How Dissent on Gender Bias in Academia Affects Science and Society: Learning from the Case of Climate Change Denial

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Abstract

Gender bias is a recalcitrant problem in academia and society. However, dissent has been created on this issue. We focus on dissenting studies by Ceci and Williams, arguing that they reach conclusions that are unwarranted on the basis of the available evidence and that they ignore fundamental objections to their methodological decisions. Drawing on discussions from other contexts, particularly on manufactured dissent concerning anthropogenic climate change, we conclude that dissent on gender bias substantially contributes to (a) the exacerbation of biases in society and (b) an increasing number of attacks on researchers, making it both epistemically and socially problematic.

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1. Introduction

Despite much effort and multiple demands formulated over decades, women's underrepresentation in STEM fields continues to be a problem. In the US, women represent only 19% of graduates in physics, 29% in mathematics and statistics, 24% in engineering, and 20% in computer science (NSB 2018). Moreover, women with doctoral degrees in STEM continue to be employed at a lower rate: 19% of women between the ages 30 and 65 are unemployed compared to 8% of their male counterparts. And, women are less likely to be employed in a science and engineering occupation: 18% are employed in their fields of study compared to 33% of men (NSF 2019).

When it comes to understanding what causes women's underrepresentation in STEM, there is a storied debate that began, as Kristina Rolin (2006) shows, with Jonathan Cole's *Fair Science* in 1987. Cole argues that there are two possible explanations for the underrepresentation of women in science: overt discrimination and self-selection. In response to this simplification, feminists introduced the idea of subtle forms of discrimination such as a chilly climate and gendered practices, thus, calling into question the idea of women choosing to opt out of academia themselves, be it more or less voluntarily. The concept of subtle forms of discrimination provides a more complex and adequate picture of the distribution of agency and responsibility because it does not reduce the problem to a bifurcation in which there are "malicious agents" on the one hand and "helpless victims of discrimination" on the other. Instead, it envisages a richer concept of discrimination, one that includes the possibility that discrimination is sometimes an "unintended outcome of certain actions and social arrangements" (Rolin 2006, 132).

Gender bias, in its various forms, plays a central role in such subtle discrimination. Currently, evidence in a number of quantitative and qualitative, empirical and experimental studies is mounting, indicating that gender bias is not only present in academia (Steinpreis 1999; Bug 2010; Knobloch-Westerwick 2013; Handley et al. 2015), but also an important factor contributing to the gender gap (e.g., Nosek et al. 2009; Moss-Racusin et al. 2012; Reuben et al. 2014; Sheltzer and Smith 2014; Williams et al. 2014; Greenwald et al. 2015). Consequently, in recent times the role of gender bias in the academy has been subjected to heightened scrutiny by philosophers approaching the issue from such different angles as social philosophy, epistemology, or philosophy of science (e.g., Dotson 2011a, 2011b; Lee and Schunn 2011; Crouch and Schwartzman 2012; Hutchison and Jenkins 2013; Leslie et al. 2015; Brownstein and Saul 2016; Bright 2017; Leuschner 2019). In light of this robust body of research—combined with the accumulation of anecdotal evidence provided by men and women from virtually all academic fields—it is reasonable to conclude that gender bias plays a significant role in causing and reproducing the underrepresentation of women in many academic fields.

Such findings notwithstanding, research on gender bias in academia is still continually subject to attacks alleging their lack of reliability or trustworthiness, as was most recently the case in new studies claiming to present evidence to the contrary. In their work published in 2011, social psychologists Wendy Williams and Stephen Ceci conduct a review of 20 years of correlation studies on gender discrimination in science, concluding that "the evidence shows women fare as well as men in hiring, funding, and publishing (given comparable resources)." Further, they find that "continuing to advocate strategies successful in the past to combat shortages of women in math-based fields today mistakes the current causes of women's underrepresentation" (Ceci and Williams 2011, 3161).

In a 2014 monograph, they conduct an extensive life-course comparison of women in both math-intensive and non-math-intensive fields, claiming that women have come close to parity with men. They find that women doctorates in math-intensive fields "have equivalent access to tenure-track academic jobs in science, and they persist and are remunerated at comparable rates [to men]" (Ceci et al. 2014, 75). Furthermore, they conclude by explicitly rejecting the existence of gender bias in the academy: "Our analyses and research synthesis led us to […] the conclusion that the overall state of the academy is largely one of gender neutrality." (Ceci et al. 2014, 125)

