CAMBRIDGE

Cambridge University Press & Assessment
978-1-009-50725-7 — Feminist Philosophy of Science
Anke Bueter
Excerpt
More Information



## 1 Introduction

Feminist philosophy of science is concerned with matters of gender (in)equality and their impacts on scientific knowledge, as well as with the consequences of gender bias in research for how we think about and treat people of different genders. Prima facie, combining feminism (a political position) and philosophy of science (an epistemological and metaphysical inquiry) might appear misguided at worst, or at best only marginally relevant. It may seem misguided because it mixes matters of ideology and science in an epistemically and politically irresponsible fashion. Especially in its early days, feminist philosophy of science was often accused of replacing central scientific ideals of objectivity, truth, and methodological rigour with dogmatic or wishful thinking. The very idea of a feminist (philosophy of) science, it was argued, undermines the epistemic trustworthiness of (philosophy of) science as well as feminism. Interpreted in a slightly more charitable way, feminist philosophy of science might be seen as a project that reflects upon areas of science directly relevant to matters of gender/sex (e.g., purported cognitive difference between the sexes) or of particular interest to women (e.g., women's health). Understood in this latter way, feminist philosophy of science makes additions to the discipline that focus on specific subject areas. For example, this could mean to uncover gender bias in former research in these fields.

Such work has been very important, but feminist philosophy of science is, in fact, a far more ambitious endeavour. While it started from empirical case studies in areas directly relevant to gender/sex, this has led to a thorough rethinking of evidential standards and key concepts such as confirmation, objectivity, and value-freedom in science more generally. The relevance of feminist philosophy of science is thus by no means limited to feminists. Overall, feminist philosophy of science has been a very important driver towards an understanding of science as an essentially social enterprise. Importantly, this does *not* mean collapsing the rational into the social or denying science its traditional claim to epistemic authority. At the same time, science is regarded not only as social but also as deeply political. Feminist philosophers of science are particularly interested in the effects of power relations on scientific knowledge and knowers. They thus focus on categories that are related to the distribution of social power; starting with gender, but also extending to variables such as race, class, or (dis)ability, as well as their interactions.

Feminist philosophy of science is, accordingly, often critical of specific areas of scientific research, as well as of its more abstract philosophical underpinnings and socio-political consequences. Nevertheless, it is, at heart, an ameliorative project. A central assumption in most of contemporary feminist

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE

Cambridge University Press & Assessment
978-1-009-50725-7 — Feminist Philosophy of Science
Anke Bueter
Excerpt
More Information



philosophy of science is that feminism, science, and its philosophy are potential allies, not enemies. (Philosophy of) science, at its best, can help the feminist cause; for example, by providing well-founded relevant knowledge. Feminism, in turn, can further science and the philosophy of science; for example, by correcting past mistakes, by deepening our understanding of what 'good science' means, or simply by providing new perspectives and questions.

Over the last decades, feminist philosophy of science has, accordingly, stimulated rich debates on what science is and should be like. It will be hard to do them all justice within the short span of this Element. I aim to provide an overview of the central lines of the field's historical development, leading up to more current discussions and some open questions. Section 2 begins with a brief overview of issues related to the discrimination against female scientists and its connection to gendered ideas about rational knowers. Section 3 traces the impact of gender bias on the contents of scientific theories by recourse to empirical case studies, introducing infamous examples from the fields of evolutionary biology, primatology, and medicine. Section 4 sketches different philosophical responses such as feminist standpoint theory and feminist empiricism, and discusses the (in)adequacy of early critiques of the developing field. Section 5 focuses on the question of values in science, which has long been a pivotal concern in the field. Many of the arguments here point in the direction of value-freedom being unattainable, and potentially even misguided as a normative ideal. Instead of value-freedom, feminists of different theoretical orientations have tended to focus on diversity in the scientific community as the best way to ensure that values in science are not epistemically detrimental but potentially fruitful.

