Wishful Thinking and Values in Science

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This article examines the concept of wishful thinking in philosophical literature on science and values. It suggests that this term tends to be used in an overly broad manner that fails to distinguish between separate types of bias, mechanisms that generate biases, and general theories that might explain those mechanisms. I explain how confirmation bias is distinct from wishful thinking and why it is more useful for examining the relationship between cognitive bias and beliefs about the existence of injustices.

1. Introduction. The concept of "wishful thinking" has come to play a prominent role in recent philosophical literature on science and values. In particular, it is sometimes used to articulate or motivate general criteria for how values must be restrained in order to protect scientific integrity (Douglas 2009; Brown 2013; de Melo-Martín and Intemann 2016; Elliott 2017). Yet the ordinary use of "wishful thinking" to refer to a tendency for a wish that X to cause an unjustified belief in X (Maller 2013) would seem too narrow for such purposes. For example, science might be corrupted by fraud or by selective and deliberately misleading presentation of results. But deception or manipulation of others is not necessarily a case of wishing that X causing a person to believe that X. The perpetrators of the deception might not believe their own public claims, and those they persuade might not wish these claims were true. Consequently, to play the role of separating epistemically legitimate from illegitimate impacts of values in science, "wishful thinking" is forced to take on a general meaning that encompasses all kinds of bias and failures of epistemic integrity.

In this article, I recommend against this broad use of "wishful thinking." Instead, I suggest that it is better to stick with the narrower concept of wishful thinking (i.e., wishing that X causing unjustified belief that X) and to recognize that wishful thinking is just one bias among the many that might be relevant to science. A variety of biases exist—confirmation bias, allocation

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bias, sponsorship bias, and so on—and it is unhelpful to discuss all of them under the heading of "wishful thinking." Furthermore, I suggest that it is important to separate biases from mechanisms by which those biases may operate and from general cognitive theories that purport to explain those mechanisms. In short, a bias is different from an account of how and why that bias happens. Failure to appreciate this easily leads to confusions when two biases can result from similar mechanisms that are explicable by the same theory, as is indeed the case for wishful thinking and confirmation bias.

I develop the above suggestions in connection with the question whether a commitment to equality and social justice tends to lead to bias or to reduce it. Early critics of feminist philosophy of science sometimes charged that a commitment to feminist values would lead to wishful thinking (Haack 1993, 2003; Gross and Levitt 1994). In contrast, some feminist philosophers of science argue that a commitment to feminist values tends to generate epistemic improvements in science (Harding 1986, 2015; Campbell 1998; Schiebinger 1999). I focus on Harding's notion of "strong objectivity" as a prominent example of this line of thought (Harding 1986, 2015). I suggest that the concept of confirmation bias is more useful than wishful thinking for examining the relationship between bias and a conviction that social injustices exist and should be remedied. The reason for this is that a person who believes in the existence of injustices, such as sexism, is unlikely to wish that these injustices exist. It is questionable, then, whether wishful thinking is an appropriate concept to apply to such cases. Nevertheless, a belief in the existence of injustice could lead to confirmation bias. I discuss a dispute about the ethics of a clinical trial on heroin-assisted treatment carried out in Vancouver, Canada, to illustrate the relevance of these observations to Harding's concept of strong objectivity.

2. Wishful Thinking versus Confirmation Bias. A cognitive bias is a factor that tends to distort reasoning in a specific way. A variety of different types of things might be biasing factors: common tendencies of human cognition (e.g., egocentric bias), aspects of an individual person's social circumstances (e.g., bias due to individual conflicts of interest), or features of a broader social system (e.g., racial bias in criminal justice). Of course, these several types of factors are overlapping and interacting rather than separate. The notion of bias also involves a normative component. Since bias distorts reasoning, identifying bias requires some standard of good reasoning relevant to the context. For example, the standard might be that one should not believe a claim for which one has no good evidence, especially not when counter evidence exists.

The first step in examining a cognitive bias, then, is to identify the factor in question and to specify what distorting effect on reasoning it is thought to have. In the case of wishful thinking, this appears straightforward: the factor is a wish, and the distorting effect is a tendency to believe that the wish is, or

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will become, true, despite the lack of good supporting evidence and perhaps even in the face of contrary evidence (Maller 2013). For instance, wishing that one's favorite candidate will win an upcoming election might cause one to believe that this will happen, even when evidence strongly suggests the contrary.

