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Is it appropriate to 'target' inappropriate dissent? on the normative consequences of climate skepticism

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Abstract As Justin Biddle and I have argued, climate skepticism can be epistemically problematic when it displays a systematic intolerance of producer risks at the expense of public risks (Biddle and Leuschner in European Journal for Philosophy of Science 5(3): 261–278, 2015). In this paper, I will provide currently available empirical evidence that supports our account, and I discuss the normative consequences of climate skepticism by drawing upon Philip Kitcher's "Millian argument against the freedom of inquiry." Finally, I argue that even though concerns regarding inappropriate disqualification of dissent are reasonable, a form of "targeting" dissent—namely revealing *manufactured* dissent—is required in order to identify epistemically detrimental dissent and, thus, to protect scientific and public discourse.

Keywords Dissent in science · Climate science · Climate change denial · Inductive risk · Kitcher's Millian argument against the freedom of inquiry

1 Introduction

In this paper, I examine the notion of epistemically detrimental dissent in science—or dissent that inhibits the development of scientific knowledge. At first glance, it might seem that there could be no such thing as epistemically detrimental dissent. Of course, dissent can be misguided, or just plain wrong. However, as John Stuart Mill famously argued, even this sort of dissent can be epistemically fruitful, as it can lead to a deeper understanding of hypotheses and what warrants them. In recent years, how-

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ever, science studies scholars have exposed a growing tendency of some stakeholders to attempt to delay political action by 'manufacturing doubt' about particular scientific findings: Proctor (2012) examines the ways in which the tobacco industry sought to delay advances in the understanding of the adverse health effects of smoking; Oreskes and Conway (2010) revealed that similar techniques of manufacturing dissent have been employed by the oil and gas industries in order to cast doubt upon the hypothesis of anthropogenic climate change. Clearly, such dissent can be detrimental to society: the extent to which research questioning anthropogenic climate change delays mitigation and adaptation efforts contributes to the harm caused by both present and future generations. However, I also posit that there is something epistemically problematic about such dissent. That it can, under certain circumstances, impede scientific progress. Unfortunately, to justify this claim is much more difficult than it might at first appear.

Recently, Justin Biddle and I have provided a philosophical account of such scientifically problematic dissent, which we call the "inductive risk account of epistemically detrimental dissent" (Biddle and Leuschner 2015). Focusing on climate science and the hypothesis of anthropogenic climate change, we argue that dissent is epistemically problematic when (amongst other things) it displays a systematic preference for false-negatives.

In this paper, I wish to elaborate and provide empirical support for this account (Sects. 2, 3), and discuss the counter-intuitive possibility that such manufactured dissent might lead to biased preferences for false-positives (Sect. 3). In Sect. 4, I examine the normative consequences of manufactured dissent by drawing upon Philip Kitcher's "Millian argument against the freedom of inquiry," and in Sect. 5, I finally address the question whether there is a form of "targeting" such manufactured dissent (e.g., "masking" it, "silencing" it, or "discrediting" its producers) which is morally and epistemically appropriate.

2 On epistemically detrimental dissent

Many people may already have the intuition that dissent in science can, under certain circumstances, be epistemically detrimental. However, as previously noted, it is difficult to justify this belief. Christopher DeMuth, director of the *American Enterprise Institute*, a conservative think tank that actively promotes dissent against mainstream climate science, stresses that "consensus plays an important role in science and scientific progress, but so does disputation—reasoned argument is essential to good science, and competition of ideas is essential to scientific progress" (deMuth 2007, att. 3, 2). By itself, this statement is unremarkable. It is clear that dissent is essential to good science, but it does not follow that all instances of dissent are epistemically beneficial. For example, if dissent is motivated *solely* by non-epistemic aims such as financial gain, then there is little to prevent said motives from twisting research to achieve desired results. Kitcher (1993, chap. 8) has shown that 'grubby' motives *can* be epistemically beneficial, but only when they are combined with other, epistemically 'pure' motives such as the desire for truth or reliability. Scientists who are not merely epistemically *sullied*, but also epistemically *depraved*, are likely to produce biased research.

Admittedly, intentions are notoriously difficult to prove. Moreover, many climate skeptics[1] are not epistemically depraved, but genuinely believe that anthropogenic climate change is either nonexistent or exaggerated. Their dissent could be influenced by a variety of factors—including conscious or unconscious ideological or political interests, or merely wishful thinking—each of which is tending to bias research. More specifically, such motives can influence the types of hypotheses considered, the methods employed for the evaluation of results, as well as the choice, characterization, and interpretation of data in such a way as to increase the probability of achieving a desired result. Empirical evidence supports the conclusion that studies used by skeptics to cast doubt on the results of climate science do not usually fulfill scientific quality criteria. Indeed, most of them are not written by climate scientists, do not appear in peer-reviewed journals, rely upon manipulated data, ignore unwanted data, or include inadequate statistics and incoherencies (Benestad et al. 2015; Lewandowsky et al. 2016; Oreskes and Conway 2010; Weart 2011; Mann 2012, pp. 65–69; http://www.skepticalscience.com/).

