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“I don’t see gender”: conceptualizing a gendered system of academic publishing

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Abstract

Academic experts share their ideas, as well as contribute to advancing health science by participating in publishing as an author, reviewer and editor. The academy shapes and *is shaped by* knowledge produced within it. As such, the production of scientific knowledge can be described as part of a socially constructed system. Like all socially constructed systems, scientific knowledge production is influenced by gender. This study investigated one layer of this system through an analysis of journal editors' understanding of if and how gender influences editorial practices in peer reviewed health science journals. The study involved two stages: 1) exploratory in-depth qualitative interviews with editors at health science journals; and 2) a nominal group technique (NGT) with experts working on gender in research, academia and the journal peer review process. Our findings indicate that some editors had not considered the impact of gender on their editorial work. Many described how they actively strive to be 'gender blind,' as this was seen as a means to be objective. This view fails to recognize how broader social structures operate to produce systemic inequities. None of the editors or publishers in this study were collecting gender or other social indicators as part of the article submission process. These findings suggest that there is room for editors and publishers to play a more active role in addressing structural inequities in academic publishing to ensure a diversity of knowledge and ideas are reflected.

Keywords:

gender inequity, health sciences, publishing, peer review, journalology, feminist science studies

Introduction

Academia is considered to be the pinnacle of knowledge production. The ability to take empirical data and imbue it with the authority accorded to academe bestows power upon those who conduct science and academic research (Latour, 1987). Academic institutions and modes of inquiry were created by and for powerful men (Ahmed, 2015; Franklin, 2015). Historically, women were formally excluded from universities, laboratories and publishing societies and thus the power to create and reproduce this knowledge has resided primarily with men (Harding, 1991).

Today, women's exclusion from academia is less explicit yet publishing – and the critical gatekeeping role it plays in the recognition of academic knowledge – is still an arena of male privilege. Women publish fewer articles (Elsevier, 2017; Filardo et al., 2016; Helmer, Schottdorf, Neef, & Battaglia, 2017), particularly in high-impact journals (Bendels, Müller, Brueggmann, & Groneberg, 2018; Shen, Webster, Shoda, & Fine, 2018). Women are less likely to be called upon as peer reviewers (Helmer et al., 2017; Mullan, 2018; Murray et al., 2018; Steinberg, Skae, & Sampson, 2018; Williams, Garvey, Goodman, Lauderdale, & Ross, 2018) and hold fewer editorial board positions (Amering, Schrank, & Sibitz, 2011; Amrein, Langmann, Fahrleitner-Pammer, Pieber, & Zollner-Schwetz, 2011; Ioannidou & Rosania, 2015). Having fewer women in gatekeeper roles has implications for their representation in the generation of knowledge through published literature (Nielsen, Andersen, Schiebinger, & Schneider, 2017). Given that academic publishing is the mode of knowledge dissemination that is most highly valued and rewarded with promotion and advancement within the scholarly ecosystem, it must be examined and understood from a gender perspective.

In this paper, we apply an explicit gender lens to academic publishing in medical and health science journals, to understand if and how academic editors in the health sciences recognize

or consider gender in their editorial role. We ground our understanding in feminist theory, which conceptualizes gender as an organizing social structure that governs societal attitudes, beliefs, behaviours and expectations which results in different lived experiences for people of different genders (Ridgeway & Correll, 2004). The absence of ongoing and widespread critical inquiry across disciplinary boundaries makes it difficult to identify individual, organizational and societal level 'blind-spots' – we do not often realize that we ascribe to specific gendered systems. As such, our attitudes and beliefs about gender are reproduced through daily interactions, within organizations and across systems (Franklin, 2015).

The evolution of academic publishing

Academic publishing is an exchange between authors, peer reviewers and editors (Smith, 2006). A researcher can and may act in any of these roles. As an editor, a researcher works as a curator and initial evaluator of content submitted to a scientific journal. An editor typically first gains experience as an author and then as a peer reviewer before advancing into the more senior position of editor.

Peer review has evolved to become central to the scientific enterprise. It is the mechanism through which articles are evaluated for publishing, as well as in other contexts such as research funding, conference submissions and hiring committees (Smith, 2006). The practice of editorial peer review in biomedical and scientific journals began in the mid-20th century and evolved in different forms across journals (Burnham, 1990). The approach, however, dates back to the all-male learned societies of 17th century Europe (Berg, 2001; S. G. Harding, 1991). In journal peer review, experts in a particular discipline are invited to review the written work of other colleagues in the same field (Lee, Sugimoto, Zhang, & Cronin, 2013). Subjecting an article to peer review lends credibility to a piece of research and facilitates the communication of research findings to the broader academic community, as

well as policy-makers and practitioners (Ali & Watson, 2016; Smith, 2006). Peer-reviewed journal articles document new knowledge and, in some cases, scientific discovery (Ali & Watson, 2016). In this way, journals play a vital role in the advancement of knowledge, policy and practice (Ali & Watson, 2016).