More recently, Williams and Ceci (2015a) also published an experimental study on faculties from 363 universities and colleges in the US, in which they evaluate hypothetical female and male candidates for a tenure-track position. According to the study results, there is "a 2:1 preference for women by faculty of both genders across both math-intensive and non-math intensive fields, with the single exception of male economists, who showed no gender preference" (Williams and Ceci 2015a, 5360). With this experimental study, the authors aim to fill the lacuna in the literature on gender bias in hiring where, according to them, "no current experimental study demonstrating sexist hiring is based on actual faculty members who were asked to rate identically qualified tenure-track assistant professor applicants" (2015a, 5361). Having obtained positive results for women candidates, Williams and Ceci go on to conclude that "[a]fter decades of overt and covert discrimination against women in academic hiring, our results indicate a surprisingly welcoming atmosphere today for female job candidates in STEM disciplines, by faculty of both genders, across natural and social sciences in both math-intensive and non-math-intensive fields […] [I]t is an auspicious time to be a talented woman launching a STEM tenure-track academic career, contrary to findings from earlier investigations alleging bias" (2015a, 5364–65).

Ceci and Williams' results are surprising and unexpected as they challenge and, in many cases, are diametrically opposed to mainstream research on gender bias. On the basis of the wide-ranging conclusions that the authors reach they present a neutral or even positive picture for women seeking academic careers, which seems to

undermine the case for the existence of gender bias in academia. They imply a strong critical stance against not only the testimonies of multiple women who have suffered gender discrimination in their academic careers, but also against a swathe of scientific research confirming the impact of gender bias in the academy.

In this paper, we will argue that research denying gender bias in academia is socially and epistemically detrimental. We will focus on the example of Ceci and Williams' research and draw a parallel between their studies and studies denying anthropogenic climate change. Building on the "Inductive Risk Account of Epistemically Detrimental Dissent" (Biddle and Leuschner 2015), we will argue that, operating similarly to climate change denial, denial of gender bias in academia is epistemically problematic given current societal conditions (section 2). Moreover, drawing on Kitcher's "Millian argument against the freedom of inquiry" we will argue that Ceci and Williams' research is also socially problematic as it co-occurs with political and epistemic societal asymmetries (section 3). We will conclude that research denying the existence of gender bias has serious social and epistemic effects: it not only strengthens the already pervasive social biases of contemporary societies but also stifles discussion as intimidated researchers tend to become reluctant to address certain questions or to bring certain hypotheses to the table in the first place.

However, before we begin it should be noted preemptively that targeting specific dissenting views may strike some as dangerous, e.g., as a potential pathway to censorship, silencing, and other unscientific attitudes. After all, society praises science for not being dogmatic and for thriving on debate and criticism. Indeed, Inmaculada de Melo-Martín and Kristen Intemann (2014; 2018, ch. 5) stress this point in particular. However, manufactured dissent does not actually contribute to scientific progress; rather it, in fact, actively obstructs scientific practice, misinforming both policymakers and the public (Leuschner 2018; Nash 2018). It is, therefore, *appropriate* to disqualify such *inappropriate* dissent because the consequences of not doing so may be even more dangerous. A good example of this risk is illustrated by the tobacco industry whose dissenting campaign led to the deaths of millions of people worldwide (Proctor 2012). Given the growing number of documented cases of manufactured dissent (McGarity and Wagner 2008; Michaels 2008; Oreskes and Conway 2010; Elliott 2011; Proctor 2012; Markowitz and Rosner 2013; Gillam 2017), the distinction between epistemically fruitful and epistemically detrimental dissent seems more pressing now than it ever was. The case of dissent on gender bias in academia is, as we will now argue, another case of epistemically detrimental dissent.

2. The Inductive Risk Account of Epistemically Detrimental Dissent

Through an analysis of climate change denial, Justin Biddle and Anna Leuschner—also a co-author of this paper—have provided, an "Inductive Risk Account of Epistemically

Detrimental Dissent" (IndRA) (Biddle and Leuschner 2015). Without ignoring the importance of dissent for scientific practice, they argue that, in some cases, dissent can function to the detriment of the epistemic goals of science. The IndRA identifies four jointly sufficient (but not necessary) conditions for epistemically detrimental dissent:

"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." (Biddle and Leuschner 2015, 273)

Thus, dissent meeting these conditions is epistemically detrimental as it affects academic debate. In climate science, for example, the discourse has been seriously affected by dissent on climate change. In this context, "dissent on climate change" does not mean "a skeptical view of the validity and utility of [climate …] models", but, in accordance with Riley Dunlap (2013) and Myanna Lahsen (2008), the case of "dissident" or "contrarian scientists" who "strongly criticize climate science" (Biddle and Leuschner 2015). Such dissent has contributed substantially to a social atmosphere in which climate scientists are targeted by aggressive personal attacks from climate change deniers. Climate scientists are confronted with people touting manufactured pseudo-evidential claims to disprove their findings, and they are subjected to continual doubt with regard to their competence and reliability, eventually creating an anti-scientific atmosphere leading many of them, as Raymond Bradley puts it, to "keep a low profile and go with the flow" (Bradley 2011, 137; see also Brysse et al. 2013; Lewandowsky et al. 2015; Medimorec and Pennycook 2015). As Oreskes and Conway write in *Merchants of Doubt*: "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, 264–65)