Section 6 therefore discusses whether diversity can serve as the central, unifying idea for a consensus position in the field. Yet, the devil lies in the details here. While, for instance, feminist standpoint theorists and critical contextual empiricists agree that diversity is crucial, they disagree over what kind of diversity is important and why. I will advocate an approach that conceptualises diversity in terms of different values as well as social locations and assigns them a causal role in identifying and overcoming biases and blind spots. This contrasts with standpoint theoretical accounts that assign values the role of good reasons in themselves. Standpoint theorists are correct, however, in arguing that not all perspectives are on a par epistemologically. This is so because those perspectives that have been historically excluded from science will be most likely to challenge existing assumptions and priorities that lead to bias and systematic ignorance. I will connect this to recent discussions of epistemic injustice in science, and I will argue that a diverse scientific community is epistemically advantageous only in so far as it is also epistemically just.

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-1-009-50725-7 — Feminist Philosophy of Science
Anke Bueter
Excerpt
More Information



## 1.1 A Note on Terminology

Before I get started, some remarks on the gender-related concepts used in this Element. The distinction between sex as a biological category and gender as a social one has been very influential and helpful in feminist thought, as it served to challenge automatic assumptions of biological determinism (in the sense of feminine or masculine traits and behaviours being caused by one's biological sex). Some scholars nowadays use the terms 'sex/gender' or 'gender/sex' to indicate that these dimensions are often interrelated, albeit not in a deterministic manner. For example, some bodily features are impacted by gendered ideas about what women/men are like, which affect variables such as nutrition, kinds of work, or types of exercise (Clune-Taylor 2020). The debate on these concepts is also connected to various metaphysical and political questions, which I have to bracket here (for an overview, see Mikkola 2023). In the following, I will use 'sex' when referring to primarily biological and 'gender' when referring to primarily social aspects. Where they seem interrelated or it is unclear which level is prioritised, I will use the combined term 'gender/sex'.

A related problem is how to name the different sexes/genders. I will often use the terms 'woman' and 'man', simply because they have been used extensively both in the history of science and of (feminist) philosophy of science (and congruence here will enhance readability). Often this was done without an explication of these concepts because it is presumed that people are of either female or male sex, and that they also identify themselves, and are identified by others, as being of female or male gender. This presumption runs into numerous difficulties, however. For instance, people of female sex have long been discriminated against in science because of gendered prejudices against women, whether or not they self-identify as female. Moreover, using these categories in a binary fashion ignores all kinds of non-binary people and people who do not identify with the sex/gender assigned to them. Importantly, gendered oppression affects not just biological females, but basically everybody who is not a cisgendered male whose gender identity matches the sex he was assigned at birth and who is read as such by other members of society. An umbrella term might be 'non-cisgender-male', yet it seems unfortunate to identify those suffering from oppression negatively and via reference to a male standard. In what follows, I will therefore use the terms woman/man and female/male somewhat loosely to refer to individuals with the respective gender identity, and I will by no means presume that this is a binary opposition. Sometimes these terms will also be used to refer to the biological sexes, especially when reconstructing episodes from the history of science.

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE

Cambridge University Press & Assessment
978-1-009-50725-7 — Feminist Philosophy of Science
Anke Bueter
Excerpt
More Information



## 2 The Gender of Scientific Knowers

There are obvious connections between feminism and science, both on the structural, institutional level, and on the level of content. On the one hand, women have been discriminated against as subjects of scientific knowledge and have been excluded from scientific careers. On the other hand, science has often been instrumental in gendered oppression by ways of making claims about women's supposed nature, such as women being less intelligent, less rational, more emotional, more caring, more passive, and more submissive than men. The presumed upshot is that women are better suited to caretaking and service to others than to leading a life of the mind. Rather than an issue of discrimination and unfairness, women's underrepresentation in academia would thus be an expression of the natural order of things. This, of course, contributes to and perpetuates the underrepresentation of women in scientific careers, cementing the view that women lack scientific interests and abilities further in a vicious cycle. As we will see below, a lack of women in the scientific community also means a lack of critical perspectives on the very theories and data that were supposed to support the relevant assumptions about women's nature. Exclusion and discrimination on the institutional level and gender bias in scientific content thus go hand in hand and reinforce each other. In what follows, I will look at these two levels in some more detail.