Distinct biases, then, involve distinct biasing factors or distorting effects or both. To illustrate, consider two further examples of biases. Egocentric bias is the tendency to overemphasize one's own perspective, which can result in exaggerating one's own importance in social interactions (Gilovitch, Medvec, and Savitsky 2000; Hyman et al. 2014). For instance, imagine that you pass a friend on the street who walks past in a hurry while appearing annoyed and without returning your greeting. In this case, egocentric bias might cause you to believe that your friend is angry with you because of some offense that you had inadvertently given. The biasing factor (i.e., a tendency to focus on your own perspective and not to consider alternatives) and the resulting epistemic distortion (i.e., unjustified belief in one's importance) in egocentric bias, therefore, are distinct from those of wishful thinking. A cognitive tendency to overemphasize one's own point of view is not the same as a wish. Indeed, a person might be ruefully aware of possessing this tendency and wish to change it. Moreover, egocentric bias might result in beliefs that one does not wish to be true, as the example just given illustrates.

Similar observations pertain to confirmation bias. Confirmation bias refers to a tendency to favor information that supports beliefs and expectations that one already holds (Nickerson 1998; Hernandez and Preston 2013). Thus, the biasing factor in this case consists of an antecedent belief,[1] and the epistemic distortion consists of unjustifiably favoring supporting evidence for that belief, which can result in the belief becoming unreasonably confident or extreme. Again, the biasing factor and distorting effect here differ from wishful thinking. Wishful thinking says that wishes may lead to an unjustified belief that the wish is, or will become, true. In contrast, confirmation bias highlights a tendency for beliefs to be unreasonably self-reinforcing. Hence, the input of confirmation bias is a belief, not a wish, and the unjustifiably confident belief that emerges from it need not be something the agent wishes to be true. Nickerson expresses this idea with a distinction between motivated and unmotivated confirmation bias: "People may treat evidence in a biased way when they are motivated by beliefs that they wish to maintain. . . . But people may proceed in a biased fashion even in the testing of hypotheses or claims in which they have no material stake or obvious personal interest. . . . An adequate account of confirmation bias must encompass both cases because the existence of each is well documented" (1998, 176). Indeed, it is possible

1. Since expectations can be understood in this context as beliefs about the future. I will not mention them separately in what follows.

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for confirmation bias to operate with respect to beliefs that one wishes were false. To illustrate, consider a scientist who believes that catastrophic effects of climate change are unavoidable. The scientist is subject to confirmation bias in that she very carefully and critically examines sources that disagree with her belief, while being much less strict in evaluating sources that agree with it. Nevertheless, she wishes that catastrophic impacts of climate change could be prevented.

One might counter that confirmation bias can always be reduced to wishful thinking due to a universal human desire to have one's beliefs confirmed. However, even if one grants for the sake of argument that desire for vindication is universal, the reduction of confirmation bias to wishful thinking would not go through. That is because a person may have conflicting wishes and may judge other wishes to be more significant than the wish to be proven right. Thus, in the example above, the scientist wishes that catastrophic effects of climate change could be averted and, let us suppose, also wishes to be vindicated. But there is no reason to assume that the second of these wishes outweighs the first. She might sincerely say, "As much as I like to be right, I hope I am proven wrong about this." In short, it is possible for people to hold beliefs they wish were false, and such beliefs might be fodder for confirmation bias.

Furthermore, it is important to distinguish a bias from explanations of how or why that bias occurs. To illustrate this point, consider some (nonmutually-exclusive) mechanisms by which confirmation bias could operate. Confirmation bias might happen as a result of preferentially engaging with sources of information, including other people, likely to support one's beliefs or avoiding sources likely to disagree or both. It might also result from interpreting information in ways that support one's beliefs and dismissing other interpretations or from seeking reasons to discount conflicting information but not doing the same for favorable information. Such mechanisms themselves might be given a more general theoretical explanation. For example, the mechanisms just described might be attributed to cognitive dissonance theory, according to which conflicting cognitions, such as inconsistent beliefs, generate discomfort and a desire to eliminate that dissonance (Festinger 1957).[2] Thus, cognitive dissonance theory could explain behaviors such as preferentially seeking confirmatory sources of information and other mechanisms that can generate confirmation bias.

Noting the difference between a bias and an explanation of it is important because failure to do so can result in conflations of distinct biases that admit of similar explanations. Thus, wishful thinking might result from mechanisms like those that generate confirmation bias. For example, a person who

2. Cognitive dissonance is not the only possible explanation of confirmation bias, however (Nickerson 1998; Metzger, Hartsell, and Flanagin 2015).