Consequently, climate change deniers have and continue to obstruct scientific progress because "scientists fear to address certain topics and/or to defend hypotheses as forcefully as they believe is appropriate" (Biddle and Leuschner 2015, 262).[1]

[1] There is discussion on various details of the IndRA (e.g., Le Bihan and Amadi 2017; Carrier 2018; de Melo-Martín and Intemann 2018, ch. 5; Winsberg 2018, ch. 13.4) which we cannot address here as this would go beyond the scope of this paper. For the purpose of our argument, we accept the IndRA as is and apply it to the case of dissent on gender bias.

The case of climate change denial shows that dissent meeting the four IndRA conditions is conducive to polemic criticism and concomitant personal attacks on researchers. This, in turn, has epistemically detrimental effects on those involved in the criticized approach given that the dissent gains powerful support in the society in which it is embedded. Researchers tend to feel intimidated, thus, endeavoring to avoid any failures by means of exceptional industriousness; they become reluctant to bring any aspect to the table that may not have been thoroughly thought through; or they even become averse to addressing specific questions at all (Brysse et al. 2013; Lewandowsky et al. 2015; Biddle et al. 2017; Leuschner 2018).

In what follows, we argue that the recent studies denying the existence of gender bias in the academy meet the four conditions of the IndRA and, therefore, are prone to producing similarly problematic consequences. Of course, there are no producer and consumer risks involved in this case. However, this is only a matter of wording: if we speak more generally of risks of type I and II errors instead of producer and consumer risks, then, we argue, the IndRA can be easily applied to the case of dissent on gender bias in academia.

Condition 1 is clearly met due to the huge amount of empirical and anecdotal evidence of gender discrimination in academia. Claiming that these problems belong to the past, as Ceci and Williams do, and that things are just fine now sends the wrong message, i.e., that it is the women's fault if and, indeed when, they do not succeed. This attitude could in fact discourage women instead of giving them the opportunity to understand the problems they face and make informed decisions accordingly. Moreover, as Carole Lee (2016, 266) convincingly emphasizes, the dissent can be detrimental to affirmative action and other programs seeking to support women academics.

Condition 3 is met here as well since Ceci and Williams, despite numerous objections (Zevallos 2014; Williams and Smith 2015), persist in rejecting the well-supported hypothesis that there is gender bias in academia. We will show this in more detail in the following section.

And, condition 4 is also met: the risks of type I and type II errors fall largely upon different parties. In particular, wrongly accepting the hypothesis that there is gender bias in academia would lead to measures supporting women academics even though they were not required. This would be both costly to universities and unfair to men, while wrongly rejecting the hypothesis would, on the other hand, be especially harmful to women.

When it comes to condition 2, we need to go into more detail in order to show how Ceci and Williams' studies flout conventional scientific standards. We will examine some of the most worrisome methodological concerns regarding Ceci and Williams' studies without trying to be exhaustive. We will begin with the reviews of their

correlational studies (Ceci and Williams 2011; Ceci et al. 2014), and then examine their latest experimental results (Williams and Ceci 2015a).

3. Methodological Concerns Regarding Ceci and Williams' Research

As mentioned above, Ceci and Williams' 2011 study is based on a review of correlational studies (i.e., studies investigating correlations between sex and disadvantages in academia), concluding that gender discrimination in academia no longer exists. Carole Lee identifies substantial methodological problems in these correlational studies: "[…] despite their laudable efforts to control for quality indirectly through proxy, the correlational studies cited by Ceci and Williams cannot rule out the possibility that a quality confound is responsible for cancelling out the impact of ongoing implicit gender bias in journal review, grant funding, and hiring. Nor can the correlational studies rule out the possibility of a quality-related sample bias in the sample of women and men […]" (Lee 2016, 266).

The correlational studies draw their conclusions exclusively on the basis of submission and acceptance rates. They do not take the possibility into account that there could be gender-specific differences in the quality of manuscripts, grant applications, or job dossiers. However, such differences are likely to exist: there is empirical literature suggesting that women—on the whole—tend to submit higher-quality papers than men in order to be maximally prepared for biased scrutiny (Sonnert and Holton 1995, 152–54; Valian 1998, 264–65, 275; Williams et al. 2014; Lee 2016, 266; Bright 2017; Hengel 2017; Card et al. 2020).

