A Framework for Understanding Wishful Thinking

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Abstract

While the science and values literature has seen recurrent concerns about wishful thinking, there have been few efforts to characterize this phenomenon. Based on a review of varieties of wishful thinking involved in climate skepticism, we argue that instances of wishful thinking can be fruitfully characterized in terms of the mechanisms that generate them and the problems associated with them. We highlight the array of mechanisms associated with wishful thinking, as well as the fact that it can be evaluated both from epistemic and ethical perspectives. We argue that it is doubtful that a single unified definition of wishful thinking can be developed. Moreover, the concept of wishful thinking can problematically focus

excessive attention on individual and epistemic problems in science, to the exclusion of social

and ethical problems.

A Framework for Understanding Wishful Thinking

1. Introduction

In the 1970s, 1980s, and 1990s, a generation of feminist philosophers of science and epistemologists produced a series of critiques of the ideal of value-free science — the view that non-epistemic values have no legitimate role to play in evaluating scientific hypotheses. In the 1990s, a number of critics put forward countercharges, defenses of the value-free ideal. Wishful thinking and cognate concepts were prominent in these countercharges. As Elisabeth Lloyd noted at the time, "There are several interrelated pronouncements that materialize with mystifying but strict regularity whenever 'feminism' and 'science' are used in the same breath. These include: feminists judge scientific results according to ideological standards instead of truth and evidence" (Lloyd 1996, 217). Similarly, Elizabeth Anderson characterized the views of Susan Haack (1993) as a concern that rejecting the value-free ideal "would allow inquiry to be infected by wishful thinking: people would feel entitled to infer from the fact that they wanted something to be true that it was actually true" (Anderson 1995, 32-33).

By the 2010s, the "science wars" had settled into détente, and the science and values literature can no longer be characterized as a conflict between feminists and their critics. But concerns about wishful thinking still make regular appearances. For example, Heather Douglas justifies her distinction between direct and indirect roles for values in terms of concerns about "science … merely reflecting our wishes, our blinders, and our desires" (2009, 102).

While the science and values literature has seen recurrent concerns about wishful thinking, there have been few efforts to characterize this phenomenon. What, exactly, is supposed to be picked out by this term, and why is it a problem? In this paper, we address this lacuna. Based on a review of wishful thinking in the case of climate skepticism, we argue that instances of wishful thinking can be fruitfully characterized in terms of the mechanisms that generate them and the problems associated with them. We highlight the array of mechanisms associated with wishful thinking, as well as the fact that it can involve both epistemic and ethical problems. We argue that it is doubtful that a single descriptive definition of wishful thinking can be developed that reflects its usage in the science-and-values literature, and that using the concept of wishful thinking can have the problematic consequence of focusing attention on individual and epistemic problems in science, to the exclusion of social and ethical problems.

2. "Wishful Thinking" in the Science and Values Literature

As noted above, in the 1990s, wishful thinking primarily served as a countercharge, used against feminist philosophers (and others) who were critical of the ideal of value-free science: rejecting this ideal, it was thought, opened the door to wishful thinking. By contrast, in recent work, wishful thinking has come to act as a constraint that is adopted by critics of the value-free ideal themselves. For example, Matthew Brown has argued that opponents of the value-free ideal have continued to insist on what he calls the "lexical priority" of evidence over values because they have wanted to avoid the possibility of scientists falling prey to the

problem of wishful thinking (Brown 2013, 829; see also Brown 2017). Inmaculada de Melo-Martín and Kristen Intemann have proposed what they call the Wishful Thinking Criterion as a constraint on acceptable accounts of values in science: "The ways in which contextual values are claimed to operate at the core of scientific reasoning must avoid the problem of wishful thinking" (2016, 503). One of us has also held up wishful thinking as a primary example of the sorts of value influences that must be avoided in scientific reasoning ([redacted]).