Nevertheless, showing that there are problems with much of the research of climate skeptics does not yet establish that such dissent is epistemically problematic. Drawing on Mill's argument against censorship, even bad arguments reaching false conclusions can lead to a fuller understanding of the truth. "Bad science" is not necessarily "bad dissent." Thus, the question ensues of what is required that, in addition to being bad science, makes some research from climate skeptics instances of epistemically detrimental dissent.

Justin Biddle and I answer this question by proposing an inductive risk account of epistemically detrimental dissent, arguing that the following set of conditions is sufficient (though not necessary) for recognizing epistemically problematic dissent with regard to a hypothesis H:

Dissent from a hypothesis H *is epistemically detrimental if each of the following obtains:*

1. *The non-epistemic 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.*

This account clearly holds for dissent from the hypothesis of anthropogenic climate change (H_{acc}): the risks of wrongly accepting H_{acc} fall largely upon industries that produce greenhouse gases, while the risks of wrongly rejecting H_{acc} fall largely upon the public (especially populations in developing countries and future generations). Suppose that a group of scientists puts forward dissent from H_{acc}, and suppose that this dissenting research violates conventional scientific standards—by, for example,

[1] When I refer to "climate skeptics" I do not mean "skeptical climate scientists" who merely "hold a skeptical view of the validity and utility of [climate …] models." In Myanna Lahsen and Riley E. Dunlap's terms I am discussing the case of "dissident" or "contrarian scientists" who "strongly criticize climate science and in many cases participate in the denial machine" (Dunlap 2013, p. 693; cf. also Lahsen 2008).

using inadequate statistics, manipulated data sets, or inconsistent assumptions. This dissent should be considered bad science. Now suppose that the dissenting research, in addition, systematically prefers false negatives over false positives. Given that the production and dissemination of much scientific research today is heavily influenced by powerful industrial interests—interests that can structure research in particular ways and can marshal numerous resources to undermine their opponents and skew the course of debate—, such dissenting research can be mobilized to stifle, rather than to advance, scientific progress. It can, for example, be used to attack mainstream scientists who defend H_{acc}; it can be employed to force mainstream scientists to respond repeatedly to misguided objections, and it can be used to apply political pressure to scientists defending H_{acc} publicly. Consequently, dissent can slow down the progress made by mainstream scientists, and it can lead them to moderate their claims more than they otherwise might for fear of being attacked. Does dissent from climate skeptics really have these effects on climate science?

3 Evidence of distortion of risk assessment in climate research

As I will show in this section, there is a correlation between climate skepticism and systematic errors in mainstream climate science: although climate skeptics repeatedly assert that mainstream climate science, such as that reviewed in Intergovernmental Panel on Climate Change (IPCC) reports, exaggerates climate change and its impacts, (1) empirical studies refute this. Indeed, to the extent that mainstream climate science tends to err, it errs on the side of *under*estimating the effects of global climate change (Brysse et al. 2013; NRC 2009; Rahmstorf et al. 2007; UNEP 2009). Furthermore, there is (2) significant anecdotal evidence from climate scientists that incessant attacks from climate skeptics is causing scientists to moderate their claims, to the point of systematically underestimating climate change and climate change impacts (Brysse et al. 2013; Freudenburg and Muselli 2010; Lewandowsky et al. 2015; Medimorec and Pennycook 2015). These two lines of evidence suggest that dissent from climate skeptics is at least partially responsible for systematic errors in climate science.

(1) There is strong empirical evidence that IPCC reports consistently err on the side of underestimating climate change and its impacts (Freudenburg and Muselli 2010). For example, Rahmstorf et al. (2007) compare predictions from the IPCC's Third Assessment Report for mean global temperature change, sea-level rise, and atmospheric carbon concentration with updated observations and find that the report did not exaggerate climate change impacts, but in some cases (particularly sea-level rise) underestimated them. A report from the U.S. National Research Council finds that the projections of previous IPCC reports were "too conservative" regarding CO_2 emissions, global mean surface temperature and sea-level rise (NRC 2009, pp. 11–12). Similarly, the United Nations Environment Programme's *Climate Change Science Compendium* examines predictions from over 400 peer-reviewed studies published following the IPCC's Fourth Assessment Report and finds that atmospheric carbon concentration and climate change impacts, particularly sea-level rise, were more severe than predicted (UNEP 2009). Brysse et al. (2013) discuss a number of additional studies confirming this trend. Also, Medimorec and Pennycook (2015) concluded in

a language analysis, in which they compared the latest IPCC report with a skeptical report from the "NIPCC" (Nongovernmental International Panel on Climate Change) organized by a conservative think tank, the *Heartland Institute*, that the IPCC report uses more cautious (as opposed to certain) language than the NIPCC. This indicates that the

> political controversy over climate change may cause proponents' language to be conservative (for fear of being attacked) and opponents' language to be aggressive (to more effectively attack). [… This finding flies] in the face of claims that IPCC scientists are 'alarmist' and less scientifically rigorous than climate skeptics. (Medimorec and Pennycook 2015, pp. 597, 603)