Moreover, there are issues with Ceci and Williams' interpretation of their findings. In one of their more recent studies, Ceci and Williams once again claim for mathematically intensive fields that "manuscript reviewing and grant funding are gender neutral: Male and female authors and principal investigators are equally likely to have their manuscripts accepted by journal editors and their grants funded, with only very occasional exceptions" (Ceci et al. 2014, 76). From these results they reach the conclusion that: "although in the past, gender discrimination was an important cause of women's underrepresentation in scientific academic careers, this claim has continued to be invoked after it has ceased being a valid cause of women's underrepresentation in math-intensive fields" (Ceci et al. 2014, 76). However, there is a significant issue with this interpretation. From the fact that there is no disparity in outcomes disadvantaging women in one specific academic context (e.g., manuscript or grant proposal assessment), it cannot be concluded that women do not experience discrimination in *any* academic context. For even if we allow for the possibility that gender bias is no longer present in *those* contexts (and that is a big "if"), that does not mean that there is no longer gender discrimination anywhere in the academy. However, this is exactly

what the conclusions of their studies suggest: "[…] that the overall state of the academy is largely one of gender neutrality" (Ceci et al. 2014, 125).

As a consequence, in order to explain the gender gap, the authors are forced into the position of claiming that the main cause of women's underrepresentation in STEM "is not that women applicants are not being hired, but rather that they are choosing to opt out of academic science" (Ceci et al. 2014, 120). This explanation is highly problematic due to the fact that personal choices are constrained by institutional factors where gender bias is present. As Williams and Smith claim: "If science designs its professional ideals around a man married to a homemaker, that's sex discrimination […] Requiring women to sacrifice having children as the price of an academic career in science guarantees a paucity of women" (2015, 5; see also, Zevallos 2014). In other words, personal choices are not made in an environment free of gender discrimination, contrary to what Ceci and Williams suggest. In this sense, their conclusions present faulty overgeneralizations insofar as they make unwarranted assumptions with regard to women's freedom of choice.[2]

With respect to their most recent experimental study, Williams and Ceci (2015a) compare men and women job candidates only at the highest level and, at least with respect to faculty hiring, one can remain skeptical as to how methodologically sound this is. There are probably important differences between career stages, and it seems likely that gender bias affects women academics mostly early on in their career, "before they reach the stage of being perceived as academic superstars" (Brownstein 2015, referring to Bryce Huebner). This view is strongly supported by a survey asking 238 male and female academic psychologists to assess applications from men and women, finding significant differences between evaluations of the suitability for hiring and those for tenure with regard to male and female academics:

> Both men and women were more likely to vote to hire a male job applicant than a female job applicant with an identical record. Similarly, both sexes reported that the male job applicant had done adequate teaching, research, and service experience compared to the female job applicant with an identical record. In contrast, when men and women examined [… a] highly competitive curriculum vitae of [… a candidate] who had gotten early tenure, they were equally likely to tenure the male and female tenure candidates and there was no difference in

[2] We would like to acknowledge that in their 2011 paper, Ceci and Williams describe women's individual choices as being "freely made or constrained", and even suggest that the issue of whether women's decision to pull away from research "is a consequence of choices freely made, or constrained by gendered expectations related to work-family balance coupled with inflexibility in tenure-track timetables and employment options, is worthy of study" (3160). However, they discard such social constraints as factors playing a role in discriminatory practices in the academy when they reach their conclusions. Furthermore, the possibility of "socially constrained" decisions is not mentioned in later papers.

> their ratings of their teaching, research, and service experience. (Steinpreis et al. 1999, 509)[3]

Consequently, Steinpreis and colleagues conclude that "a superb record may indeed function as a buffer for gender bias when making promotional decisions" (1999, 524). In other words, by using only extremely qualified candidates in their study, Williams and Ceci (2015a) are disregarding the fact that graduate students and junior scholars can be (and in fact the evidence suggests, that they are) targeted by gender bias—regardless of the fact that the "academic superstars" have reached a status granting them (more) equal treatment. Moreover, and in contrast to Ceci and Williams' self-evaluation, it does not seem at all surprising that "academic superstar women" might be preferred over "academic superstar men" as hiring committee members would likely rate a "big shot" woman as a "good catch" for their institute: not only do they gain a highly qualified colleague, but as a positive side effect they also improve their gender statistics.

Thus, examining gender bias in hiring processes in academia requires the comparison of different levels of qualification, not only top-qualified women vis-à-vis top-qualified men but also lower level candidates of both genders.

In addition, it is important to note that Ceci and Williams have responded several times to their critics via different media outlets such as *American Scientist* (Ceci and Williams 2015a), *The Chronicle of Higher Education* (Ceci and Williams 2015b), and even a five-piece response in *The Huffington Post* (Williams 2015). The authors provide methodological explanations and address some of the objections that emerged after their 2015 experimental study came out. But their responses do not address what we consider to be the most fundamental limitations of their whole undertaking. First, they do not respond to the criticism of the frequent overgeneralization they make in their study conclusions, i.e., from evidence against gender bias in a particular context to the conclusion that there is no gender discrimination in science writ large. And second, they do not acknowledge the fact that gender bias is likely to be tacitly involved in women's choices within a sexist society. So, even if the results show that women are "opting out" instead of being "pushed out", gender discrimination may still play a role in an individual woman's decision and, thus, it is incorrect to assume that there is no discrimination at work simply because it is a personal decision. In this sense, we find that Ceci and Williams have largely ignored the most pressing objections to their research program.

