Gender matters: smaller audiences for women in academia

Natalia Mariel Schroeder 🆔 *based on peer reviews by* **Silvia Beatriz Lomascolo** 🆔 *and* **Letícia dos Anjos**

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The current lack of social diversity - that is, gender, race and ethnicity - in academia reinforces a historical pattern of exclusion, wherein the knowledge, perspectives and advances of certain groups dominate the narrative, set rhythms and agenda, while the contributions of others are minimised or overlooked. The underrepresentation of and discrimination against women in academia is a well-documented and persistent issue. Despite policies designed to increase female representation and mitigate the structural processes that lead women to abandon their academic careers (Shaw & Stanton, 2012), women scientists continue to face inequalities in authorship, publications, funding, salaries, recognition and decision-making spaces (Astegiano et al., 2019, Woolston, 2019; Fox et a. 2023; Fontanarrosa et al. 2024; Zandonà, 2022; among others). Making these inequalities visible and fostering open discussion is a critical first step toward dismantling them. In this sense, the study by Rodrigues Barreto et al. (2025) makes an important contribution. The authors examine gender bias in seminar series within the field of Ecology, Evolution and Conservation Biology at the University of São Paulo (Brazil), using audience size as an indirect measure of speaker recognition.

The most interesting and novel finding of this work is that talks given by women -especially by female professors- attract smaller audiences than those given by men counterparts, despite the women having comparable levels of academic productivity, similar career trajectories, and presenting on equivalent topics to those of their male colleagues. These results suggest that seminar culture is not gender-blind (Dupas et al., 2021) and provide a new layer of evidence on how gender-based stereotypes continue to influence the visibility and recognition of women in science.

The authors also investigated whether the implementation of affirmative actions (i.e., open calls for volunteer speakers that prioritised women) improved both the representation of female speakers and the size of their audiences. As expected, these actions did succeed in increasing the representation of women among presenters, especially at senior academic levels; however, they did not lead to a proportional rise in audience size. While the time series and number of talks considered before the implementation of affirmative actions were considerably higher than those after this policy, the comparison remains relevant given the importance and timeliness of the topic.

The authors found that women give fewer talks than men. However, as they discuss, their results do not allow them to distinguish whether this inequality is due to gender bias or to a structural gender imbalance. Through a supplementary analysis of a subset of data from the University of São Paulo community, they find some evidence that the underrepresentation of women in the academic population itself may partly explain the gender gap in the seminar series. In any case, these findings, along with similar results from other studies (e.g. Greska, 2023) raise valuable questions: Will simply increasing the number of women in academia be enough to close the recognition gap between men and women scholars? What role might affirmative actions play in attracting a wider audience or enhancing the visibility and recognition of women's work? What kinds of initiatives could change the way we acknowledge women researchers' contributions? What could reconfigure that "recognition landscape" from a feminist perspective, i.e., one less competitive, less hierarchical, more communitarian and less individual-centered?

As the authors acknowledge, the study has limitations (e.g., its focus on a single institution, a short timeframe to assess the impact of affirmative actions), but it provides valuable evidence to initiate broader approaches that include other disciplines, institutions, experimental approaches, and intersectional perspectives.

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Reviews

Evaluation round #3

Authors' reply, 24 April 2025

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Decision by Natalia Mariel Schroeder , posted 03 April 2025, validated 03 April 2025

Dear Júlia Rodrigues Barreto and coauthors,

Thank you for the newly revised version of the manuscript. I have now evaluated your responses to my comments and those of Dr. Lomascolo, the changes you made to the manuscript, and the overall meaning and logic of the text after the full revision. Many of these changes allowed a deeper understanding of what affirmative actions truly mean, as well as the whole connections between objectives one and two. That is, why you were interested in evaluating how affirmative actions affected women's representation among seminar speakers and the centrality of the two analyses you made (with the whole dataset and with the subset PPGE-USP) in discussing this relationship and affirmative actions themselves.