Gender and the academic cycle of knowledge production

The research presented in this paper contributes to the current debates by exploring gender considerations in editorial practices. Drawing on our review of the literature, we conceptualize the academic model of knowledge production and dissemination as a cycle (Figure 1). Each stage of the cycle is influenced by gender, and other social characteristics such as ability, class, ethnicity, nationality, race and sexuality (Combahee River Collective, 1995; Crenshaw, 1991).

Figure 1 The cycles of power and privilege in academic journal publishing

The cycle begins with securing funding to conduct scientific research, often as a result of holding a position as a junior researcher, staff or tenure-track faculty at an academic institution. Acquiring research funding is gendered. Scientific review panels award a higher number of grants and a more substantial grant funding to male applicants (Head, Fitchett, Cooke, Wurie, & Atun, 2013; Kaatz et al., 2016; Magua et al., 2017; Tamblyn, Girard, Qian, & Hanley, 2018; R. van der Lee & Ellemers, 2015). Women applicants experience biased assessments based on pervasive gendered assumptions about quality and merit (Witteman, Hendricks, Straus, & Tannenbaum, 2019).

Author contributions have also demonstrated a gendered division of labour within research teams: women are more likely to perform the 'physical' labour and men the 'conceptual' labour (Macaluso, Larivière, Sugimoto, & Sugimoto, 2016). Across all fields in the JSTOR database, including demography and pollution and occupational health, women are less likely to be associated with the more prestigious roles of first or last author (West, Jacquet, King, Correll, & Bergstrom, 2013) which often correspond to the Principal Investigator or senior researcher. Women academics are often described as 'less productive,' and this observation has been conceptualized as a 'productivity puzzle' (Albert, Davia, & Legazpe, 2016; Dehdarirad, Villarroya, & Barrios, 2015; Larivière, Vignola-Gagné, Villeneuve, Gélinas, & Gingras, 2011; Mauleón, Hillán, Moreno, Gómez, & Bordons, 2013; Reza Davarpanah & Moradi Moghadam, 2012). While these studies document a puzzle, they offer few explanations, due to the limited amount of data within large-scale bibliometric databases, such as Web of Science. Other studies posit that biases are at work in the discrepancy between roles of men and women; for example, a large bibliometric study of the Frontiers journals found that women represent 37% of authors, 28% of reviewers and 26% of editors across disciplines (Helmer et al., 2017). The authors conclude that increasing the numbers of female authors is not enough to counteract the effect of subtle (or explicit) gender bias that

disadvantages women within the peer review process, and throughout their careers (Helmer et al., 2017). Both women and men were found to be less likely to recommend women for peer review (Fox, Burns, Muncy, & Meyer, 2017). When reviewed with a feminist framework, the 'puzzle' can be 'solved' by considering systemic gendered structural forces within and across the academy (Elsevier, 2017; Filardo et al., 2016; Helmer et al., 2017).

There is conflicting evidence regarding gender and citations. Studies show that women are less likely to be cited (Larivière, Ni, Gingras, Cronin, & Sugimoto, 2013), including in fields such as health sciences and international relations (Beaudry & Larivière, 2016; Maliniak, Powers, & Walter, 2013). Others argue that over time women will receive more citations (Ceci & Williams, 2011); recent evidence shows that men are more likely to cite themselves and research by other men (King, Bergstrom, Correll, Jacquet, & West, 2017). Securing citations is a mechanism for greater visibility and is associated with recognition and financial reward, including promotion.

Despite literature documenting the underrepresentation of women in certain positions in many scientific journals, qualitative work on the topic remains scarce. In particular, the social practices of editorial work and journal peer review, specifically regarding gender and bias reducing interventions, have not been adequately studied. Further study of the topic is needed to explore existing gender dynamics and mechanisms for greater recognition of women's contribution to health sciences. In this study, we build on the understanding of peer review as a social process to investigate how editors understand the influence of gender on journal peer review. Specific research questions asked were: How do academic journal editors approach gender in the peer review process (if at all)? What are their views about the topic? What is the role of journals in addressing women's equal participation in peer review?

Methods

Positionality

All the researchers in this study are women working at academic institutions in high-income countries. The two senior researchers have experience in lead editorial roles, and one has an established area of research in gender and healthcare. We began this research with an inductive approach, situated in what we would later come to understand as a liberal egalitarian feminist framework — asking questions about the representation of women in health science publishing. We undertook an exploratory empirical process, including interviews with editors from academic health science journals and a consensus workshop to prioritize critical issues and solutions. We initially framed our questions around gender representation and gender bias. As we continued with interviews, the concepts required thinking beyond a liberal egalitarian framework. How did we make sense of someone's claim not to notice gender, for example? Our research questions and analysis, thus, evolved to become more clearly situated within feminist theories, including feminist science studies.