### 2.1 Issues of Equality and Representation

Women have been formally denied access to higher education and scientific careers for centuries. Even today, women are still underrepresented in many disciplines, and face a myriad of obstacles as researchers. Denmark, for example, is above the European average according to the gender equality index of the European Union. The data show that by now, more women than men graduate in tertiary education. Options for childcare are also comparatively good. Still, only 23 per cent of all full professors in 2019 were female. In addition, there is a high degree of segregation regarding the fields women versus men graduate in (with 53 per cent versus 27 per cent being found in education, health and welfare, humanities, and arts). In 2016, the percentage of female professors in the natural sciences was 12 per cent, and in the technological sciences only 8 per cent. Women also work under precarious conditions more often than men in the higher education sector (e.g., with part-time or fixed-term contracts). Looking at the wider field of R&D, only 10 per cent of patent applications are made by women.[1] While there are of course important differences between various countries, EU-wide data show similar patterns:

[1] Cf. European Institute for Gender Equality (2021). *Gender Equality Index,* https://eige.europa.eu/gender-equality-index/2021/domain/knowledge/DK; Danish Society for Women in Science (2023). *Hiring Statistics*, https://danwise.org/facts-and-statistics/hiring-statistics/; Styrelsen for

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE

Cambridge University Press & Assessment
978-1-009-50725-7 — Feminist Philosophy of Science
Anke Bueter
Excerpt
More Information



Whereas more than half of all students in Europe were female in 2018, only about 26 per cent of full professors were. Zooming in on the STEM disciplines, these numbers reduced to 32 per cent of female students and 19 per cent of female full professors (European Commission 2021, ch. 6). Gender segregation also pervades science and engineering in the USA; for example, in 2021, fewer than one-third of doctoral degrees were awarded to women in engineering, mathematics and statistics, and computer and information sciences, whereas about half of doctoral degrees in the social and biomedical sciences and almost three quarters in psychology were obtained by women (NSB 2023).

While it is clear that the gender distribution is still skewed, especially in the prestigious STEM disciplines, there is considerable debate regarding the causes of female underrepresentation in science (and philosophy). Most feminists would hold that this has to do with gender bias and covert or overt discrimination. Alternative explanations contend that this is due not to a lack of equal opportunities but to self-selection, with women deciding for other career paths or choosing to drop out of science, especially its most prestigious fields (e.g., Ceci & Williams 2011; Cole 1987; for a critique, cf. Rolin 2006).[2] Others have proposed that the lack of women in science and technology results from women's lack of aptitude (e.g., innate mathematical ability) and/or effort (e.g., the willingness to put in eighty hours per week) (Summers 2005; for a critical response, cf. Handelsman et al. 2005).[3]

However, there is by now a huge body of literature documenting various subtle (and not so subtle) mechanisms of exclusion and discrimination that questions these alternative explanations (cf. also Crasnow 2020). It has been shown that gender inequality can arise not only from formal barriers to access, overt discrimination, or sexual harassment in the workplace but also from less visible mechanisms. These range from factors such as unconscious perpetuation of gendered stereotypes by parents, field-specific ability beliefs,[4] a lack of role models and a sense of belonging in education, to gendered distributions of

Forskning og Uddannelse (ed.) (2020). Mænd og kvinder på de danske universiteter: Danmarks talentbarometer 2019, https://ufm.dk/publikationer/2020/filer/talentbarometer-2019.pdf.

2 To be fair, current researchers mostly agree that the causes of female underrepresentation in STEM fields are multi-factorial. For instance, Ceci and Williams (2011) acknowledge that the choice to drop out of a scientific career, or never to pursue one to begin with, can be free or 'constrained', e.g., by biological factors such as women's restricted span of fertility (in combination with the time pressures of the academic labour market). Clearly, such choices do not occur in a social vacuum. It is thus often a question of what factors are emphasised (and which might be downplayed), or of how their interrelation is conceptualised. For a review of different proposed causal factors and the respective evidence, cf. Wang and Degol (2017).