The trend to underestimate climate change and its impacts becomes visible by comparing the development of findings in the IPCC assessment reports: the risk estimations of climate change impacts have increased from report to report. This becomes evident when one considers the history of the famous "burning embers diagram." First introduced in the third assessment report in 2001 (IPCC 2001, WG II, SPM, 5), it is used to illustrate the IPCC's risk estimations of the five reasons for concern (i.e., (i) risks for unique and threatened systems, (ii) the frequency and severity of extreme climate events, (iii) the global distribution and balance of impacts, (iv) the total economic and ecological impact, and (v) irreversible large-scale and abrupt transitions). It was updated in the *Proceedings of the National Academy of Sciences of the United States* in 2009 (Smith et al. 2009), and most recently in the AR5, the IPCC's fifth assessment report (IPCC 2014, WG II, chap. 19, pp. 1073–1074). Tracing this diagram's history one can observe how risk estimations in the reports have increasingly worsened (Figs. 1, 2).

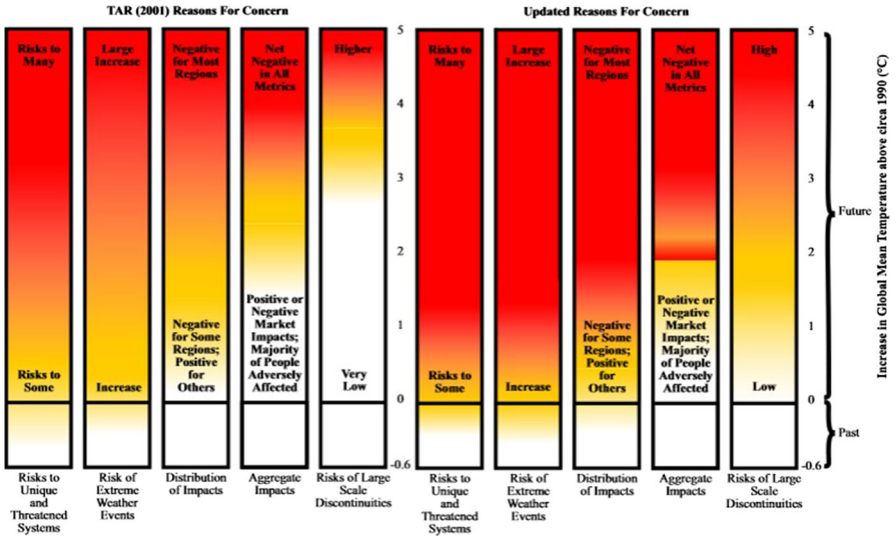

Fig. 1 Update of the original diagram (*left*) in Smith et al. (2009)

There are[2] a number of potential explanations for this trend. First, the fact that risks increased does not necessarily mean that the risks were previously underestimated. In fact, the development of risk estimations of the five reasons for concern, for example, was caused to a large extent due to an improvement of the evidence, particularly measurement data from and knowledge about the respective social systems and ecosystems (Smith et al. 2009). This caveat notwithstanding, there has been an apparent tendency to systematically neglect negative findings in the IPCC reports.

Brysse et al. (2013) hypothesize that at least part of the explanation is the tendency to "err on the side of least drama," which is a tendency stemming from "the scientific values of rationality, dispassion, and self-restraint" (327). Traditionally, scientists have emphasized avoiding false positives over false negatives. This is perhaps a good strategy, if there are no significant social, political, or economic consequences of false negatives. In the case of the hypothesis of anthropogenic climate change, however, the consequences of false negatives are almost certainly more severe than false positives. Be that as it may, this tendency on the part of the scientific community to err on the side of least drama is likely a part of the explanation for the trend of underestimating climate change and its impacts. However, it likely does not suffice as a full explanation, as Brysse et al.(2013, p. 333) acknowledge.

Another part of the explanation might be that the IPCC seeks to arrive at "joint acceptance" (in order to endorse a general consensus view and present a "united front" to the public; this might lead to "soft-peddling" of certain possibilities and to an adoption of relatively conservative assumptions).[3] However, if correct, one might wonder how this state of affairs comes about. Seeking for an answer to this question leads to that part of the explanation I consider most pivotal here: the continual attacks of climate skeptics, their manufacture of epistemically detrimental dissent, and, eventually, the anti-scientific atmosphere leading scientists, as Raymond Bradley puts it, to "keep a low profile and go with the flow."(Bradley 2011, p. 137; cf. also Brysse et al. 2013; Freudenburg and Muselli 2010; Lewandowsky et al. 2015; Medimorec and Pennycook 2015). Anecdotal evidence from climate scientists adds increasing weight to this diagnosis.

(2) In the United States—and increasingly in Canada, the United Kingdom, and Australia—scientists defending the hypothesis of anthropogenic climate change face intense pressure from the fossil fuel industry and from many politicians. This pressure has, in many cases, influenced the claims that climate scientists are willing to make. For instance, in the spring of 1992, climate scientists were unjustly lambasted after their warnings that a major Arctic ozone hole could develop did not come to pass. An editorial from the conservative newspaper *The Washington Times* stated:

> This is not the disinterested, objective, just-the-facts tone one ordinarily expects from scientists. Nor is it the stuff of peer-reviewed science, the consensus-setting standard that helps establish what is or is not 'science.' This is the cry of the apocalyptic, laying the groundwork for a decidedly non-scientific end: public policy (quoted in Brysse et al. 2013, p. 331).