Despite recurrent references to the problem of wishful thinking, the precise nature of the problem remains surprisingly unclear. Strictly speaking, wishful thinking would seem to be the fallacy of moving from the desire for something to be true — the wish — to the belief that it is true, despite inadequate evidence (Maller 2013). Interpreted in this way, it seems unlikely that scientists would deliberately engage in such fallacious reasoning (Elliott 2017, 13). For this reason, Haack argues that "wishful thinking doesn't work directly, but by distorting the evidence to enable you to give too much credence to propositions you would like to be true, too little credence to propositions you would prefer to be untrue" (Haack 2003, 292). Thus, Haack appears to treat wishful thinking in science as more closely related to the widely discussed psychological phenomenon of confirmation bias.

While there are advantages to equating wishful thinking with important concepts from cognitive psychology like confirmation bias, other philosophers have used the notion of wishful thinking in a wide variety of ways that are not captured by this approach.[1] For

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[1] Footnote removed for anonymous review.

example, Bela Szabados (1973) contrasts wishful thinking with self-deception, where those who fall prey to self-deception display unconscious efforts to deny opposing evidence but those who engage in wishful thinking are ultimately responsive to conflicting evidence when they are confronted with it. Brown (2013) defines wishful thinking in terms of being dogmatic and unwilling to revise conclusions in response to contrary evidence. Elizabeth Anderson has characterized wishful thinking both in a narrow way, as feeling entitled to infer from the fact that one wants something to be true to the fact that it is true (Anderson 1995, 33), and in the broader sense of "wishing away" contrary evidence (Anderson 2004, 8). Kevin Elliott takes a similar approach of distinguishing the narrow definition of wishful thinking from a range of other activities associated with it: "using 'rigged' methods that generate predetermined outcomes, ignoring evidence that conflicts with one's preferred conclusions, and repeating objections over and over even after they have been addressed" (Elliott 2017, 13).

Given the complexity of deciding how best to characterize wishful thinking, our strategy in this paper is to illustrate the wide range of activities that are associated with this phenomenon in some way. Even though wishful thinking is typically regarded as a behavior of individuals, we think it is important to avoid starting out with overly narrow conceptions of what it might involve. Thus, in the following section we will deliberately consider a wide range of activities related to wishful thinking that incorporate both individual and social phenomena. With those activities in view, we will propose a framework for characterizing and reflecting on the variety of phenomena that could potentially be called "wishful thinking."

3. Wishful Thinking and Climate Change

In this section, we examine climate skepticism — that is, rejection of the mainstream climate science position that climate change is real, anthropogenic, and is having serious environmental and socio-economic consequences — as a paradigm of wishful thinking. We regard climate skepticism as an excellent case study insofar as it is a significant contemporary social issue; it is a case in which major public figures deny well-established scientific claims, seemingly because they wish those claims were not true; and there are numerous analyses of the causes of this skepticism for us to drawn on (see citations throughout this section). We will examine this case with the goal of developing a framework for characterizing the different kinds of activities associated with wishful thinking in the next section. The overarching theme of this section is that climate skepticism has been explained in terms of a wide variety of different kinds of individual- and social-level processes, and that climate skepticism involves both epistemic and ethical problems.

In their influential book *Merchants of Doubt,* historians Naomi Oreskes and Erik Conway (2010) elucidate a wide variety of strategies used to promote climate skepticism, and they explore some of the underlying factors that may have encouraged this skepticism. First, just as tobacco executives consciously lied to the public about the health effects of their products, Oreskes and Conway indicate that some activities of climate skeptics also appear to involve conscious misrepresentations of scientific evidence. Oreskes and Conway give the example of a report created for a think tank called the George C. Marshall Institute by prominent physicists Robert Jastrow, Fred Seitz, and Bill Nierenberg (2010, 186-189).

According to figures within the George H. W. Bush White House, this report, which placed the blame for climate change on increased solar output rather than greenhouse gases, played a major role in halting action by the Bush administration to address climate change. Unfortunately, the report included fairly blatant manipulations of the available evidence, such as including portions of a figure created by renowned climate scientist James Hansen but leaving out other portions of the figure that did not fit with the report's argument. The report also failed to acknowledge that if the climate were as sensitive to increased solar output as the physicists claimed, then the climate should be highly sensitive to greenhouse gases as well; Oreskes and Conway insist that the authors of the paper "would of course have known this" (2010, 189).