3 For critical discussions of research on cognitive differences between sexes, cf., e.g., Bluhm (2020), Crasnow (2020), and Kourany (2016).

4 Common beliefs that certain fields such as mathematics or philosophy require innate talent or brilliance (versus effort and learning) correlate with lower numbers of women in such fields. Arguably, this is so because brilliance is stereotypically associated with white men (Leslie et al. 2015).

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-1-009-50725-7 — Feminist Philosophy of Science
Anke Bueter
Excerpt
More Information



teaching and administrative duties, implicit bias in evaluation processes, lack of access to informal networks, and gendered citation patterns (for an overview, see, e.g., Sugimoto & Larivière 2023; Wang & Degol 2017). Already the daily experience of micro-inequities (such as being interrupted more frequently), as has been argued early on, can have a cumulative effect that can be very consequential and overall creates a chilly climate for female academics (e.g., Hall & Sandler 1982, 1984; MIT 1999).

Over the last decades, we could witness progress in terms of understanding how gender bias affects academic careers, even though the resulting picture is generally complex and at times puzzling. We have also seen some progress in terms of the employment rates of female researchers, even though there is still a significant gender gap. In recent years, some scholars have claimed that discrimination is now behind us. For example, Ceci and Williams hold that the academy, even in the STEM disciplines, is either gender-neutral or privileges women (e.g., Ceci and Williams 2011; Williams and Ceci 2015). Yet their research suffers from a selective focus on particular points in the span of an academic career (such as appointments to tenured positions). This overlooks the myriad of other points that impact scientific careers, as well as the evidence on covert discrimination mentioned above. For example, it does not follow from the fact that appointment committees do not display gender bias in their evaluation of tenure-track candidates that everyone has an equal opportunity to even reach this point. The playing field is not level to begin with. Leuschner and Fernández Pinto (2021) provide a detailed critique of these claims and point out such issues of overgeneralisation:

> 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 (Leuschner and Fernández Pinto 2021, 579).

As an example, bias against female authors can be countered by double-blind or triple-blind peer review formats (Ceci and Williams 2011; Lee et al. 2013). Yet the submission of a manuscript of a certain quality to a prestigious journal might be easier to achieve given a series of preconditions: One needs a position that allows sufficient time for research (or to have time for it after official working hours), one might profit from colleagues' constructive feedback before submission, one might be in need of co-authors with particular expertise or require access to particular technology, and one needs sufficient epistemic self-trust. All of these factors can be affected by gender and other variables related to societal power structures.

If a paper is submitted and accepted, the next question is whether it receives uptake, that is, is read and cited in the field. In recent years, bibliometric

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-1-009-50725-7 — Feminist Philosophy of Science
Anke Bueter
Excerpt
More Information



research has demonstrated extensive citation imbalances in a variety of disciplines (e.g., neuroscience: Dworkin et al. 2020; medicine: Chatterjee and Werner 2021; for a general analysis, see Sugimoto & Larivière 2023). Published work by female authors is systematically under-cited compared to that by their male counterparts. Unsurprisingly, the same pattern can be found regarding citations of papers by white authors versus authors of colour (with black women scoring worst; Kwon 2022). At the same time, citation counts and bibliometric markers such as a researcher's h-index play an increasing role in scientific careers, influencing, for example, hiring and funding decisions. Biased citation patterns therefore bias decisions made further down the line.[5]

This is rendered invisible if one just compares the qualifications and successes of applicants in a synchronic, decontextualised, and politically insensitive manner. Let's say we have two top candidates with the same level of publications, citations, and excellent teaching evaluations. Choosing between those two (one white male and one black female) might not in itself be affected by any explicit or implicit bias – but this does not make the decision neutral if the very criteria of comparison are affected by social bias. Thus, even if some particular aspects of some of the decisions made in relation to academic careers have become more equitable over the last decades (not least thanks to the work of feminist scholars), it seems highly implausible that discrimination and social bias are now behind us, or that the underrepresentation of female scientists is not causally related to such biases.