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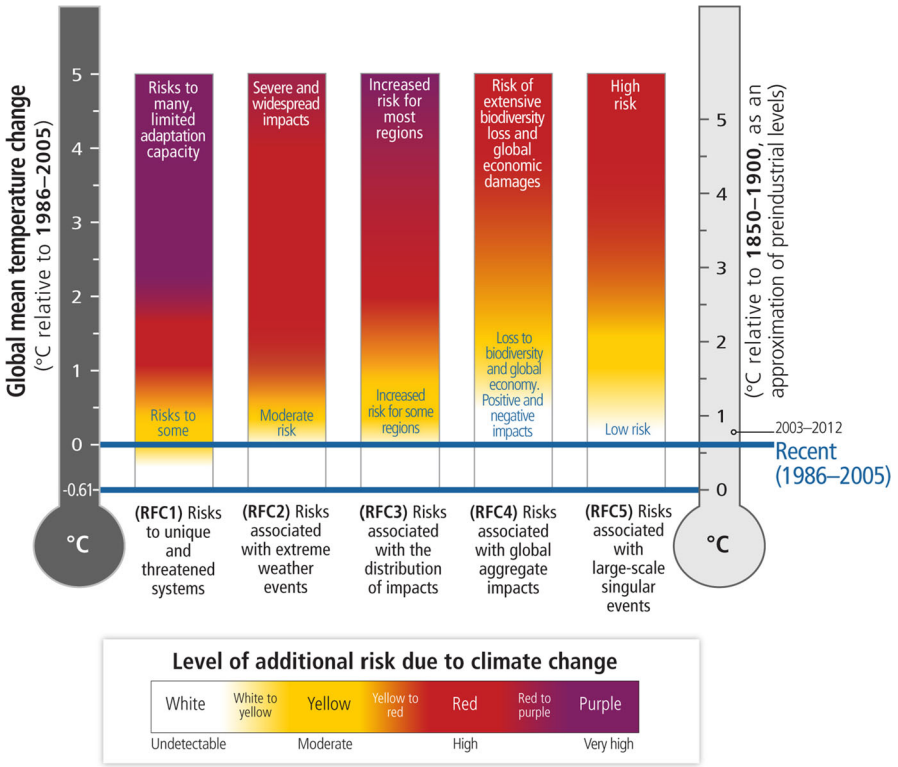

Fig. 2 The diagram in the AR5 of 2014. While this version uses a different baseline than the previous ones (1986–2005 vs. 1990) another category was introduced now, namely the inclusion of purple, in order to indicate a risk increase from high risk to very high risk

Other conservative media outlets, such as the *Wall Street Journal*, responded with similarly harsh comments. These responses came as a surprise to the scientific community, and they influenced how it would act in the future. Following this incident, according to a NASA spokesperson, the community of climate scientists would proceed with even more caution: "We aren't going to put out [another] press release until we have a complete story to tell" (quoted in Brysse et al. 2013, p. 331). This tendency toward extreme caution is evident in more recent debates about anthropogenic climate change. For example, Oreskes and Conway report:

> At a recent conference, a colleague told one of us that in IPCC discussions, some scientists have been reluctant to make strong claims about the scientific evidence, lest contrarians 'attack us'. Another said that she'd rather err on the side of conservatism in her estimates, because then she feels more 'secure' (Oreskes and Conway 2010, pp. 264–265).

These reactions of mainstream climate scientists suggest that dissent from climate skeptics is epistemically detrimental. It is used to attack and intimidate mainstream scientists, to the point that they systematically bias their research toward underestimating climate change and its impact. This empirical evidence serves to confirm the

"inductive risk account of epistemically detrimental dissent", in that it shows how research exhibiting a systematic intolerance of producer risks at the expense of public risks can be deployed as an ideological and epistemically detrimental attack against scientists who defend claims that are contrary to powerful political and economic interests.

However, it seems important to recognize that climate skepticism can also have opposing effects. Some have argued that the prevalence of climate skepticism can lead mainstream scientists to *over*estimate the effects of climate change in order to avoid being labeled as climate-change deniers by others in the mainstream research community:

> [Some scientists] are reluctant to publish or publicly discuss research that might—incorrectly—be used to question existing scientific knowledge. For example, there are genuine disagreements about how best to model cloud formation, water vapour feedback and aerosols in general circulation paradigms, all of which have significant effects on the magnitude of global climate change predictions [...]. Yet, some scientists are hesitant to make these disagreements public, for fear that they will be accused of being denialists (Melo-Martín and Intemann 2013, p. 232).

Similarly, climate researcher Claire Parkinson states: "It's gotten so polarized that scientists who go against the mainstream worry they'll be treated poorly in the press. People will just say, 'Oh, they've been bought off by the oil industry,' but that's not always true" (Parkinson quoted after Schmidt 2010, p. A538).