In-depth interviews

We chose a qualitative approach — in-depth interviews — in light of the exploratory nature of the research and the open-ended questions outlined in this study (Robson, 2002). To ensure a diverse sample, we included journal editors according to the following criteria: gender, editor's geographic location, the type of peer review process (open, single-blind, double-blind) practices in their journal, journal specialty and publisher. We identified respondents were through purposive and snowball sampling (Tongco, 2007). The interviews explored the editors' understanding of their practice as an editor and how gender influences the peer review process, awareness of gender equality in their work and any actions they may have considered or taken to address potential gender bias in the publication process.

We recruited participants via email sent by an academic publisher that was involved in the conceptualization of the research topic and who facilitated access to networks of publishers. We put out further calls on social media (Twitter). We conducted a total of 15 in-depth interviews in July 2017 (see Tables 1 & 2). The sample represented the experiences of editors at nine journals, across four different publishers. We conducted four interviews in person and another 11 via Skype. We recorded and transcribed all interviews verbatim. The ethics committee at Anonymous Institution approved the study, which we conducted between July 2017 and April 2018. We obtained written and verbal informed consent from all participants.

Table 1: Summary of in-depth interview participant characteristics

Criteria	Category	Number of participants
Gender	Women	9
	Men	6
Position	Editor-in-Chief	3
	Senior editor	12
Geographic region	Europe	7
	North America	5
	Australia	3

Table 2: Summary of journal characteristics

Criteria	Category	Number of participants
Type of peer review process	Open peer review	10
	Single-blind	4
	Double-blind	1

Nominal-group technique

Building on the findings of the in-depth interviews, we convened a consensus-building workshop using NGT to prioritize issues and actions to address gender imbalances in scientific journal peer review. We chose NGT because of its strengths in generating ideas where there is limited evidence on a given topic and as a structured approach to reconciling diverse views (Nair, Aggarwal, & Khanna, 2011). The NGT also served as a forum to validate findings from the in-depth interviews.

We recruited NGT participants using purposive and snowball sampling, starting with emails to participants identified during the in-depth interviews as actively working on gender within journal peer review. We generated an initial list of participants, based on the sample of editors interviewed during the first phase of the research. We also purposively recruited participants with experience working in low and middle-income countries, as this was as an issue of concern in health sciences during the in-depth interviews. We posted a call for participants on the Mendeley group "Gender bias in academic publishing" run by Elsevier. We contacted potential participants via email with an invitation to participate in the workshop.

Our recruitment target was eight to 12 participants, anticipating saturation at this point (McMillan, King, & Tully, 2016). We invited 34 participants via email. Potential participants who could not attend were asked to forward the invitation to others or recommend colleagues with relevant expertise. Seventeen participants attended the NGT at Anonymous Institution in November 2017 (16 in-person and one via GoToMeeting). The participants were from a range of organizations with experience at journals, publishers and funding institutions (see Anonymous 2018 for a full list of participants). All were from health sciences fields, with experience in publishing and organizational gender equity work in policy or programming.

Two participants had also participated in the in-depth interviews, as they are recognized leaders in relevant fields.

Table 3: Summary of NGT participants

Criteria	Category	Number of participants
Gender	Women	14
	Men	3
Primary employer	Academic Institution	5
	Funder	1
	Journal	4
	Non-governmental organization	3
	Publisher	4
Geographic region	Africa	1
	Asia	1
	Europe	15
	North America	1

The NGT followed four steps, silent generation, round robin, clarification, and ranking (McMillan et al., 2016). The question posed to the group was: what can journals do to promote women's equal participation in peer review (as authors, peer reviewers and editors)? We recorded and transcribed key discussions during the NGT. All five authors participated in the NGT, four as facilitators and one as a participant.

Data analysis

We employed a thematic analysis of the interview data using the six steps suggested by Braun and Clarke (Braun & Clarke, 2006). For familiarization, we reviewed the transcripts against the recordings. We read and re-read paper copies of each transcript. Second, we developed initial codes by hand. This allowed us to re-examine the codes in context and identify new codes. The first author developed a charting framework in Excel 2016 and

copied quotes against each code. We then reviewed the codes within each interview to ensure consistency. We grouped codes into broader categories of data (e.g. 'gender-blind'). We compared codes and quotes across interviews and grouped them into subthemes. We reviewed themes and reorganized data that did not fit the original theme. The first author reviewed, discussed and revised themes together with the last author, who has experience as an editor. We discussed the preliminary findings among all authors, which led to revisions. We identified common themes and areas of divergence from the in-depth interviews which we presented and discussed at the NGT. We then further revised and prioritized based on the findings from the two methods and helped to generate a set of concrete ideas of how journals can address women's equal participation in peer review. We present the findings thematically below.