While some of the activities displayed by climate skeptics like the Marshall Institute physicists appear to have been conscious, much of their underlying skepticism may have been driven by unconscious psychological mechanisms. For example, Oreskes and Conway emphasize that many of the prominent physicists who worked to promote climate skepticism were passionate opponents of Communism who thought that environmental regulations pushed the country in that direction. Thus, it is plausible that their opposition to regulations unconsciously influenced how they responded to evidence for climate change (2010, 248ff; Lahsen 2013). This could have been the result of mechanisms like Dan Kahan's (2012) model of identity-protective cognition — on which individuals reject evidence that threatens the defining beliefs of "people like them." Similarly, George Marshall's book *Don't Even Think*

about It (2015) explains climate skepticism based on mechanisms such as confirmation bias, availability bias, and optimism bias.

In addition to conscious and unconscious mechanisms at the level of individual cognition, some analyses view climate change skepticism as driven by social and institutional factors. For example, consider Farrell's (2015) analysis of industry funding and climate skepticism. Using a combination of network analysis and text mining, Farrell argues, inter alia, that funding of skeptical blogs and organizations by ExxonMobil and the Koch Family Foundations has supported four common climate skeptical arguments, such as the argument that increased atmospheric CO_2 is beneficial (Farrell 2015, 4 and fig. 4). Sociologists like Robert Brulle, Riley Dunlap, and Aaron McCright have also studied the ways in which funding from powerful corporations and individuals has equipped right-wing think tanks and front groups with climate skeptical arguments (Brulle 2014; McCright and Dunlap 2010). These analyses do not focus on the reasoning of any individual as such, but instead examine social-level trends and the activities of collective agents and institutions.

The analyses discussed in the last few paragraphs are primarily concerned with the epistemic harms of climate skepticism — namely, manufacturing doubt and widespread false beliefs about climate change. These epistemic harms are particularly worrisome because of the social and economic problems that they generate. Some analyses of climate skepticism explicitly connect epistemic and ethical problems. Like Farrell, Biddle and Leuschner's (2015) analysis of climate skepticism focuses on the way collective agents promote skeptical arguments — specifically, the American Enterprise Institute (AEI) offering a 10,000 USD

reward "to any scientist who provides results that contradict the fourth assessment report of the Intergovernmental Panel on Climate Change (IPCC)" (262). While Biddle and Leuschner characterize this as promoting "epistemically detrimental dissent" from the mainstream climate science position, they argue that this dissent is problematic in part because of ethical factors, namely, the way it would contribute to an unjust distribution of the benefits and burdens of fossil fuel use and climate change. Specifically, following Wilholt (2009), Biddle and Leuschner argue that AEI's offer promotes research that "involves intolerance for producer risks at the expense of public risks" (273), that is, reducing risk to the fossil fuel industry while increasing risk for the general public. On this analysis, dissenting research is not problematic solely for epistemic reasons, but also in part because it is associated with a lopsided and unjust distribution of risk.

Another example of the ways in which ethical and epistemic problems intertwine stems from the harassment and persecution of scientists. For example, Ben Santer, the convening lead author of one of the chapters in the 1995 report of the IPCC, was subjected to harsh criticism because of his alleged attempts to modify the chapter at the last minute. These attacks were subsequently shown to be completely unwarranted, but they caused a great deal of personal upheaval for Santer and wasted the time of many other scientists who came to his aid (Oreskes and Conway 2010, 208-213). Personal attacks on scientists who report unwelcome findings are common in many areas of environmental science (Elliott 2016).

Biddle et al. (2017) argue that these sorts of attacks are both ethically problematic (insofar as they cause inappropriate harm and stress to scientists) and epistemically

problematic. In part, this is because of the obvious ways in which scientists are not able to be as productive when they are fending off attacks. But Biddle et al. (2017) argue that a particularly important problem is the way harassment is likely to foster epistemic vices in scientists and scientific communities. When they are under attack, their curiosity is likely to be degraded, and they are likely to become overly timid—afraid to pursue important but potentially threatening lines of investigation. Thus, Biddle et al. show that the wishful thinking associated with climate skepticism intertwines ethical and epistemic failings.