However, I still have comments on the overall writing and organisation of the manuscript, as it seems to me that the new results you added after our suggestions, especially those associated with objective 1, have changed the interpretation of the results you reported in previous versions of the manuscript. Such changes were not properly integrated throughout the manuscript.

Since affirmative actions were focused on increasing women's participation in talks (rather than directly attracting a wider audience), I believe it is very important to have the complete picture of their effects on the number of women that actually gave talks (Figure 1). This means acknowledging that at least part of the results shown in Figure 1 and in the first analysis of Table 1a may be biased (or "confounded") with the number of women who can be invited to participate (something that is shown by the results on the PPGE-USP subset). I think that recognizing the complexity of these results and making them visible in the abstract and main text will enrich your work, particularly regarding future directions for affirmative actions. Even if PPGE-USP results may have limitations (as you properly recognized), they challenge the linear interpretation that you keep associated

3

with your results on objective 1; for instance, the way they are presented in the abstract. I strongly suggest that you make a big effort to integrate the results from the PPGE-USP subset and put them in dialogue with the findings from the full speaker dataset. Both datasets have limitations, but a proper discussion combining their analyses may strengthen your manuscript.

Thus, I strongly suggest you (1) explicitly divide objective 1 both in the abstract and in the main text, I mean, stating objective 1, outlining the subset analysis, and explaining the reason for doing it; (2) add the information to Figure 1 (for instance, by replicating the graphic using only data from the PPGE-USP subset); (3) discuss the limitations of both analyses (for example, the full dataset may confound the effects of gender imbalance with those of gender-bias) and (4) discuss how differences between these results highlight the importance of affirmative actions aimed at attracting a larger audience or making women more visible/recognisable. For instance, which affirmative actions could change the way we recognize researchers' work? What could reshape such a "recognition landscape" from a feminist perspective, i.e., less competitive, less hierarchical, more communitarian, less individual-centered? Do you think that, as shown by the results associated with the PPGE-USP subset, having more women in academia will solve the gender recognition gap?

On the other hand, objective 1 appears to be subordinate to objective 2, which is the main focus of your paper (the impact on the audiences, as correctly reflected in the title and the beginning of the discussion). To make this clear, you need to state it explicitly and structure the objectives to reflect this hierarchy.

Additionally, it now seems that objective 3 requires a proper introduction that contextualizes why differences in the topics of the talks might be expected. Without this, it comes across as a more auxiliary analysis—interesting, but somewhat disconnected. I strongly encourage you to make the effort to articulate why you expected differences in the topics.

Lastly, I ask the authors to, in addition to making the suggested modifications, verify the coherence of the final text as a whole to ensure that the incorporated changes are not disconnected and are properly integrated.

I believe this work has potential, as it presents valuable findings on a highly relevant and timely topic. Precisely because of its importance, I encourage the authors to make a special effort to ensure clarity and rigor in the presentation of the results and their discussion.

Minor comments:
    Lines 255 to 258: "of females SPEAKERS." Also, I understand that the correct figure is S2, not S3.

Line 395: is "encouraging"
    I look forward to these comments being considered in making a decision on the recommendation for the manuscript.

Thank you again for sending your important contribution to PCI Ecology.

Best wishes

Natalia

Evaluation round #2

DOI or URL of the preprint: https://doi.org/10.32942/X25607

Version of the preprint: 2

Authors' reply, 21 February 2025

Decision by Natalia Mariel Schroeder ⓘ, posted 10 January 2025, validated 12 January 2025

Dear Júlia Rodrigues Barreto and coauthors,

Thank you very much for submitting the revised version of your manuscript and for providing a detailed response to our revisions. Congratulations on your work in addressing many of our suggestions.

Dr. Lomascolo highlights several issues that still need to be addressed before your manuscript can be considered for publication. I agree with many of her comments, particularly those related to affirmative actions, their potential effects, and their relevance to the study. I encourage you to focus on these aspects during the revision process.