Results

The editor is 'gender blind' and thus considered objective

Gender 'blind' manuscript review and associate editor assignment

One of the primary tasks carried out by the editors was to assess manuscripts submitted to the journal. The quality of the manuscript was reported to be the focus of the assessment. In keeping with the principle of objectivity, quality was referred to regarding the methodological rigour. In contrast, editors described exercising professional freedom and applying subjective judgement when interpreting the other elements of quality, such as English-language writing ability, "fit" within the mandate of the journal, "useful and correct analysis" or scientific merit of the submission. One editor spoke about quality as an individual, subjective decision and said:

> *"…the influence that I have as a section editor, you know, kind of independently in terms of what I accept and reject. I mean, it's not like*

> *there's a clear line for what the level of quality is, that means that they ... what's the word, yeah, means it's a useful and correct analysis, it's a very messy line that's open to interpretation, so the only influence is how I interpret that line." (Participant 6, Man)*

In this task, most participants thought that gender was immaterial. When asked what role gender plays in editorial work, one male participant responded "none." When asked why he answered:

> *"Okay, I'll revise that. There's a small role because there's a stream of scholarship related to women's health and similar issues, and we have one or two associate editors that are interested in those topics, and those editors happen to be female. So, to some extent, research on women's health issues is going to go to one or two female associate editors. Aside from that, I don't see gender. Sort of a dumb joke. It's not relevant because it's not relevant"* (Participant 8, Man)
>
> Q: *What do you mean by that?* (Interviewer)
>
> *Honestly, I tell you to look at the authorship, when I see a publication, I'll tell you what I do. I look at the authorship to see if it's anybody that I recognize. Usually, the answer to that is no….* (Participant 8, Man)

Despite discussing several ways in which the editor obtains social cues – country and institutional affiliation(s) of the author(s) – the editor maintained that the assessment of the manuscript was not "flexible." The statement may reflect the view, explained further by other editors, that the editor is believed to be an unbiased scientist who can pass objective judgement on the quality of scientific research. In this line of argument, concepts of quality are not influenced by gender.

> *"As I say, I don't find that (gender) is at all useful in giving me any clues about the likely quality of the work and the trustworthiness of the work that's coming through."* (Participant 2, Man)

In this way, "gender-blind" or "blind to gender" conceptualization was used by several editors. Editors strived to be 'blind,' seen as a metaphor for being objective, and deliver an assessment based strictly on the objective measures of quality of the manuscript.

Gendered names but genderless authors

Editors discussed names as the only gendered information that editors receive about authors. Many editors reported noting the name and reviewing the author(s) information to check for conflicts of interest and make an initial observation about the reputation of the author's institution. While editors acknowledged that these practices might introduce other forms of partiality, they believed – in direct contradiction to the idea that names are gendered – that the names did not send any signals about gender that would influence their opinion of the document:

> *"…it's far more difficult to isolate the gender of an author in public health simply because we have multi-author papers almost as standard, so the typical public health research paper has many authors. And it's again difficult in that context to then think about a paper being written by a male or a female. So just from that angle, I don't think it has a lot of roles to play."* (Participant 15, Man)

Thus, manuscripts with multiple authors complicate how editors consider the gender of an author and lead to a situation where the editor tries to disregard gender.

Another way editors referred to being 'blind' to gender or viewing authors as gender neutral was about names from certain parts of the world. In some cases, editors expressed frustration with being unfamiliar with naming conventions.

> *"So, in the review process, I mean, I am really completely blind to this question, because a lot of people who submit articles to us are from outside of the continental US, and I can't tell from their names whether they're male or female. I mean, I get probably 600 Chinese articles a year, and for most of them, I can't tell at all. I mean, I don't speak Mandarin, so I have no clue."* (Participant 10, Man)

Several participants noted that they had no control over the gender composition of authors submitting to the journal.

> *"Authors obviously we can't do anything about, we just…papers come in, we just evaluate them, and we don't really look at who they've come from. I mean we, you know, some names you recognize, some you don't but definitely don't worry is it from a man or a woman."* (Participant 9, Woman)

The editor, in this case, cared about gender representation but did not think it was possible to address the structural issues in journals to increase the number of women authors. This was primarily seen to be due to "upstream" forces such as women taking time out of work to have children or some disciplines attracting more women than men (or vice versa). Most participants viewed gender as a topic that should be addressed by academic institutions and mentioned workplace policies and initiatives that they were familiar with, such as gender committees or tracking gender balance in academic appointments.