[3] Note that this does not mean that senior women candidates are no longer the target of biases. For instance, as Steinpreis et al. show, although "findings did not indicate that potential female tenure candidates are evaluated more negatively than potential male tenure candidates, […] participants were four times as likely to write cautionary comments in the margins of their questionnaire [… such as] 'We would have to see her job talk,' 'It is impossible to make such a judgement without teaching evaluations,' 'I would need to see evidence that she had gotten these grants and publications on her own.' Such cautionary comments on the male tenure candidate's vitae were quite rare" (Steinpreis et al. 1999, 523).

Claiming that gender discrimination is a problem of the past overlooks not only a huge swathe of anecdotal evidence from women academics (e.g., Monroe et al. 2008; Roos and Gatta 2009; Pololi et al. 2013; VanDerwarker et al. 2018), but it also bypasses the selectively rotten rungs on the career ladder. In contrast, Samantha Brennan provides a reasonable and cogent explanation for the situation, namely, that students who experience systematic disadvantages are unlikely to persevere in the field: "We might start out not seeing junior women as qualified, and then later we look and there are no senior women who are qualified. […] It is often the case that the later judgment—'There are no qualified senior women'—is correct even though our earlier judgment made it so" (Brennan 2013, 187).

This is not at odds with Ceci and Williams' (allegedly contradictory) findings; furthermore, it provides an explanation for both the disadvantages while moving up the career ladder and the enormous amount of anecdotal evidence on the experience of gender bias provided by so many women academics—particularly by students and young researchers—from so many disciplines.

So far, we have listed a number of methodological issues with Ceci and Williams' dissenting research. However, one could wonder whether these really constitute violations of established conventional standards, as required by the second IndRA condition, or whether Ceci and Williams merely make questionable methodological choices in their research.[4] For example, by using correlational studies based on proxies (Ceci and Williams 2011), or by selecting only top-qualified candidates to examine gender bias in hiring processes in academia (Williams and Ceci 2015a), they clearly make poor methodological choices insofar as there were better choices available for the intended research purpose. However, the argument could still be made that these issues themselves do not constitute violations of methodological standards in that the research adequately followed methodological rules and the researchers did not engage in any sort of scientific fraud.[5]

Furthermore, it is also not a violation of a methodological rule for Ceci and Williams to ignore criticism. Indeed, while this lack of receptiveness to critical voices can clearly be seen as disregard of a social norm at the heart of the scientific enterprise and key to epistemic progress (Longino 2002, 128–30), there is "no methodological rule that specifies the right balance of responsiveness or resistance to evidence and critics" (Carrier 2018, 158).

[4] We wish to thank two anonymous reviewers for drawing our attention to this point.

[5] This point also applies to clinical research sponsored by pharmaceutical companies. While research results in such cases are definitely the consequence of targeted manipulation, they are not exactly the consequence of overt fraud such as fabrication or falsification of data (Bero and Rennie 1996; Fernández Pinto 2019). Although one could still argue here that no established methodological standards are being violated, these cases nevertheless show that there is a fine line between poor methodological choices and the violation of methodological standards.

Such considerations notwithstanding, Ceci and Williams do actually violate a methodological rule in that they make overgeneralizations in their conclusions going well beyond what their results could possibly warrant. This is not a mere poor interpretive choice. Limiting the scope of a scientific study accurately is a well-established scientific standard, which, if violated, leads others to believe something that has actually not been sufficiently proven in the study. Carrier (2018) calls this violation "false advertising": the issues alleged to be addressed are in fact bypassed due to a discrepancy between the design of the study and its use, meaning that the setup of the study "makes it rather insensitive to the issue it purportedly addresses. This incongruity is concealed and glossed over in the interpretation of the results" (Carrier 2018, 162).

Given this violation of a methodological standard, we conclude that Ceci and Williams' dissenting research meets all four conditions of the IndRA and is, thus, conducive to a societal atmosphere in which scientists come under attack and their credibility, competence, and reputation is publicly cast in a doubtful light. In the next section, we will illustrate this point with examples of how researchers studying gender bias have frequently been targeted.

4. Attacks against Researchers in Gender Studies

So far, we have argued that Ceci and Williams' dissent on gender bias in academia meets the four IndRA conditions. Just as the denial of anthropogenic climate change promotes a hostile social atmosphere for climate scientists, analogously, the denial of gender bias in academia is also conducive to a hostile social environment for researchers studying gender bias.