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wishes that X be true may prefer to associate with others who voice persuasive arguments for X and to avoid the company of those who express contrary opinions. In this way, the person's wish that X might result in a firm belief that X is true. And such behavior might be explained by cognitive dissonance avoidance. Nevertheless, wishful thinking and confirmation bias are distinct for the reasons given above.

Let us return, then, to wishful thinking in philosophy literature on science and values. As noted above, some writers in this genre use wishful thinking as a general criterion for distinguishing between epistemically legitimate and illegitimate roles of values in science. For example, de Melo-Martín and Intemann (2016) propose what they call the Wishful Thinking Criterion, according to which, "The ways in which contextual values are claimed to operate at the core of scientific reasoning must avoid the problem of wishful thinking" (503). And Brown writes that "the motivation behind lexical priority [according to which epistemic values should always override nonepistemic values] is to avoid reaching conclusions on the basis of wishful thinking rather than good evidence" (2013, 829). Why this focus on wishful thinking in discussions of science and values?

One answer appears to be an implicit assumption that people often wish for a world that exemplifies or affirms their values and consequently that values can lead to wishful thinking. This line of thought is found in Douglas's discussion of direct roles of values, which she claims must be carefully restricted to protect scientific integrity.

> A direct role for values in the characterization of data would allow scientists to reject data if they *did not like* it. . . . A direct role of values in the interpretation of evidence would allow values to have equal or more weight than the evidence itself and scientists could select an interpretation of the evidence because they *preferred* it cognitively or socially, even if the evidence did not support such an interpretation. And if values were allowed to play a direct role in the acceptance and rejection of scientific theories, an *unpalatable* theory could be rejected regardless of the evidence supporting it. (Douglas 2009, 102; italics added)

In this passage, values are said to lead to dislikes, preferences, or perceptions about the palatability of scientific data, hypotheses, or theories, which in turn lead to unjustified inferences that comport with those attitudes. It is natural to read this passage, therefore, as claiming that values may lead to wishful thinking and that protecting against this is central to ensuring that values do not intrude upon science in illegitimate ways.

However, it is important to recognize that values can be linked to biases in ways apart from wishful thinking. For instance, values that people hold now and have held in the past may shape social institutions so as to perpetuate

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bias, as in the example of racial bias in the criminal justice system. Yet given its emphasis on the distorting effects of individual desires, wishful thinking does not appear to be an appropriate concept for understanding systemic or institutional bias. Moreover, wishful thinking is not the only way that values can be related to people's beliefs. To give one example, people's values are likely to influence who they associate with, which can in turn affect what information they are exposed to and what beliefs they form. And such a process need not be wishful thinking. Instead, valuing, say, evangelical Christianity might result in associating with people at a local church, which in turn results in acquiring many other beliefs, for instance, about the details of the lives of other churchgoers. While mostly not being beliefs that one wishes to be true, these beliefs nevertheless might be related to bias. For example, awareness of the varied personalities and backgrounds of evangelical Christians coupled with ignorance about people of other religious persuasions might lead to out-group homogeneity bias (Quattrone and Jones 1980).[3] Moreover, attending an evangelical Christian church might result in learning things the person wishes were false, for example, that Christian minorities are persecuted in some parts of the world. The next section takes up the issue of bias in relation to beliefs about the existence of injustices and argues that confirmation bias is a more useful concept than wishful thinking in this context.

In sum, I suggest that wishful thinking be regarded as just one bias among many and, thus, that it be dislodged from any special place in discussions of science and values. Of course, one could attempt to avoid this conclusion by interpreting the term "wishful thinking" as a label for any type of bias or fault of epistemic integrity possibly related to values in science. However, I think such an approach is ill advised for pragmatic reasons. It invites confusion for readers who may naturally assume that "wishful thinking" means what the label suggests. It also invites equivocation in which a person asserts that values have had no problematic epistemic effects in a context because they have not resulted in wishful thinking in the more narrow sense of the term. Finally, it encourages one to overlook the variety of biases discussed in academic literature and the importance that differences among them may have for philosophical discussions of science and values.

3. Bias and Beliefs in the Existence of Injustices. In this section, I consider how beliefs about the existence of injustices might be related to bias. In addition to the possibility that such beliefs might lead to bias, I also consider the opposite proposal that commitment to "emancipatory values" tends to

3. Out-group homogeneity bias refers to the tendency to assume that social groups that one does not identify with are more homogeneous than one's own group. Thus, out-group homogeneity bias is plausibly related to stereotyping.