What should, in any case, be uncontroversial is that there is a long history of exclusion of women and other marginalised groups from science. This exclusion usually worked not only via denying women access to education and careers as researchers but also went hand in hand with the creation and perpetuation of gender stereotypes by contemporary scientists. We will look at how such stereotypes found their way into scientific ideas and theories in the following sections, starting with how they shaped the very idea of a (scientific) knower.

## 2.2 Issues of Metaphor and Dichotomy

The history of science and its reflection in Western philosophy has been thoroughly gendered from the very beginning. To start with, the very conception of a scientific knower has not been gender-neutral: being a scientist (or philosopher)

[5] The same pattern has been demonstrated in recent studies on bias in students' evaluations of teaching. Some studies show that white men receive significantly better assessments than all other people, even though these assessments do not correlate with students' learning outcomes. Other studies show a more complex picture of 'gender (stereotype) affinity bias': female (male) students evaluate female (male) teachers better *if* these accord with stereotypical gender role behaviour, such as female teachers being more caring (e.g., Kreitzer and Sweet-Cushman 2021; Mengel et al. 2019). Down the line, this, too, can skew decisions on tenure or payment, affects self-confidence, and so on.

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE

Cambridge University Press & Assessment
978-1-009-50725-7 — Feminist Philosophy of Science
Anke Bueter
Excerpt
More Information



was conceived of as a way of living and thinking suited to male rather than female humans. As Genevieve Lloyd (1984) has put it, it is the 'man of reason' who strives to reveal nature's secrets and to (potentially) control her. Lloyd shows how reason and rationality have been portrayed as typically male domains from ancient Greece through medieval philosophy to the scientific revolution, the enlightenment, and beyond. Particularly noteworthy here is her analysis of Francis Bacon. Bacon was a seventeenth-century philosopher whose empiricist and inductivist stance was highly influential for the development of our modern notion of science. He used gendered, sexualised metaphors abundantly throughout his work. Infamously, he characterised inquiry by comparing it to a heterosexual marriage: 'Let us establish a chaste and lawful marriage between mind and nature' (cited after Lloyd 1984, 11). Mind, reason, and science are portrayed as male, whereas nature represents the female part in this marriage. The contemporary model of this marriage was, moreover, one of dominance and submission: 'Nature betrays her secrets more fully when in the grip and under the pressure of art than when in enjoyment of her natural liberty' (cited after Lloyd 1984, 11 f.).

Other feminists have also argued that the Western tradition of thought, including the history of science, has been implicitly but deeply structured by such gendered metaphors, which juxtapose masculinity with reason, rationality, and science, while characterising nature, emotion, and irrationality as feminine. The *man* of reason is detached, analytic, and rational, whereas femininity has long been conceived of in a contrasting way as intuitive, warm, emphatic, caring, holistic, corporeal, and often irrational.

While some feminist interpretations of Bacon's work have been met with criticism,[6] it seems undeniable that historically, science has not only been dominated by affluent white men and excluded other kinds of people, but also often has been thought of in a way that aligns with stereotypes of masculinity and femininity. This, in turn, has been argued to be highly consequential for the representation and success of women in scientific careers: Their underrepresentation is embedded in a certain way of thinking about thinking. In addition, this way of understanding reason and rationality in terms of 'purity' from bodily, emotional, or other worldly matters leaves us with distorted ideas about the human mind and knowledge, as Rooney (1991) argues.

[6] Some feminists have made more radical and controversial claims about how Bacon's sexualised metaphors give rise to an exploitative relation to nature, ultimately contributing to the subordination of women as well as the modern ecological crisis (Merchant 1980). Others have criticised these accounts for cherry-picking from or misunderstanding Bacon's writings, or have doubted the postulated impact of gendered metaphors (e.g., Soble 1995).

© in this web service Cambridge University Press & Assessment www.cambridge.org