Despite the methodological problems of their research, Williams and Ceci have succeeded in publishing their work in prestigious journals. Given the deeply entrenched gender bias in society, it is not surprising that their publications have received much attention and recognition by readers who are only too happy to discover studies debunking "the gender myth" and to feel confirmed in their disapproval of feminism and political correctness. To illustrate this point, one only has to read through the comments following one of Ceci and Williams' (2015b) online publications:

> Apparently, many critics of the Williams Ceci PNAS article have strong vested interests in finding sex discrimination anywhere and everywhere, thus ignoring the possibility that our society has evolved and that some attitudes have changed. Many of these critics have jobs that depend on their universities and employers believing sexism is rampant. (Astro Woman)
>
> Actually, sexism is rampant in business and academia. But it's sexism in favor of females, not the other way around. (RalphF)

> The effect of this innately specious strategy [of changing and expanding aims], very quickly caused feminism to shift from a movement ostensibly pushing for; Fairness for Women, Gender Equality and Female Emancipation, to one blatantly pushing for; Privilege for Women, Gender Superiority and Male Emasculation. (  )
>
> As suspected there *is* a gender bias in academic STEM hiring – I guess men will just need to accept being discriminated against because...why? (Hootyman)
>
> Ah, yes. There is no creature so angry as a feminist who is told that life is getting better for women in some way. (karen straughan)
>
> There is only one institutionalized negative bias. It is against white males. Forward. (megapotamus)

Although we acknowledge that authors have no control over the online comments they receive, we wish to point out that it is not unreasonable to expect researchers working on issues of sexism to be aware of the social problems related to their work and to seek to avoid garnering support from sexists.[6] Otherwise, they ratify an atmosphere of intimidation in science that is epistemically problematic. In the case of Ceci and Williams, their sometimes polemic tone conveys the impression that they are perhaps even interested in stoking such sexist attitudes. When asked in *Nature* about the methodological criticism of their studies presented by a number of distinguished colleagues, Williams deemed it appropriate, for example, to simply respond that "people find it hard to accept when there's change, even for the better" (Deng 2015). In an interview in *Science*, again, she claimed that: "It's tempting to blame gender when you don't get a job and you're a woman […]. It's easier … than to admit that the entire premise of what you've done for the past 7 years of your life was flawed at the root" (cited from Benderly 2015).

Such statements trigger polemic echoes and aggressive comments by people in online discussion forums and social networks. Researchers conducting studies confirming the existence of gender bias in the academy (and of gender bias in general) become discredited, their credibility, competence, and reputation are cast in doubt, and, in extreme cases, they are threatened and harassed.

Indeed, researchers working on gender bias in academia report that they have received hate e-mails and telephone calls and that they have become targets of right-wing social media sites; the attacks come from students and the public, who are in many cases incited by right-wing media such as *Breitbart* or *Fox News* (Andreassen

[6] We will spell this out in more detail at the end of the next section, where we argue that researchers conducting (potentially) critical (but not denialist) research should distance themselves clearly and distinctly from denialist positions.

and Myong 2017; Ferber 2018). After the US 2016 election, the *American Association of University Professors* launched a campaign through which it sought to collect "experiences of targeted harassment and intimidation" of faculty members, and they received many stories from researchers of various fields including gender and race studies (AAUP 2017, 2018). "The attacks aimed at faculty take the form of harassment, abuse, and outright threats. Examples include 'Traitor; Communist Jew pig; Fat cunt; N——; You deserve to be raped; I have seen your children; I know where you will be and I will be there.' Under the guise of protecting free speech, these messages are clearly meant to silence" (Ferber 2018).

Such attacks are detrimental to scientific research as they do not promote, but rather stifle scientific discussion and, thus, epistemic progress. It seems likely, for instance, that the intimidation of researchers affects academic teaching, and if professors become too afraid to teach certain topics, this has implications on the discipline, on the students who are attracted to the subject, the thoughts that are expressed, the ideas that are triggered, the debates that are raised, and the paradigms that are established.

Of course, Ceci and Williams do not participate in this intimidation directly. However, in the doubt they create regarding the reliability of gender studies, their research is conducive to this hostile atmosphere. Moreover, it is also socially problematic as Ceci and Williams operate in a social environment that is characterized by political and epistemic asymmetries, as we will argue in the next section.

5. Political and Epistemic Asymmetries in Society

Unburdened by its methodological problems, Ceci and Williams' research denying gender bias has been very successful in that it has caused a kerfuffle in the press and among fellow academics, and has been widely disseminated and embraced in particular due to political and epistemic asymmetries in society. Certain media outlets and the internet play a pivotal role here. For example, Ceci and Williams' studies were highlighted in *The Washington Post* (Kaplan 2015) and *The New York Times* (Williams and Ceci 2014) as sensationalist news about women in academia who now have a "hiring advantage", and academic reactions in social media, both for (e.g., Cesario 2017) and against (e.g., Zevallos 2015), also emerged. Ceci and Williams themselves were also granted the opportunity to present their studies in the media in a way that garnered them attention: speaking with *CNN*, for instance, they claimed that "the only sexism [… women] face in the hiring process is bias in their favor" (Williams and Ceci 2015b).