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promote scientific objectivity, which I take to entail reducing bias (Harding 1986, 2015). I argue that confirmation bias is a more useful concept than wishful thinking in this context.

Begin with what might be called the "basic problem" for wishful thinking when it comes to beliefs about injustices. People who sincerely believe in the existence of an injustice are unlikely to wish that their belief be true. To the contrary, they likely wish their belief were false, and they may vigorously work toward a future in which it is false. Consequently, it is doubtful that wishful thinking is an appropriate concept for understanding how bias might be related to such beliefs. Anderson expresses this point forcefully in connection with feminism. "Feminists believe that women ought to be free from rape, forced reproduction, and material deprivation. This does not give us the slightest interest in believing that we *already* live in a feminist utopia, where women enjoy these freedoms! To the contrary, it heightens our awareness of when these feminist values are not realized" (Anderson 2004, 7–8). Nevertheless, Anderson considers a way that wishful thinking might be relevant to beliefs about injustices. "The judgments non-neutral inquirers are thought to have an interest in believing, regardless of the evidence, are rather *the factual claims that provide evidential support for their noncognitive value judgments*. When feminist scientists are suspected of 'wishful thinking,' they are suspected of thinking, for example, that the paucity of women among political leaders is not due to any innate inferiority of women in leadership ability, and wishing away evidence to the contrary" (8). However, Anderson argues that if there is an epistemic failing here, it does not consist in unjustifiably inferring factual claims from normative ones or vice versa; instead, the problem is dogmatically adhering to one's values or beliefs regardless of evidence (8).

I take Anderson to be suggesting that dogmatism is best not described as wishful thinking at all. That would explain the scare quotes in the passage above and her point that dogmatism should not be understood in terms of illicit inferences between what one wants and what one thinks is true. I agree that "wishful thinking" is problematic here, but I also claim that dogmatism is not the best replacement. That is because the epistemic failing alleged by the critics need not be interpreted as dogmatically refusing to consider any contrary evidence. In short, bias is at issue, and biases need not be absolute. Emphasizing dogmatism makes it too easy to let oneself off the hook—not being completely dogmatic is easy, but avoiding bias is hard. So, I suggest that in this context it is better to speak of confirmation bias. In the passage above, Anderson imagines a person who believes that gender discrimination exists in politics and other areas of public life and who consequently tends to unjustifiably favor information that supports this belief. That is a textbook example of confirmation bias. Moreover, unlike wishful thinking, no conceptual difficulties arise for confirmation bias in relation to beliefs wished

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to be false, and unlike dogmatism, confirmation bias plainly admits of degrees.

Confirmation bias is also a helpful concept for examining the proposal that some beliefs about injustices may contribute to objectivity and thereby reduce bias. Let us consider this idea in connection with Harding's (1986, 2015) notion of strong objectivity. Strong objectivity rests on the premise that, rather than being sources of bias, values of human equality and opposition to oppression and domination tend to result in more objective science. According to Harding, "the paradigm models of objective science are those studies explicitly directed by morally and politically emancipatory interests—that is, by interests in eliminating sexist, racist, classist and culturally coercive understandings of nature and life" (1986, 250). A key element of strong objectivity is a methodology of foregrounding in the research process perspectives of people from socially marginalized or oppressed groups. "The strong objectivity program argues that starting research from 'outside' a discipline can enable the detection of the dominant values, interests, and assumptions that may or may not be widely prevalent, but which tend to serve primarily the most powerful social groups" (Harding 2015, 34). Strong objectivity, then, might be viewed as a strategy for disrupting confirmation bias, by actively seeking out perspectives likely to question influential and often implicit assumptions and framings. But some caveats are in order. What egalitarian and emancipatory values entail in a given case is often a matter of dispute. Members of historically oppressed groups are, furthermore, not monolithic in their views, which creates openings for confirmation bias in strong objectivity inspired research. For example, researchers might be more likely to collaborate with community members who share their views on some controversial topic or to discount those who express dissenting views.