In this regard, I would like to add the following points to Dr. Lomascolo's comments:

The authors quantify two aspects that at times seem to be misinterpreted in the discussion of the results. On one hand, and most importantly given the title of the paper, is audience size relative to speaker gender (while controlling for other important variables such as talk content and speaker trajectory). On the other hand, they examine the gender proportion among speakers. It is important to note that affirmative actions aimed at increasing the visibility of women in academic environments should not be evaluated based on the change in the proportion of female speakers, as this is a variable that organizers are actively modifying. By inviting more women, a higher proportion of female speakers is a direct outcome. The critical measure of impact lies in whether these actions influence audience size—namely, did affirmative actions enhance the visibility of female speakers? I believe the authors present convincing evidence that there is indeed an issue with the visibility of women scientists, which appears to be genuinely linked to their gender rather than the topic of their talks or their professional trajectory.

Regarding the gender ratio among speakers, the supplementary material includes an analysis that would be better presented in the main text. This analysis demonstrates that the proportion of female speakers in the PPGE aligns with what would be expected by chance, given the gender ratio of the potential pool of speakers within the PPGE community. Including this analysis in the main text would provide a clearer and more balanced perspective, showing that there is no inherent gender bias in speaker selection. Although this finding may not align with the primary focus of the study, it is important to present it, particularly since the authors frequently note that women gave fewer talks than men—something that would naturally occur if the PPGE community is predominantly male.

It is also worth considering that the gender ratio within the PPGE community might indicate a different type of gender issue, one that would require alternative affirmative actions to address. However, there seems to be a limitation in how the expected gender ratio among speakers was calculated, based on the average gender proportion within the PPGE community. Gender proportions vary significantly across academic levels (e.g., students, postdocs, and professors), as does the representation of each academic category among speakers (and across different years, in fact). Thus, relying solely on an average gender ratio for the entire community may not provide an accurate estimate. To illustrate with an extreme hypothetical example: if 100% of the speakers came from the professor category (approximately 38% women), the expected gender ratio would differ greatly from a scenario where 100% of the speakers came from the student category (approximately 61% women). A more accurate approach would involve weighting the expected gender ratio by the proportion of speakers within each academic category.

Minor comments:

1. Specifically, what did the affirmative actions consist of? Were targeted invitations sent? Were they directed at specific academic levels or extended equally to the entire community? Were general invitations issued but with priority given to women? Providing a more detailed description of this aspect would help clarify.

2. Both in the abstract and in the introduction, the word "also" (would also enhance...) and the phrase "and the effect of affirmative actions" in objective (i) should be removed, as they suggest that the effect of affirmative actions on the representation of women as speakers was also evaluated.

3. Line 38: As previously noted, the word "prestige" should be replaced.

4. Objective (iii) in the abstract and introduction: Saying "if gender differences in the audience of professors" gives the impression that gender differences in the audience were evaluated. I suggest rephrasing this to align more closely with the referenced title (lines 152, 246): "Speaker gender differences in seminars audience."

5. Line 154: Remove "on the audience."

6. Lines 239-244: The description of c) is missing in the table legend.

"I look forward to receiving a revised version of your manuscript, along with specific responses to the comments and suggestions, before making a decision about recommending your article for PCI Ecology.

Thank you again for sending your important contribution to PCI Ecology.

Best wishes

Natalia

Reviewed by **Silvia Beatriz Lomascolo** ⬡, 04 January 2025

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Reviewed by **Letícia dos Anjos**, 17 December 2024

Dear Editor,

I believe all the comments from reviweres and the editor were addressed, leading to a cleaner and more comprhhensive version of the manuscript. I fully agree with the publication of the work given its experimental quality and the importance of the topic.

I have no futher comment.

Evaluation round #1

Authors' reply, 06 November 2024

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Decision by **Natalia Mariel Schroeder** ⬡, posted 27 September 2024, validated 02 October 2024

Dear Júlia Rodrigues Barreto and coauthors

Thank you very much for submitting your manuscript "Is the audience gender-blind? Smaller audience in female talks highlights prestige differences in academia" to PCI Ecology. I read your contribution and I found it novel, timely and highly relevant for current discussions on the gender gap in the scientific community.