Gendered research content

Several editors mentioned that gender can be important when moving the manuscript on to the next phase of the peer review process. If the topic of the manuscript deals with a women's health issue (postmenopausal osteoporosis was an example), some editors preferred to send the document on to a woman editor or peer reviewer, who may have both professional expertise and a more nuanced personal understanding of the topic through lived experience. For some, identifying as a woman was equated with having expert knowledge of gender issues or women's health – which are not necessarily related. Others who used 'gender-blind' did not assume women had content expertise and thus did not consider gender when choosing reviewers or editors.

Beyond the manuscript content, for some editors, the peer review process was not considered gendered.

> *"Yes, I usually don't look at the gender of the peer reviewer" (Participant 5, Man)*

> *"But, it's an interesting question, because I just have to tell you, I'm completely blinded to that question. It just never occurs to me that I should pick a female versus a male associate editor" (Participant 10, Man)*

> *"Yeah, I definitely would say I don't really consider gender in my decisions to assign papers to associate editors or to assign or pick peer reviewers at all, that I'm aware of." (Participant 4, Man)*

It was interesting to note the contradictory views that some editors held about the gender issues relevant to the peer review process. Of the 15 editors, five women were aware of gender issues with the publishing process and were actively working to manage any gender inequalities or biases in the peer review process.

One of the strategies implemented by editors was positive discrimination, which was aimed to increase the number of women editors on the Board and to increase women's representation amongst peer reviewers.

> *"The next one is peer review, what's really interesting is we asked authors, they were allowed to recommend some peer reviewers for their paper and they just recommend men. It's 80%, and sometimes it's all men. …that's where I will exercise positive discrimination, so if I'm looking at five suggested people and I don't know them, or I do know them and whatever, I will go for the women first."* (Participant 9, Woman)

Other participants were emphatic that they do not (and should not) consider gender when selecting peer reviewers or editors; considerations when selecting reviewers were "*competence*," "*workload*," content-knowledge, "*geography*" and the ability to provide "*thoughtful, incisive, critical kind of reports*."

Editorial acknowledgment of other social characteristics of authors

Editors admitted holding predetermined views about particular social characteristics of both authors and peer reviewers. Overall, there were concerns regarding the representation of authors from parts of the world underrepresented or under-resourced in academic research and publishing. In some cases, strategies were in place to redress the inequities. Editors expressed concern over geographic inequities in publishing, with gender being less commonly perceived as a source of inequity. Some editors actively worked to recognize and try to counteract disparities based on nationality.

> *"…[E]veryone looks out for papers, for example, where you might have ten authors from a high-income country, but the paper's exclusively on Sierra Leone, so we ask the question why. Why is that the case? It has to be a pretty good reason, really."* (Participant 12, Woman)

In addition to nationality, most editors believed that the institution or reputation of a research group influenced their decision about whether or not to send a paper on for peer review. Further, reviewers from prestigous institutions were selected based on the presumption that they would likely provide a high-quality review.

Distancing from inequities

Most participants believed that inequities exist in academia and peer review, just not in their own work as an editor. One editor wondered about bias in high impact journals and several others about the bias that could be perpetuated by peer reviewers or other editors, thereby placing potential blame of partiality on other journals and reviewers, not themselves, their journal's policies or processes.

> *"I suppose some biases could occur at the reviewer level. It's possible you could get reviewers that may have some biases that you may not be aware of, which could affect their peer review or recommendation to publish or not."* (Participant 4, Woman)

Editors mentioned the potential for gender bias in other journals where editors use personal networks to find peer reviewers. A common concern was about bias related to individual disciplines, such as economics and computer science or within certain health specialties, such as psychiatry.

Belief in the existence of gender inequities was also based on anecdotes that editors had experienced first-hand or had been recounted to them by family members or colleagues; stories related to either the academic workplace or to the peer review process. In this way, others were portrayed as perpetrators, and the participants as the audience or 'victims' of gender bias; nevertheless, editors acknowledged that gendered inequities and prejudice exists. Others were aware of the literature on the topic or had read the literature themselves.

Of those who believed gender inequities or bias in academia or peer review exists, few could point to gender inequities or bias in their own role as editor. Most editors were reluctant to admit that they might hold biased views based on gender. This may be because gender bias is not socially acceptable, even if unconscious. Editors exhibited the belief that their commitment to impartiality and broad awareness of gender issues could overcome any potential individual unconscious gender bias. Others working on gender issues, at feminist journals or coming from feminist viewpoints, did not think they were as susceptible to gender bias. One editor put it this way:

> *"…most people doing this kind of work, it's about the public good and concerned about public health, probably believe that their biases are fairly limited and that they can overcome them intellectually, but I don't think that's necessarily the case, so I think having people become more aware of [gender bias], that could be useful as well."* (Participant 6, Man)

Editors from open review journals believed that the journal was more likely to attract a diversity of authors, and thus minimize possible gender bias or inequities. Editors remarked that open peer review journals value transparency and diversity in content, examples such as implementing peer review and being an avenue for replication studies were given as examples of these values.