4. A Framework for Understanding Wishful Thinking

Our overview of climate skepticism illustrates that in real-life scenarios, wishful thinking manifests itself in a complex combination of ways. As highlighted in our review of "wishful thinking" in the science and values literature, it is not entirely clear which activities should fall under the rubric of wishful thinking, and they are intertwined in practice. The conscious activities of individuals are influenced by their unconscious cognitive processes as well as by social and institutional structures, and these structures are in turn influenced by the activities of other individuals. Moreover, these individual and social processes incorporate multiple sorts of problems. Individual climate skeptics display both epistemic and ethical failings, and these failings in turn interact with a variety of problems associated with their social context. In an effort to bring some clarity to the complexity of wishful thinking, in this section we propose a general framework for distinguishing different types of activities associated with wishful thinking.

Our framework distinguishes different kinds of wishful thinking in terms of two components: mechanisms and problems. Mechanisms comprise various entities and their activities, including specific kinds of causal interactions among the entities (Machamer, Darden, and Craver 2000). Although, as noted above in our review of the science and values literature, many previous accounts of wishful thinking have focused on the thought processes of individuals, our framework makes no a priori assumptions that any particular kind of entity must or must not be involved in wishful thinking, nor what kinds of activities they must engage in. As illustrated by our discussion of climate skepticism, the mechanisms associated with wishful thinking can include cognitive processes "in the heads" of individuals, interactions between individuals and social groups or institutions, or involve only collective agents.[2]

We do suggest that it is often useful to distinguish between individual and social mechanisms, as well as between conscious and unconscious ones. Some discussions of cases of wishful thinking focus on individuals, whether concrete (for example, a particular scientist in an historical narrative, as in Oreskes and Conway 2010) or generic (for example, a generic

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[2] There is a body of recent literature on mechanistic explanation, including rival conceptions of mechanisms and a vigorous debate over the limits of mechanistic explanation (Hunemann 2015; Brigandt, Green, and O'Malley forthcoming). To be clear, we do not intend to make any controversial claims here about what mechanisms are or whether all explanations are mechanistic. Instead, we draw on the general concept of a mechanism — a productive arrangement of entities and their activities — as useful terminology for comparing and contrasting the different kinds of processes that are variously called "wishful thinking."

individual in a game-theoretic analysis). Others focus on collective agents (such as corporations, as in Biddle and Leuschner 2015, or government agencies), networks of social interactions (such as a network of blogs, as in Farrell 2015, or massively distributed research collaborations; see Winsberg et al. 2014), or social institutions (such as disciplinary publication standards or patterns of research funding). Still other discussions of cases of wishful thinking describe multilevel mechanisms, which include both individuals and the social contexts in which they act. For example, game-theoretic models frequently involve individual agents (or individualized collective agents) making decisions under socially-imposed constraints. All together, distinguishing the various mechanisms involved lets us distinguish these different senses of "wishful thinking."

Characterizations of wishful thinking are incomplete, however, if they focus only on a description of mechanisms without identifying the problems associated with those mechanisms. We take it to be obvious that "wishful thinking" is a thick concept, with both "world-guided" descriptive and "action-guiding" evaluative content (Williams 2005, 47ff). "Wishful thinking" describes how knowledge has (not) been produced in a particular case; it also (generally and for the most part) implies that some agents or institutions operated in a problematic fashion.

