One response to this objection is to bite the bullet and acknowledge that even though the approach proposed in this paper is helpful in many cases, there are cases that it is not designed to solve. However, it is worth noting that there are likely to be relatively few cases where disputed value judgments do not play at least some role. For example, even in cases where other factors appear to be at play, there are still value judgments involved in deciding how much of the dispute can be chalked up to those factors. In the vast majority of cases, one cannot completely dismiss dissenting views as a matter of corruption, ignorance, or error, and therefore the approach proposed in this paper is likely to be relevant.

Another potential concern is that the strategies proposed in this paper still do not typically provide simple, straightforward answers about how to handle dissent. We have seen in the Lyme case that even though the literature on managing value judgments suggests creative strategies (e.g., adopting nuanced cognitive attitudes and communicative approaches, adopting transparency about value judgments, and implementing engagement between different stakeholders and community members), it can still be difficult to decide how best to pursue each of these strategies. But to expect simple answers about how to handle dissent is unrealistic. Scientific dissent is complex, varied, and difficult to address. As the beginning of this paper emphasized, in many cases there are significant

dangers associated with suppressing it as well as dangers associated with allowing it to run rampant. Given this complexity, the best we can do is to develop a wide array of strategies so that we have as many potential resources as possible in our "toolbox" for handling many different kinds of dissent. This is what the literature on values in science gives us: not easy answers, but rather an array of promising strategies to explore.

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