Editorial acknowledgement of gender identities

Most editors did not believe they were susceptible to individual-level gender bias but did recognize gendered behaviour that played out in the publishing process. Interestingly, the view regarding the impact of gender on the performance of the peer reviewers was diverse and often relied on personal opinions, indirect observation and hearsay. Some believed women give more thorough and thoughtful peer reviews. Others mentioned that women are harsher or provide more critical feedback in their peer review comments. Another perception

of women peer reviewers was that they were more likely to decline a request to act as peer reviewers or editors. Women were believed to have a more significant commitment to quality and a need to balance family and other obligations with their academic career. In one instance, an editor-in-chief discussed difficulty recruiting women as editors.

> *"Women are devoted..."How many hours is it going to take?"...so the most ask you lots of questions. "How many hours a week?" "What's the commitment?" "How can I, you know, balance this with my parent role?" Etcetera, etcetera... And often it ends up in a no. Um, I held this reservation. Whereas I speak to a man, you almost hear yes immediately."* (Participant 14, Man)

The challenges in recruitment were based on observations by the editor, not on empirical testing or data collection. On the other hand, one editor believed that she works more often with women peer reviewers and that women are more likely than men to say yes to a peer review. She thought that this was due to two factors: firstly, that her discipline had more women working in it and secondly, that men were less likely to take on volunteer roles. It may be the case that she had more professional contacts who are women and therefore found it easier to secure women peer reviewers. For the most part, editors were not collecting empirical data to test their observations or designing interventions to address any imbalances.

Visibility of men in peer review

Editors did not express any significant concern over the gender composition in manuscripts; however, some noted that there might be more contributions from researchers, senior scientists or principal investigators who are men.

> *"I would say that at least more senior PIs in most academic institutions are more men..."* (Participant 5, Man)

The above statement suggests an awareness of gender inequalities in senior authorship and the need for the problem to be addressed. The same participant describes this further as a problem within academic institutions, as related to promotions:

> *"I actually know my managing editor is a woman, and I think in public health, like a lot of practitioners, if not most of them, are women, so nothing... I mean, that wouldn't necessarily... I'm not saying the whole field is gender-blind, but at least, in my practice, it doesn't seem to present itself. I think from a publishing standpoint, that's more applicable to promotions and things like that, women aren't getting equal promotions. When it comes to publishing productivity and things like that, but I don't necessarily see it in the workflow of a journal."* (Participant 5, Man)

Some editors had beliefs about stereotypically male behaviour: 1) men were more likely to put themselves forward for positions; 2) men were less worried about the quality of their work and will commit to the opportunity regardless of if they can deliver, and 3) men had more time to commit to work outside the home.

Some participants believed that men are more visible in peer review and academia in general. For this reason, participation in peer review was emphasized by some participants as more favourable to scientists who are men.

> *"This could be due to the fact that men are more often invited to review because that's where they are more visible, they are more at conferences, they are more first authors. When we are talking about the reviewers, that's the pictures that we are getting, is more male than female, just because we are more exposed to male researchers."* (Participant 13, Woman)

Some editors were concerned that despite a commitment to gender equality, the visibility of men, as well as the influence of male-dominated social networks in their fields made it difficult for women to receive consideration for editorial positions.

Nominal group technique

After presenting these findings, the question posed to the NGT was: *what can journals do to promote women's equal participation in peer review (as authors, peer reviewers and editors)?* There were a variety of opinions on the best approach within journal peer review. Some of the NGT participants – those with experience in open peer review suggested the transparent process may discourage discriminatory practices, as was identified during in-depth interviews with editors from open review journals. Others, however, were more likely to favour the use of 'blinding.' One NGT participant remarked, "*I think that double-blind and fully open are different solutions to the same problem,*" recognizing that both have been proposed to counter social biases. There was also debate over what was perceived as the deficit model, focused on "fixing" women versus making changes to the journal publishing system. One participant remarked, *"that's a bit of a deficit, that's saying the women are in some way lacking, and what do we need to provide to them."* There was recognition amongst the group that:

> *"…whether it's focused on supporting women, or whether it's focused on removing barriers in the system. I think having advancement in both is important in any programme you do."* (NGT participant, Woman)

Table 4 includes the top ten recommendations as developed and ranked according to potential impact by participants, indicating changes between the two rounds or ranking. Recommendations span the range of individual, journal, publisher and system-level changes. We have reported findings as ranked by participants, which is essential to stay true to their priorities (Delbecq, Van de Ven, & Gustafson, 1975). Some of the recommendations appear

to be overlapping; however, the participants felt that specifying self-identification would raise the profile of this issue.