In all of the examples that we have discussed in this paper, wishful thinking obviously involves epistemic problems, where "epistemic" covers at least the pursuit of truth, empirical adequacy, or explanation/understanding, and perhaps also the pursuit of practical knowledge or know-how. The case of climate skepticism illustrates, however, that when the full range of

mechanisms underlying wishful thinking are considered, they can involve not only epistemic problems but also ethical ones. For example, the harassment of scientists such as Ben Santer is ethically bad, independent of its epistemic aspects. Ethical problems can have epistemic consequences, as when harassment causes scientists to become epistemically timid. And "intolerance for producer risks at the expense of public risks" entangles epistemic and ethical problems. Epistemic and ethical problems may be independent in some cases, causally related in others, and conceptually entangled in still others. The ethical problems with wishful thinking may be constitutive or intrinsic (in some sense, "internal to" the scientific community), contextual or extrinsic (a matter of the relationship between the scientific community and its broader social context) (Longino 1990, 4ff; Scheinke et al. 2009, 322ff), or both. In general, the relationship between epistemic and ethical problems of wishful thinking is complex, and space does not permit us to consider this relationship further here.

While the mechanisms involved in wishful thinking might seem more central to the concept than the problems associated with it, both the epistemic and the ethical problems associated with wishful thinking have provided much of the motivation for philosophers of science to discuss it. For example, Susan Haack closes her critical response to feminist epistemology with concerns about political persecution:

Have we forgotten already that in *Nineteen Eighty-Four* it was thoughtcrime to believe that two plus two is four if the Party ruled otherwise? This is no trivial verbal quibble, but a matter, epistemologically, of the integrity of inquiry and, politically, of freedom of thought.

Needlessly sacrificing these ideals would not help women; it would hurt humanity. (Haack 1993, 38)

It is clear that her concerns about wishful thinking encompass not only its epistemic implications for achieving scientific goals but also its ethical implications, both for the scientific community and for society at large.

5. Lessons

Our framework for understanding wishful thinking suggests two major lessons for those working with this concept. First, it is doubtful that a precise, unified definition of wishful thinking can be developed that reflects its recent usage in the science-and-values literature. Wishful thinking might be understood strictly as the behavior of an individual who consciously infers a particular conclusion because they would like it to be true. But scientists rarely commit such fallacious reasoning in a deliberate way (Elliott 2017, 13). Thus, when wishful thinking is discussed in the context of scientific practice, the term is almost always used in a more ambiguous fashion, involving a wider variety of mechanisms: dogmatism, or disingenuousness, or confirmation bias, or other forms of motivated reasoning. Therefore, as the term "wishful thinking" is used, it does not lend itself to a unified definition in terms of a single mechanism or phenomenon. Instead, we suggest that it typically acts as a generic placeholder for illegitimate influences of values on science. This interpretation accords well with its rhetorical use in the science and values literature, where it has been employed as a thick ethical concept to warn that particular influences of values are inappropriate.

An important consequence of interpreting wishful thinking as a generic placeholder, though, is that its content becomes unclear or equivocal. Opponents of the value-free ideal do not agree on precisely what influences of values are appropriate or not, so they would end up disagreeing about which cases count as wishful thinking. For example, Douglas (2009) argues that scientists fall prey to wishful thinking when they allow values to influence their reasoning in a direct way, but not when they relegate values to an indirect role in their reasoning. However, this distinction between direct and indirect roles is contested (Elliott 2013; Elliott and Richards 2017). Moreover, even if one treats the distinction as settled, some have argued that direct roles for values are not always problematic and that indirect roles for values can be problematic (de Melo-Martin and Intemann 2016; Elliott and McKaughan 2014; Steel and Whyte 2012). In recent work, philosophers of science have argued that the distinction between appropriate and inappropriate roles for values should be based on whether the value influences are made sufficiently transparent (Elliott and McKaughan 2014; Elliott 2017), whether they have received democratic endorsement (Elliott 2017; Intemann 2015), whether they do not violate epistemic standards (Steel 2017; Steel and Whyte 2012), whether they jointly satisfy epistemic and ethical standards (Brown 2017; Kourany 2010), or whether there is an appropriate fit between social ends and scientific means (Hicks 2014). If "wishful thinking" is merely shorthand for the inappropriate influence of values in science, then these distinct, incompatible accounts of values in science produce distinct, incompatible senses of "wishful thinking."