This possibility illustrates the complexity of the consequences that can result from epistemically detrimental dissent. One might initially expect that continual attacks by climate skeptics would influence mainstream climate scientists to moderate their claims, especially when the attacks are accompanied by threats backed by powerful political and economic interests. It is then perhaps surprising that climate skepticism could also bias some scientists to overstate the risks of climate change. Certainly, that is not the effect that is intended by the dissenters. However, while acknowledging the point made by de Melo-Martín and Intemann and others, the empirical evidence suggests that the primary consequence of dissent from climate skeptics is indeed to bias mainstream researchers toward underestimating the risks of climate change. As Freudenburg and Muselli conclude, there is "significantly stronger support for the testable prediction [...] that far from *over*stating the degree of change that is likely, scientific consensus statements such as those provided by the IPCC are more likely to *under*state the actual degree of climate disruption taking place" (Freudenburg and Muselli 2010, pp. 489–490, emphasis in original).

Finally, it is worth noting that, even if dissent from climate skeptics leads some scientists to overestimate the extent and impacts of climate change, this would still confirm the general problem: dissent systematically tolerating public risks over producer risks (among other things) is epistemically detrimental.

4 The Millian argument against the freedom of inquiry

Given that dissent stemming from climate skeptics can be epistemically detrimental in the sense discussed above, what should be done in response? In what follows, I wish to examine the normative consequences of the inductive risk account for research aiming to undermine the hypothesis of anthropogenic climate change (H_{acc}). To do so, I will draw on Kitcher's discussion of the freedom of research in *Science, Truth, and Democracy*. Kitcher (2001, chap. 8) articulates two political asymmetries and three epistemic asymmetries, arguing that if a research topic meets all of these asymmetries, then it is unethical to pursue that research. The research topic he discusses is whether or not there is a biological basis for intelligence differences between different social groups.

If one investigates the question of whether or not there is a biological basis for intelligence differences, the best social consequence that one can reasonably hope for is the maintenance of the status quo: If the outcome of one's research is that there is no biological basis for intelligence differences, then (as a rule) one's research will be ignored by society. On the other hand, if the outcome is that there is indeed a biological basis, then that will tend to have a detrimental effect on marginalized groups. However, in actuality, such research is likely to produce indecisive results, as Kitcher points out. Yet, even indecisive results can strengthen extant societal biases that women or immigrants have less intellectual capacities. Therefore, Kitcher concludes that any research on such topics should be avoided. Note that he does not argue that such research should be prohibited, as this could benefit contrarians by allowing them to portray themselves as modern day Galileos, "opposing widely held views in the interest of truth" (Kitcher 2011, p. 101). Rather, he argues that it is unethical to pursue such research.

In what follows, I will apply the case of climate research to the five asymmetries Kitcher identifies. I argue that research on H_{acc} meets three of the five asymmetries, and on this basis, conclude that it is unethical to pursue research attempting to undermine H_{acc}.

The two political asymmetries, which I have adapted to the case of research on H_{acc}, are as follows:

> (PA1) If research on H_{acc} is pursued, and if the evidence is taken to favor the hypothesis $\sim H_{acc}$, then there will be (at least) a partial reversion to $\sim H_{acc}$ among members of the public, in that belief in $\sim H_{acc}$ becomes stronger; in contrast, if the evidence is taken to favor H_{acc}, there will be no significant further removal of the residues of $\sim H_{acc}$.

> (PA2) If belief in $\sim H_{acc}$ becomes widespread, then the quality of the lives of those affected by climate change will be further reduced through the withdrawal of existing programs of climate change mitigation and adaptation.

There are strong reasons to believe that both PA1 and PA2 are satisfied in at least many parts of the world today—particularly in the USA. Regarding PA1, it can be politically and economically prudent to believe that H_{acc} is either false or highly uncertain, because many climate change mitigation and adaptation measures require

extensive changes to political and economic structures. In this light, many politicians and members of the public will exaggerate the importance of studies casting doubt on H_{acc} (Oreskes and Conway 2010; Mann 2012).

In addition, PA1 is supported by the US media's naïve attempt to achieve 'balance' by presenting the views of both proponents and skeptics of H_{acc} as if they were equally supported by evidence (Weart 2011). As many studies have shown, climate skepticism ultimately receives disproportionate media attention in the US. For example, Boykoff and Boykoff (2004) examine media coverage of climate change between 1988 and 2002 and find that 52.65% of articles gave "roughly equal attention" to H_{acc} and $\sim$H$_{acc}$. At the same time, Oreskes (2004) examined 928 abstracts of scientific studies on climate change published between 1993 and 2003 and finds that none of these studies question H_{acc}. More recently, Cook et al. (2013) and Abraham et al. (2014) have provided more data confirming the overwhelming consensus on H_{acc} in the scientific literature. Moreover, Abraham et al. (2014) revealed significant methodological flaws within the contrarian literature that cannot be found in the mainstream scientific studies on H_{acc}. Thus, the tendency of the US media to seek 'balance' in this way is, according to Kitcher, "a disastrous flaw in the public institution for disseminating information" as "American newspapers have consistently reported the dispute [about climate change ...] as if there were two sides with equal credentials" (Kitcher 2011, pp. 183 and 245).[4]

PA2 clearly holds, particularly given the fact (mentioned above) that many climate change mitigation and adaptation measures require extensive changes to political and economic structures. If the belief in $\sim H_{acc}$ becomes widespread, then there will be no compelling reason to pursue these difficult changes, and failing to make these changes will in turn affect the quality of the lives of those affected by climate change.