To illustrate these observations, I discuss a controversy about the ethics of a clinical trial on heroin-assisted treatment (HAT) in which one of the critics of the research adopted an approach similar to that recommended by Harding. In HAT, individuals suffering from longer-term opioid dependence are prescribed medical-grade heroin (diacetylmorphine), which they inject usually two to three times per day in a clinic under hygienic conditions and with medical supervision. Several clinical trials comparing a combination of HAT and flexible doses of methadone to methadone treatment alone have been carried out in Europe dating to the 1990s and have found HAT to be a safe and effective treatment (Ferri, Davoli, and Perucci 2011). The first clinical trial on HAT in North America, the North American Opiate Medication Initiative (NAOMI), ran from 2005 to 2008 in Vancouver, Canada (Oviedo-Joekes, Brissette, et al. 2009). Like previous studies, NAOMI found that HAT was an effective treatment for people suffering from longer-term opioid use disorder who were refractory to methadone therapy. But unlike previous clinical trials, research participants in NAOMI were not able to continue re-

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ceiving HAT when the trial was concluded (Oviedo-Joekes, Nosyk, et al. 2009; Boyd and NPA 2013).

The NAOMI trial was controversial from the start, but I focus here on only one critic whose approach is particularly relevant to the current discussion. Susan Boyd, a professor at the University of Victoria, pursued a joint research project with a group of former participants in the NAOMI trial, known as the NAOMI Patients Association (NPA). This collaboration generated an article published in the *Harm Reduction Journal* (Boyd and NPA 2013). This research project appears to be an example of Harding's concept of strong objectivity. Members of the NPA obviously come from an extremely stigmatized and marginalized group—"heroin addicts"—and a major purpose of the research was to provide an opportunity for them to systematize their views and express them in a venue and format that would be taken seriously by the HAT research community. In their article, Boyd and NPA (2013) criticized NAOMI as unethical for a number of reasons, including because (*a*) opioid dependence precludes voluntary consent to clinical trials on HAT and (*b*) NAOMI did not provide participants posttrial access to HAT.

My purpose here is not to take sides in this dispute or to level accusations of bias. Rather, I only wish to observe that this example illustrates the conditions noted above that create the potential for confirmation bias within the context of collaborative research with members of marginalized social groups. First, it is unclear what emancipatory values entail in this case. For instance, there is an ongoing debate in bioethics about whether heroin addiction compromises voluntary consent in clinical trials that offer access to HAT (Charland 2002; Carter and Hall 2008; Henden 2013; Uusitalo and Broers 2015; Steel, Marchand, and Oviedo-Joekes 2017). Second, research participants in the NAOMI trial, and opioid-dependent people generally, do not speak with one voice on this topic. Not surprisingly, when researchers involved in the NAOMI trial wrote in its defense, they sometimes quoted positive testimonials from participants (Gartry et al. 2009). Thus, it is unclear to what extent views expressed in the article by Boyd and NPA are representative of NAOMI participants generally or whether confirmation bias in the form of selective association by similarity of views between academic researcher and community coresearchers was at work.

The above example illustrates the importance of choosing an appropriate concept of bias when assessing a scientific methodology. There is definitely value in collaborative research projects that foreground and develop perspectives of individuals from socially marginalized groups, such as people suffering from long-term opioid use disorder. But like any methodological approach, it may be susceptible to bias. Consequently, it is useful to carefully consider how such biases might arise and what steps might be taken to mitigate them. However, a discussion of this sort can only move forward provided a concept of bias that, unlike wishful thinking, is appropriate for the

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situation. In the example just described, it is unlikely that Boyd wished that participants in the NAOMI trial were treated unethically. Thus, assuming that problematic bias related to values must be wishful thinking makes it difficult to understand how bias could possibly be a problem for her collaborative research project with NPA. However, if one considers alternatives, such as confirmation bias, then this conceptual puzzle evaporates. To reiterate, this is not to assert that confirmation bias was in fact implicated in this example. Instead, the point is that choosing an appropriate bias concept enables the issue to be examined in a constructive manner. One can think about conditions that would be likely to generate confirmation bias and what measures might be taken to protect against it.

In general, then, wishful thinking is a problematic concept for cases involving beliefs in the existence of injustices. But this does not mean that bias cannot arise in connection with such beliefs or that conceptual resources do not exist for understanding how that might happen. What it does entail is that "wishful thinking" should not be treated as a general umbrella term or concept for all kinds of epistemically problematic effects of values on science. Instead, philosophers of science should recognize that values can be related to bias in a variety of ways, and choice of a particular bias concept should be made carefully with the options in mind and with due consideration of the particulars of the case.

4. Conclusion. A variety of biases have been identified and studied that may be relevant to philosophical discussions of science and values. These biases are not all the same, and it is not helpful to attempt to reduce them all to wishful thinking. Wishful thinking may be a useful theoretical construct in some cases, but it is not the best concept for all cases. Philosophical discussions of science and values, then, could profit from a somewhat more fine-grained approach to the several types of biases that may be relevant to science.

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