Such attention is, admittedly, typical for new and groundbreaking research results that are in conflict with a well-established mainstream. However, cases that meet the IndRA conditions are successful despite their methodological shortcomings, which has to do with the fact that there are substantial parties in society with a strong bias in

favor of the research. This is expressed in condition 4 of the IndRA. However, the IndRA considers public risks and non-epistemic consequences as criteria for evaluating how epistemically beneficial or detrimental dissenting research is; thus, its focus is on the research realm and its epistemic goals, not on the effects that this dissenting research has on the societal realm. The argument in this section aims to close this gap. We will argue that the extreme success of such controversial dissent, despite its scientific shortcomings, is due to political and epistemic asymmetries in the society in which it is situated and examine how such dissenting research harms society.

The functioning and effects of such asymmetries are explained by Philip Kitcher (2001, ch. 8) in his "Millian argument against the freedom of inquiry". Following Kitcher's line of argumentation we suggest that a social environment characterized by political and epistemic asymmetries is one in which "there are sufficiently powerful inclinations to [… support the critique], held by sufficiently powerful people" (Kitcher 2001, 102). Consequently, the criticism, even though it is methodologically flawed, is nevertheless embraced and supported by powerful parties, and this affects social improvement.

Kitcher shows that epistemic and political asymmetries exist with regard to certain research questions such as research concerning egalitarian hypotheses, meaning that social biases that are deeply entrenched in a society are much more easily exacerbated by confirming—even indecisive—evidence than ameliorated by contradictory evidence (Kitcher 2001, ch. 8). Kitcher discusses research cases in which it is highly unlikely that we will ever find decisive evidence. His concrete example is research regarding the question of whether there are biological differences in intelligence between certain social groups (e.g., between men and women or Blacks and whites). As intelligence research is highly unlikely to yield decisive results, Kitcher draws the normative conclusion that no research project on such questions ought to be pursued since, even in cases of indecisive results, people holding sexist or racist biases would feel confirmed in their misguided beliefs. Thus, such research would only lead to the aggravation of the situation—both epistemically and socially—due to existing biases against women and Blacks.

Kitcher's argument can be applied to the case of climate change denial: it meets three asymmetries among the five asymmetries Kitcher identifies (Leuschner 2018). With respect to the hypothesis of anthropogenic climate change (H_{acc}), two political asymmetries (PA) and one epistemic asymmetry (EA) hold:

> (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 ~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 […].
>
> (EA1) There are significant differences between the probabilities assigned to ~H_{acc} and the probabilities that would be assigned by using the most reliable methods for assessing evidence; the probabilities assigned to ~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. (Leuschner 2018, 1263–1264)

As the results of climate science regarding the existence of anthropogenic climate change are decisive (with the probability of the existence of anthropogenic climate change being nearly 1), it does not meet Kitcher's other two asymmetries (i.e., asymmetries that arise when results are indecisive), meaning that it is socially important to conduct research on anthropogenic climate change. However, due to the three asymmetries that are met by dissent on anthropogenic climate change it is morally, socially, and politically detrimental to conduct research that denies the existence of anthropogenic climate change as it contributes to misinforming policy-makers and the public and impedes climate change mitigation measures that would be important, particularly for people in developing countries who have been most affected by climate change impacts. Thus, while research on anthropogenic climate change is desirable, dissenting research on this matter ought not to be pursued for moral, social, and political reasons.

The same holds, again, for the case of research on gender bias in academia: as we have strong evidence for the existence of gender bias in academia and scientific progress has already been made on this issue, and as there is reasonable hope that further progress will be made, research on gender bias ought to be pursued. In contrast, research that casts doubt upon the existence of gender bias in academia ought not to be pursued due to the political and epistemic asymmetries: any evidence seemingly contradicting the existence of gender bias will have more influence on public knowledge than any evidence in fact confirming the existence of gender bias. To be more precise by way of example, an article simply claiming that there is no gender bias in academia will disproportionally strengthen the societal reservations against feminist concerns and demands, while an article that in fact presents evidence for feminist concerns and demands will not make a significant dent in the status quo (Handley et al. 2015).