The critical importance of collecting, aggregating and publishing gender statistics for authors, editors and peer reviewers was upheld. These data are currently unavailable and hamper efforts to address gender disparities. Setting quotas became more important, as well as practical steps such as providing training and mentoring for editors on addressing gender bias and capturing authors' self-reported gender via the article submission system.

Table 4: Top ten recommendations developed during NGT, presented in rank order

Rank Order Round 1	**Rank Order Round 2**	**Recommendation**
1	1	Track, analyze and publish gender statistics for authors, editors and peer reviewers
2	3	Create an Athena SWAN-type programme for journals that is binding
3	2	Set quotas for female reviewers, editors and authors
4	8	Raise the profile of female authors (through naming them, inviting them to conferences, commissioning content, profiling in the journal, invite to author commentary)
5	9	Change processes to remove bias/barriers in the peer review system (e.g. analyze language)
6	4	Providing training and mentoring for editors-in-chief and editors on addressing gender bias
7	5	Include gender as a field in the article submission system
8	7	Give preference to women when recruiting (so state "female senior editor")
9	6	Define and publicize the journal's actual objectives regarding equal participation in publishing
10	-	Provide more funding for research that can expose gender bias in peer review
	10	For handling editors, make it a performance objective to invite equal numbers of men and women to peer review

DISCUSSION

This study advances knowledge of the social nature of peer review, bringing a gender lens to the process. It provides evidence of that belief in personal objectivity (Heim, Ravaud, Baron, & Boutron, 2018; Lipworth, Kerridge, Carter, & Little, 2011) may lead editors to strive for

'gender blindness' or 'gender neutrality' in their editorial roles and responsibilities, stripping other scientists of their gendered identities. Together with time constraints and the decentralized nature of peer review (Kaatz, Gutierrez, & Carnes, 2014), such beliefs present challenges to system-wide changes. The evidence presented here makes evident that there is room for editors and publishers to question their current understandings about their role in curating a diversity of knowledge and ideas, as well as recognizing the connection of scientific knowledge to embodied individuals. Science editors' associations, such as the International Committee of Medical Journal Editors or the European Association of Science Editors, have demonstrated commitment to sex and gender analysis in research content (Heidari, Babor, De Castro, Tort, & Curno, 2016), however, similar guidelines for gender and diversity in the editorial workforce have yet to be developed. The research and publishing community would benefit from a greater acknowledgement of systemic barriers to research and publishing, including institutionalized and structural sexism, racism, classism, ableism, imperialism and heteronormativity (Combahee River Collective, 1995).

Theorizing editorial practice: blindness a metaphor

Critiques of 'blindness' employed as a metaphor (and disability or disablement metaphors in general) have been raised by critical disability scholars (Schillmeier, 2010; Schor, 1999). Critical race scholars have also raised concerns about 'racial blindness' as both an argument to defend against accusations of racism and ignorance of the impacts of racist stereotyping (Ahmed, 2012; Bilge, 2013). Drawing on this work, we examine two metaphors of blindness in journal peer review: blindness as objectivity and blindness as ignorance. Editors mostly believed that the peer review process is gender 'blind' by their definition. Editors aspired towards a 'gender blind' assessment of a manuscript as a manifestation of good practice, highlighting the widely accepted, arguably aspirational belief that editors and reviewers should strive to be impartial and objective in their assessment and handling of an academic

manuscript (Kaatz et al., 2014; Lee et al., 2013). This use of 'blindness' as a metaphor for objectivity is employed in popular literature, where "seeing is an impediment in the quest for true vision" (Schor, 1999). This echoes Donna Haraway's critique of positivistic science, which employs the "god trick of seeing everything from nowhere" (Haraway, 1988); that is, many scientists believe that by using established scientific approaches they can uncover universal and unbiased truths about the world. We question whether impartiality and objectivity are possible.

The idea of the existence of "true vision" or objectivity in science has been challenged (and overturned) by feminist scholars who show how science is always shaped by the social, economic, political and historical context (Ahmed, 2015; Haraway, 1988; Subramaniam, 2009). Within feminist standpoint theory, objectivity is understood to be strengthened through an explicit description of a scientist's social and historical location, thus becoming "strong objectivity" (S. Harding, 1992). Research findings are interpreted – and editorial decisions are made – within the context of an editor's professional training, rooted in theoretical and methodological choices informed by one's historical position and lived experience.

'Gender blindness' in the peer review system acts to secure greater opportunity and visibility for men (Helmer et al., 2017). When understood as such, 'blindness' could, therefore, be considered a metaphor for ignorance. 'Gender blind' policies are those that have not considered gender or where analysis has been done and not acted upon (World Health Organization, 2011). 'Gender-blind' systems or processes "maintain the status quo and will not help transform the unequal structure of gender relations"(World Health Organization, 2011). To self-identify as 'gender-blind' is to remain unaware of the role of power and positionality, and perhaps more problematically, to inadvertently perpetuate systems of structural gender inequities.