The three epistemic asymmetries (EA1–EA3), again adapted to the case of research on H_{acc}, are:

(EA1) There are significant differences between the probabilities assigned to $\sim H_{acc}$ and the probabilities that would be assigned by using the most reliable methods for assessing evidence; the probabilities assigned to $\sim H_{acc}$ by members of society will typically exceed the probabilities that reliable methods would yield, and the probabilities assigned to H_{acc} correspondingly will be reduced.

(EA2) With high probability, the evidence obtained by the pursuit of the question of whether human activities are causing climate change will be indecisive, in that the most reliable methods of assessing that evidence would assign a probability of roughly 0.5 to the hypothesis.

(EA3) The bias in favor of $\sim H_{acc}$ is so strong that most members of society will take evidence that, when assessed by the most reliable methods, would yield a probability for $\sim H_{acc}$ of roughly 0.5, to provide a probability close to 1 on the hypothesis.

[4] Note that the contrarian view to H_{acc}, and other conspiratorial theses about climate science are also widely disseminated by social media such as Twitter or weblogs (e.g., Jang and Hart 2015; Lewandowsky 2014).

EA1 is satisfied in many countries (especially, again, in the USA), in part due to the fact that PA1 is satisfied. The most reliable methods assign a probability of nearly 1 to H_{acc} (as evidenced by the conclusions of IPCC reports). In many countries, however, large segments of the population believe that the evidence for H_{acc} is indecisive (e.g., ABC Poll 2006; Pew Poll 2009; Public Polling 2013; Rasmussen Reports 2011; Yale Poll 2014).

Things are different, however, regarding EA2. In Kitcher's discussion of intelligence differences, the second epistemic asymmetry is satisfied: the most reliable methods would assign a probability of around 0.5 to the hypothesis that there is a biological basis for intelligence differences. This is not the case with regard to H_{acc}: again, the most reliable methods assign H_{acc} a probability of close to 1. Therefore, EA2 is false.

EA3, moreover, is at the very least exaggerated. If its wording were that "the bias in favor of $\sim H_{acc}$ is so strong that *many* members of the society" (or weaker still, "some" members of the society), then EA3 would hold, but as it stands, EA3 is probably false.

Kitcher argues that it is unethical to pursue research projects that meet all five asymmetries, the reason being that the expected (political and epistemic) utility of pursuing such projects is negative.

As I have argued, research on H_{acc} meets only three of the five asymmetries: The results of research on H_{acc} are decisive (with p of H_{acc} being nearly 1) and making this matter public clearly improves the epistemic and political situation. It is, thus, following Kitcher's line of argumentation, beneficial to do research on H_{acc}, but, as the first three asymmetries are met by H_{acc}, it is of little benefit to do research seeking to confirm $\sim H_{acc}$. There are many scientists pursuing projects attempting to undermine H_{acc}, and there are many incentives (e.g., funding from conservative think tanks and the oil industry) for doing so. Given that research aiming to undermine H_{acc} will likely conclude $\sim H_{acc}$, and given that the most reliable methods assign H_{acc} a very high probability, the fact that research on H_{acc} meets PA1, PA2, and EA1 implies that the expected (political and epistemic) utility of pursuing research that seeks to confirm $\sim H_{acc}$ will be negative.

Therefore, this finding suggests that research on H_{acc} ought to be pursued, while pursuing or incentivizing research attempting to confirm $\sim H_{acc}$ is unethical, in accordance with Kitcher's argument. However, there has been a dispute about the issue of whether it is morally and epistemically appropriate to "target" dissent on $\sim H_{acc}$.

5 Appropriately 'targeting' dissent

So far I have shown that some types of dissent such as dissent produced by climate skeptics is epistemically detrimental. Further, I have raised the question of what the normative consequences are which follow with respect to such dissent. Drawing on Kitcher's argument for constraints on free inquiry I have argued that, for political and epistemic reasons, such dissent ought not to be pursued. Following Kitcher, I did not conclude that such dissent should be prohibited. However, one might wonder what the practical consequences are which this normative conclusion might then have. This is a question that is thoroughly discussed by Inmaculada de Melo-Martín and Kristen Intemann who have recently (2013, 2014) argued that "targeting" dissent is morally

and epistemically inappropriate since a general disqualification of deviating opinions would "reinforce self-censorship and stifle legitimate and scientifically informed debate. If this happens, scientific progress is hindered" (Melo-Martín and Intemann 2013, p. 233).

By "targeting" de Melo-Martín and Intemann mean (1) masking dissent, (2) silencing dissent, and (3) discrediting dissenters. In what follows, I wish to discuss all three "strategies of targeting dissent" and finally to ask whether—in light of climate skepticism—they are really as inappropriate as de Melo-Martín and Intemann argue.