However, one could rightly ask what this demand—that such research ought not to be pursued—means in practice.[7] This question concerns two intricate points. First, in general, one never knows where a specific scientific investigation of climate change or

[7] We wish to thank an anonymous reviewer for urging us to clarify this issue.

gender bias will lead and, of course, we do not wish to make the sweeping claim that dissent in these fields is always problematic. There is normal scientific dissent on many details, in climate science as well as in gender studies. But just like in climate science, where the manufactured dissent ultimately always pertains to the factual status of anthropogenic climate change, in gender studies there are also cases of dissent that dispute “facts”, i.e., hypotheses that are so clearly confirmed that what they postulate can be deemed beyond reasonable doubt. We take the existence of gender bias in academia to be such a “fact” and, hence, we suggest that research explicitly seeking to undermine this “fact”—i.e. that strives to provide contrarian evidence—ought not to be pursued.

However, this line of thinking leads to a second point of contention one could be troubled by: What does it mean to say that such research “ought not to be pursued”? We do not wish to argue in favor of banning such research. Again, we follow Kitcher here, who points out that an official ban of such problematic research would allow deniers “to portray themselves as victims of an illegitimate public policy of stifling the truth” (Kitcher 2001, 106). Our conclusion is, thus, merely a moral imperative against conducting, supporting, or funding such research. It is clear that there can be border-line cases; there may be studies on these issues that do not seek to contradict the fact that there is gender bias in academia but nevertheless produce potentially dissenting results, i.e., findings on specific aspects of the issue that could be misused by certain stakeholders in order to attack gender studies or affirmative action programs. However, we take it as a consequence of this moral imperative that researchers conducting such critical research on this issue behave responsibly by clearly and distinctly distancing themselves and their research from denialist positions.

Thus, research denying the existence of gender bias in academia such as the dissenting studies by Ceci and Williams, is not just epistemically but also socially problematic because it hinders not only scientific progress by promoting an anti-scientific atmosphere but also societal progress by supporting and exacerbating existing gender bias in our current democratic societies.

6. Conclusion

A huge and constantly growing body of empirical and anecdotal evidence shows that gender bias is a pertinent and recalcitrant problem in academia and society. This is not to say that gender bias is already fully understood in its functioning, or that it is independent of other social problems. On the contrary, much more research is needed on all aspects of gender bias such as its interrelation with socio-economic structural injustices, discrimination, intersectionality, the role of implicit bias, and stereotype threat.

Unfortunately, those who seek to achieve a better understanding of these problems by doing research on gender bias have become targets of harassment and

attacks that are substantially supported by manufactured dissent: denialists reach conclusions unwarranted by the available evidence and they ignore fundamental objections to their methodological decisions.

We focused on the dissenting research by Ceci and Williams as an example of such denial, arguing that it meets the four conditions of the “Inductive Risk Account of Epistemically Detrimental Dissent” (Biddle and Leuschner 2015). As we know from the case of climate science, which is confronted with manufactured dissent denying the existence of anthropogenic climate change, dissent that meets these conditions has substantially serious epistemic effects: it promotes an anti-scientific social atmosphere in which discussions are stifled because intimidated researchers become reluctant to address certain questions or to bring certain hypotheses to the table. Moreover, we have argued with recourse to Kitcher’s “Millian argument against the freedom of inquiry” that such dissent disproportionally supports social biases within current democracies due to existing epistemic and political asymmetries, also making it socially problematic.

This means that Ceci and Williams’ dissent counts as a case of manufactured dissent in the same way as dissent on anthropogenic climate change does. At first glance, this might seem implausible as there are no industrial stakeholders supporting them financially. However, there are non-negligible fractions of (not only but particularly US) society (including the government) that support them non-materially. They receive disproportionate coverage in the media, spotlighting and helping to disseminate their work, then echoing through social networks. Normally, such inadequate work would be largely ignored, but here, due to the power differentials, it receives such strong support that it can flourish and successfully infiltrate scientific debates (O’Connor and Weatherall 2019).

We acknowledge that behind a critique of dissent the danger of justifying the censorship of free debate may lurk, a point also emphasized by Ceci and Williams. In one of their opinion articles, they stress how concerned they feel about a recent Cato poll finding considerable percentages of respondents to be in favor of banning socially inappropriate statements from university discussions, including statements such as “men on average are better than women at math.” Ceci and Williams claim that “college students [should] be exposed to arguments on both sides of these issues, as part of their journey of intellectual development” (Ceci and Williams 2018).

Of course, we concur that one must be careful to avoid any general “discouragement to conduct studies or publish findings that may be counter to dominant views” (de Melo-Martín and Intemann 2014, 598). Hence, we close by emphasizing that the epistemic and social concerns presented here regarding dissent on gender bias in academia do not refer to the factual content of the dissent (which we have criticized for methodological reasons) but to the fact that it is conducive to a hostile atmosphere for researchers in gender studies, sometimes even explicitly by employing a polemic tone.

It not only contributes to the endorsement and, thus, the exacerbation of existing gender bias, but it is also epistemically detrimental. Our critique is, therefore, not a call for restricting but, on the contrary, for protecting free scientific and public debate.

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