The second lesson that can be gleaned from our framework is that there are significant dangers to using the concept of wishful thinking. This is important to recognize, because even if wishful thinking does not have a single definition that fits with the science-and-values literature, one might still think that it could serve a useful rhetorical role. In other words, critics of the value-free ideal could continue to emphasize that this ideal can be abandoned without allowing wishful thinking, where "wishful thinking" refers in a general way to problematic forms of reasoning. Alternatively, one might propose to reserve "wishful thinking" for one specific problematic mechanism (say, confirmation bias). A disadvantage of this approach is that it does not accord well with the general way in which "wishful thinking" has been used in the science-and-values literature to represent inappropriate influences of values on science, but it would remove the risk of equivocation.

However, our framework highlights two dangers of either approach to using the concept of wishful thinking. First, insofar as it is understood primarily as operating through individual-level mechanisms — whether by implicit assumption or explicit definition — the concept can distract people's attention from processes that operate at a social or structural level. In this paper we have seen how values can cause illegitimate harassment of scientists, discourage scientists from exploring sensitive topics, and encourage widespread media attention to flawed or questionable claims. If discussions of illegitimate influences of values in science are put in terms of "wishful thinking," and this concept focuses our attention on the ways individuals are influenced by values, it could distract from crucial discussions about social and institution-level mechanisms.

Another danger of employing the concept of wishful thinking is that it can focus attention solely on epistemic problems in science and distract attention from accompanying ethical problems. This is especially important, given that our discussion of the problems associated with wishful thinking highlighted the importance of ethical problems. Recall Susan Haack's concerns about political suppression, expressed in terms of references to *Nineteen Eighty-Four*. It is clear that she worries that abandoning the value-free ideal could result not only in epistemological problems but also political problems. Moreover, as Biddle, Kidd, and Leuschner have pointed out, it can be misleading to characterize epistemic problems without attention to the accompanying ethical problems (Biddle and Leuschner 2015; Biddle et al. 2017; Leuschner 2016).

6. Conclusion

Based on a review of climate skepticism, we have developed a framework for understanding wishful thinking. We have argued that instances of wishful thinking can be fruitfully characterized based on the mechanisms that generate them and the problems associated with them. We noted that the mechanisms associated with wishful thinking encompass a wide array of entities and activities, including individual and social entities as well as conscious and unconscious cognitive processes. Based on our framework, we suggested two lessons for those seeking to understand wishful thinking. First, it is doubtful that a single unified definition of wishful thinking can be developed that reflects its recent usage in the science-and-values literature. Second, while the concept of wishful thinking

could still either be given a stipulative definition or serve as a generic placeholder for illegitimate influences of values on science, there are dangers that this usage can focus attention on individual and epistemic problems to the exclusion of social and ethical factors.

We suggest two avenues for responding to the vagueness of the concept of wishful thinking and its potential to distract attention from social and ethical problems in science. One option is to stop using the concept entirely. The primary purpose of recent discussions of wishful thinking in the philosophy-of-science literature has been to show that values can be incorporated into scientific reasoning without violating basic standards of good reasoning. But this point can be made without talking about wishful thinking; one can simply emphasize that values can influence scientific reasoning without violating these basic standards. Why not stop using a vague and confusing term and instead make one's claims more explicitly?

Nevertheless, one might think that there is important rhetorical value to talking about wishful thinking. After all, the claim that one can incorporate values into scientific reasoning without falling prey to wishful thinking is much catchier than the claim that one can incorporate values into scientific reasoning without violating basic standards of good reasoning. Moreover, by talking about wishful thinking one can link up with previous literature on this topic.

For those who think that the rhetorical power of "wishful thinking" makes it worth preserving, our alternative recommendation is to be careful to provide appropriate caveats when using the concept. One important caveat is to clarify that when one talks about wishful thinking in the scientific context one is typically speaking about an array of inappropriate

activities and not a single, clearly-defined phenomenon. Another important caveat is to acknowledge that, if wishful thinking is conceptualized primarily as an epistemic failing of individuals, it is not the only problem that we should be worried about when thinking about the influences of values on science. We need to think carefully not only about the ways in which values can cause epistemic problems for individuals but also social and ethical problems.

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