(1) With respect to masking dissent, de Melo-Martín and Intemann claim that "scientists may mask existing disagreements by presenting to the public and policy makers only those scientific claims about which they can all agree while omitting or downplaying those aspects about which disagreements exist. […] the consensus [about the extent of global warming] presented is somewhat superficial because it relies on over simplifications that ignore or mask existing disagreements." (2014, pp. 596–597)

By pointing out "masking of dissent", de Melo-Martín and Intemann are drawing on Beatty (2006), who demonstrated how a panel of geneticists convened by the U.S. National Academy of Sciences (NAS) in the 1950s "masked existing dissent" about the question of the extent to which humans can safely be exposed to radiation. According to Beatty, the geneticists did so because they (a) wanted to present a unified front, so that physicists would make claim to expertise regarding the matter, and (b) considered the public to be in need of unanimous expertise on such an intricate issue. While the scientists' motives are quite understandable it seems equally uncontentious that this "masking of dissent" is problematic for both epistemic and non-epistemic reasons, as issues of such political and public importance must be addressed with the utmost caution.

Regarding climate science, however, there is actually no reason to assume that such "masking/oversimplification" is to be found. In the IPCC reports, one will find that many uncertainties and variances between different studies are thoroughly and carefully discussed leading to highly balanced and extensive conclusions taking a wide variety of positions into account.

Yet, as an example of their argument, de Melo-Martín and Intemann do not proceed by criticizing the work of climate scientists, but focus on a meta-study by Oreskes and Conway instead, in which it was shown that there is unanimous consensus on the existence of anthropogenic climate change in the scientific literature. Hence, Oreskes and Conway concluded that anthropogenic climate change should be called a fact. De Melo-Martín and Intemann find that "[d]emonstrating the strength and breadth of the existing scientific consensus is correctly thought to help put dissenting views in perspective, so that they are not given more weight than they deserve. But the emphasis on the existing consensus also works to mask the disagreements that do exist." (2014, 597) One might wonder, however, what disagreement is being masked here as there is in fact hardly any scientific disagreement to be found regarding anthropogenic climate change. Hence, the specific case of anthropogenic climate change being called a fact does not serve as a good example here.

(2) "Silencing dissent" means to ignore dissent to the point that the dissenting view dies on the vine due to the swift disqualification of its proponents: scientific outsiders in particular who actually have good reasons for criticizing mainstream views

may become silenced by being discredited as unreliable. As, for example, Ludwig (2016) points out "many forms of marginalization have little to do with epistemic virtues and are more adequately explained in terms of political factors such as the privilege of deciding what questions count as relevant." Ludwig illustrates this with regard to the instance of a Canadian committee that was convened in order to examine the decline of a specific sheep population. Scientists in the committee did not take relevant traditional ecological knowledge of indigenous people seriously, dismissing it as plainly unreliable (ibid.).

In climate science, silencing dissent stems, according to de Melo-Martín and Intemann, from a "bunker mentality" of climate scientists. De Melo-Martín and Intemann refer to Grundmann (2012) analysis of the "climategate"-scandal, in which private emails from climate scientists were hacked and published, and find: "The Inspector General later found that there was no evidence that the CRU scientists were guilty of scientific misconduct […], although others have argued that the emails still demonstrate a lack of openness and 'bunker mentality' within scientific communities […]." (2014, p. 597) This view, however, seems problematic. The way how information is publicly discussed by climate scientists is—in contrast to the way how climate change deniers express their views—very cautious and nuanced (cf. Medimorec and Pennycook 2015). Rather than attesting a "bunker mentality" it seems more fitting to say that climate scientists appear to be intimidated (cf. Biddle and Leuschner 2015): that some dissenting views were criticized in the "climategate"-emails as not being worthy of further discussion was not due to a "lack of openness" or a "bunker mentality", but a consequence of the persistent, aggressive dissent by climate skeptics which has proven itself to be resistant to a fair debate (cf. Mann 2012; Medimorec and Pennycook 2015; Oreskes and Conway 2010). Given that the CRU was cleared of any wrongdoing by the Inspector General (NOAA 2011), what this hacking scandal in fact calls attention to is first and foremost the likelihood that climate skeptics would illegally hack into a university server and manufacture a controversy by intentionally misrepresenting the contents of email exchanges.

Thus, with respect to (1) and (2) de Melo-Martín and Intemann are doubtlessly correct that it would be inappropriate to politically infringe on science by any silencing or masking of dissent in order to legitimize political decisions more easily and expediently. However, there is not really any reason to assume that this is happening in climate science. On the contrary, the situation in climate science seems to be exactly the opposite: dissent on anthropogenic climate change is created by climate change deniers in order to mask reliable findings and silence "mainstream" scientists for the purpose of legitimizing the avoidance of political decisions, and this has severe consequences not only for public policy, but also for science.

Consequently, it appears to be the decisive factor to indeed "target" epistemically detrimental dissent by (3) revealing the motivation of its manufacturers because such dissent is an obstacle to both science and public policy. However, revealing and publishing "the financial or political ties that the dissenters have to think tanks or private industry" as well as discussing the problems that are related to such connections means, as de Melo-Martín and Intemann correctly emphasize, to discredit dissenters: this "strategy" "has been employed by scientists and science scholars [such as Oreskes, Conway, Shrader-Frechette, or Elliott]" (Melo-Martín and Intemann 2014, p. 598).