All editors had access to names, institutions, potentially nationality and thus critical elements of the identity of authors and peer reviewers. Addressing misconceptions about the concept of 'gender blindness' and objectivity within the peer review system may be a starting point for discussion with editors. The NGT participants discussed capturing data within the process as a necessary but insufficient step to address imbalances within the broader system (Anonymous, 2018). Authors, editors and reviewers could, for example, be asked to self-report characteristics, such as gender, race and nationality, that would allow editors to track progress towards diversity targets deliberately. They also suggest pushing this further, requiring editors to undertake further education in mechanisms to recognize and counter prejudice and discrimination.

Addressing social biases and structural inequities

The editors interviewed distanced themselves from gender inequality and bias but believed that others might hold prejudiced views. "The ability to see cognitive bias in others but not in oneself" has been referred to as "blind-spot bias," which some have theorized could potentially impact scientific peer review (Kaatz et al., 2014). "Blind-spot bias" has been demonstrated empirically in other contexts (Ehrlinger, Gilovich, & Ross, 2005; Pronin, Lin, & Ross, 2002), highlighting that "people tend to introspect to determine whether their own judgments are tainted by bias but to consult abstract theories to determine whether others' judgments are biased" (Ehrlinger et al., 2005). While editors were willing to admit to having other social biases, such as North-South, English-language and institutional biases, gender bias was not readily acknowledged as a problem. This was perhaps in part because the first author, who conducted the interviews, may have been considered a 'safe' person to discuss other prejudices with, as a white woman from a high-income country, working at a well-known university, for whom English is a first language.

The existence of gender bias within the assessment of peer review manuscripts has been debated (Ceci & Williams, 2011), and there is still a lack of consensus on the effectiveness of 'blinding' for countering gender and other social biases (Budden et al., 2008; Engqvist & Frommen, 2008). There is also some movement toward open peer review, which editors perceived to be a solution to counter biases. Given that interactions and decisions are made public, open peer review provides increased transparency, which can, in theory, deter people from discriminatory practices (Heim et al., 2018). The possibility that open peer review reduces gender and other social biases has yet to be explored. Without explicit attention to institutional and structural barriers to publishing, open peer review, in and of itself, will likely not lead to greater diversity in publishing. As more journals adopt open models (Heim et al., 2018; Matthews, 2017), this is an area where further investigation is warranted. There is limited evidence of interventions to improve peer review in general, including a dearth of evaluations of the impact of open peer review on gender and other types of discrimination (Bruce, Chauvin, Trinquart, Ravaud, & Boutron, 2016).

This study refocuses attention on the social nature of journal peer review, and the impact editors and publishers have on a journal's direction. It highlights the need to bring an intersectional lens to peer review processes. Where our initial liberal egalitarian feminist framework led us to question gendered inequality, our analysis of objectivity and bias was constructed using feminist standpoint theory. Such an approach also draws questions about other forms of inequality – race, class, sexuality, nationality, ability - into the frame (Combahee River Collective, 1995; Crenshaw, 1991); questions that our initial framework did not address. Nonetheless, we consider that our findings could be useful for this broader understanding of social inequities. Instead of a focus on representation, we must understand how ideas about objectivity function, which necessitates making sense of the ways power structures intersect.

One approach that journals and publishers may consider is being more explicit about the values of a journal. Recommendations from the NGT were to define what research equity means to each journal explicitly, set quotas, collect data and track changes. We echo the recommendations by previous authors (Lipworth et al., 2011), and add that if changes are implemented at the level of the publisher, this will go further to "open the black box" of journal peer review. Future research should evaluate potential interventions to make the peer review process more inclusive, recognizing that biases in journal publishing are potentially the manifestation of inequities in broader structural systems. Surprisingly little empirical evidence exists in this space (Tricco et al., 2017).

The study is limited in its focus on gender and on individual editors; however, we seek to inform further inquiry within academic institutions and journal structures to address inequities in peer review publishing and academia more broadly. We have also learned that we cannot apply a feminist framework without engaging with the work of Black feminists, who introduced the critically important recognition of how multiple intersecting structural forces shape our sciences and indeed our lives (Combahee River Collective, 1995; Crenshaw, 1991). The study of peer review is particularly important to understand the evolution of scientific thought as well as women, men and gender diverse people's career trajectories in scientific research. Societal and structural barriers to participation in journal peer review could partially explain the lack of women, in particular, women of colour from the 'global south,' recognized in leadership roles within health science leadership.

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Highlights

- Journal editors equate ‘blinding’ with objectivity in editorial processes
- ‘Blinding’ masks social and structural inequities in and outside editorial processes
- Our findings suggest a need for explicit equity policies for journals and publishers
- Other suggestions include establishing quotas and tracking self-reported equity data