While I agree that the first two categories are highly problematic, but cannot be found in climate science (there is no reason to assume that there is any conspirative silencing or masking of dissenting views by the IPCC, climate scientists, or respective science scholars), the third category is more complicated, simply because the revelation of any dissenters' financial or political ties inevitably leads to them being discredited. By stressing this problem, de Melo-Martín and Intemann identify a sensitive point in the work of their colleagues who seek to reveal financial or political ties of dissenters.

De Melo-Martín and Intemann write: "While we share concerns about the extent to which dissent can have negative consequences, we argue here that targeting dissent *as an obstacle to public policy* is both misguided and dangerous" (Melo-Martín and Intemann 2014, p. 595, emphasis added). They argue that the problems with some types of dissent should be addressed more by educating the public and policymakers than by the three categories of "targeting" dissent:

> [… S]cience studies scholars should direct their attention towards questions such as: […] When does dissent *appropriately* undermine a scientific consensus? When is it *appropriate* for policymakers to ignore dissenting voices? [… I]n the context of science relevant to public policy, concerns about manufactured dissent would be better addressed by an examination of these questions, rather than by focusing on dissent as a problematic activity." (Melo-Martín and Intemann 2014, pp. 609–610, emphases added)

While I agree with de Melo-Martín and Intemann that one must carefully avoid "discouragement to conduct studies or publish findings that may be counter to dominant views" (Melo-Martín and Intemann 2014, p. 598), I do wonder how one can possibly know whether it is appropriate for policymakers to ignore dissenting voices if it is not allowed to "target" them in the way Oreskes, Conway, and others have done. In contrast to de Melo-Martín and Intemann, I consider the work by Oreskes, Conway and others an important source of information. Given my above line of argumentation, identifying institutions manufacturing dissent, publishing any such findings, and highlighting the detrimental effects that such manufactured dissent can have on both science and politics has been invaluable in order to answer the questions, which de Melo-Martín and Intemann so correctly identify as urgent, in the right manner ("When does dissent appropriately undermine a scientific consensus? When is it appropriate for policymakers to ignore dissenting voices?"). Without doubt such work has a beneficial, namely an enlightening, and not a (politically or epistemically) detrimental effect since for people to be able to dismiss misinformation, they must be made suspicious of the source of a (false) claim. In the absence of such suspicion or an explanation for why false claims may have been made, people will continue to rely on false information even after its correction. The lacking credibility of these "skeptic" arguments and the reasons underlying their propagation must be highlighted for the public to be able to give the requisite credence to scientific information (Lewandowsky et al. 2012).[5]

Moreover, this benefit concerns not only the public and politics, but also science itself. If scientists became more aware of the "manufacture of doubt" and its influence

[5] Thanks go, again, to an anonymous referee of this journal for this point.

on their work, they would be in a better position to deliberately counteract it. For the sake of well-ordered education systems and a well-informed public it seems necessary to discuss under which circumstances dissent can have, and does in fact have, negative consequences.

In this light, I disagree with de Melo-Martín and Intemann that revealing and publishing any financial or political ties of those who manufacture dissent is in danger of hindering scientific progress (cf. Melo-Martín and Intemann 2013, p. 233). On the contrary, the climate science community—as well as relevant communities of scholars from related fields—have an ethical obligation to attempt to dismantle any such financial or political dependencies.[6] We need to be cognizant of them in order to identify whether dissent is manufactured and, as such, politically and epistemically detrimental—dissent that ought not to be pursued. Therefore, it is important to "target" some sorts of dissent, namely manufactured dissent by strategy (3), as such dissent is epistemically and morally inappropriate.

6 Conclusion

Dissent is not always epistemically fruitful. Given the way in which research is increasingly organized, manufactured dissent can be epistemically detrimental when it is used to attack mainstream scientists and to intimidate them into moderating their claims, which in turn can inhibit scientific progress. I have provided empirical evidence that dissent from climate skeptics is being used in this way and that it has the effect of biasing mainstream climate science towards underestimating climate change and its impacts.

Additionally, I have examined how scientists and others should respond to instances of epistemically detrimental dissent. Kitcher's discussion of constraints of the freedom of research reveals that dissent from the hypothesis of anthropogenic climate change should not be pursued or incentivized. However, it should not be restricted either, as prohibition would likely exacerbate the problem. Rather, epistemically detrimental dissent should be identified by scientists and science scholars who dismantle the financial and political interests that stand behind manufactured dissent making it. Even though concerns about an inappropriate disqualification of dissent (e.g., by silencing or masking it) are reasonable, this kind of "targeting" manufactured dissent is required in order to identify epistemically detrimental dissent and, in this way, to reliably inform science, politics, and the public. Thus, climate scientists and other related scholars have an obligation not only to communicate the results of high-quality climate science but also to attempt to debunk climate skepticism.

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[6] Note that responding to objections is a scientific core virtue. However, at the same time it is one reason why climate skepticism has epistemically detrimental effects: climate scientists have to respond over and over again to a large number of poorly qualified objections, slowing down scientific progress.

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