I have now received the reviews of Dr. Silvia Lomáscolo and Dr. Letícia dos Anjos, who raised a few major points with which I completely agree and that I consider would need major revision.

First, regarding the use of the word "prestige", I agree with Dr. Lomascolo's observation that there is a methodological issue and some circular reasoning regarding the relationship between audience size and prestige. However, what concerns me even more is the use of the term 'prestige' especially in the title but also throughout the manuscript. What constitutes 'prestige,' who defines it, and how it is defined are historically constructed concepts that are far more complex than just the size of the audience. I encourage you to carefully review these points and consider using a term such as "recognition" instead. Additionally, I recommend rewriting the title to: 'Is the audience gender-blind? Smaller audiences in female talks highlight gender bias in academia.

Secondly, regarding your claim that you are measuring the strength of the leaky pipeline, I agree with Dr. Lomáscolo and Dr. dos Anjos that this does not accurately reflect what is being done in the study. I would suggest carefully reviewing and clarifying these statements, and rewriting them throughout the text as recommended by both reviewers.

I would also like to share some other comments with you:
    Abstract
    Line 24. About the use of "minority" I suggest you use "political minority", as women are not necessarily less numerically represented in science, and even being in the same proportion, they continue to be among those groups within "political minorities" or "subaltern groups" in terms of power representation.

Data analyses
    Lines 144-150. This is very interesting as most gender bias studies in the scientific community do not have data to control for the "potential population" under study, which already may introduce a gender bias associated with numerical representation. However, I suggest you compare your general results with those only considering speakers within the PPGE or the institute, which will be strictly the population you can "control". I am making this suggestion as I think that if external visitors are mostly people invited because of collaborations with department researchers or even because they travelled for committees, that may introduce a kind of double gender bias, as both travelling and being invited to evaluations may be already biased.

Line 161 "had a side effect on the audience". What do you mean by "side effect"? I suggest you avoid this kind of expression. Try to be more direct and clearer about the variables you measured.

Introduction and Discussion
    I suggest you add a paragraph in each section in order to introduce discussions about "productivity". You measured productivity by using metrics that have been already shown to reproduce or even amplify the gender gap. What does it mean that even if you used such metrics you did not find differences among genders? Can this result suggest that women need to work much more than men to have the same productivity, considering men-biased metrics?

Please, provide a revised version of your manuscript that incorporates all these points and others highlighted

by the reviewers. Additionally, kindly include a response letter explaining the changes made and how you addressed the reviewers' feedback.

I look forward to receiving your revised manuscript and your specific responses to reviewers before making a decision about recommending your article for PCI Ecology.

Thank you again for sending your important contribution to PCI Ecology.

Best wishes

Natalia

Reviewed by Silvia Beatriz Lomascolo ⓘ, 05 July 2024

This study addresses the difference in the audience of female versus male speakers, while controlling for speaker academic level, and the subject of the talks. The authors cleanly show that female scientists have smaller audiences even though academic prestige and the subjects of their talks did not differ. Hence, they show convincing evidence that the audience is not gender-blind. I appreciate the effort to isolate variables, as it pinpoints the real bias in appreciation of women's work by the academic community just "because".

I do see some problems in how the authors present some of the concepts. From my perspective, I think that they are confusing certain phenomena. Just a change of wording and conceptualization should improve the manuscript. Here is what I see:

I don't think the "leaky pipepline" phenomenon has to do with what you are trying to quantify which is the gender ratio in invited speakers and the audience associated to that. The leaky pipeline phenomenon was well referred to in the second paragraph (lines 66-69) of the introduction, saying that all the differences mentioned between male and female scientists may contribute to the phenomenon through which female scientists differentially "fall out" of the system in comparison with male scientists; i.e., the leaky pipeline. But that is not what you are quantifying here. The difference in gender ratios amongst invited speakers seems to be more readily affected by choices of the organizing committee, not by truncated careers of female scientists leaving the system earlier or more often than male scientists. Statements such as saying that you are measuring "the strength of the leaky pipeline effect on the female representation as speakers (lines 87-88)", "Leaky pipeline effect in female speakers (line 138)", "To investigate the strength of the leaky pipeline effect on the female representation (line 139)", "Although affirmative action toward increasing women's representation fixed the leaky pipeline effect (lines 300-301)..." etc. should be rewritten to reflect what you are really quantifying here: the effect of the speakers' gender and trajectory on audience size at a seminar series (please check throughout the manuscript, as my list of statements is not comprehensive)

I also don't think you can say that affirmative action will or will not "increase the prestige" of a seminar speaker. Prestige is a much more complex concept than the size of the audience that comes to see you when you give a talk. Yes, the higher the prestige of a speaker will likely attract a greater audience. Indeed, you use a measure of prestige (productivity) to see whether that affects audience size. Audience size is affected by speakers' prestige, it is not the speaker's prestige itself. I understand what the authors mean, but I think it is an unfortunate use of terms that seem confusing and diverts from the very interesting results of this paper. In relation to this, you may increase the audience, yes, but you do not increase the speaker's prestige through affirmative action directly affecting the policies ruling decisions of speaker choice.

I made some comments in the pdf as I found some mistakes in the English language. Although the manuscript reads nicely and fluently, there are some expressions that could be improved by a native speaker. I am not a native English speaker myself, so I would recommend the authors ask a colleague to look over it. If not possible, it is not a big problem either.

Reviewed by Letícia dos Anjos, 15 July 2024

Dear Editor,

The manuscript entitled "Is the audience gender-blind? Smaller audience in female talks highlights prestige differences in academia" investigate gender bias within seminar series of the Ecology Seminars of the University of São Paulo. More specifically, the work investigates the effect of gender bias on the audience (number of attendances) in female talks before and after affirmative actions were taken to increase the number of female speakers. In addition, the work evaluates whether the scientist position level, his/her scientific productivity, or the scientific topic of the talk, are factors affecting gender bias in Ecology Seminars audience. Finally, the work also show data describing the proportion of female speakers along the last 12 years and among the students, post-Docs and Professors belonging to the Ecology Graduation Program.

Although the time-serie and the number of talks considered before the implementation of affirmative actions were considerably higher (10 years, from 2008 to 2017; and 256 talks) than the those after this policy (2 years, from 2018 to 2019; and 71 talks), the comparison is still relevant, given the importance and the contemporaneity of the topic.

The results show that implementation of gender policy to invite more female speakers was effective, particularly among post-Docs and professors categories. Despite gender policies, the audience remained higher for male professor speakers, regardless of scientific position or scientific productivity, suggesting the prevalence of cultural gender bias in the scientific community.

The manuscript is well written, and I have no significant comment about the methodology and the discussion. My only suggestion is on line 301, where authors affirm that "affirmative action toward increasing women's representation fixed the leaky pipeline effect". The pipeline effect refers to the proportional decrease of women along career levels, as first defined by Clark Blickenstaff (2005). Therefore, the implementation of affirmative actions in Ecology Seminars reduced the gender disparity among speakers belonging to different career levels, but it did not fixed the problem of decreased women representation along scientific career ascension. Thus, I suggest authors to change the sentence.

Finally, I congratulate authors for the excellent work and suggest the publication of the manuscript.

Please find below my answers to the suggested questions:

Title and abstract
Does the title clearly reflect the content of the article? [X] Yes, [ ] No (please explain), [ ] I don't know
Does the abstract present the main findings of the study? [X] Yes, [ ] No (please explain), [ ] I don't know
Introduction
Are the research questions/hypotheses/predictions clearly presented? [X] Yes, [ ] No (please explain), [ ] I don't know
Does the introduction build on relevant research in the field? [X] Yes, [ ] No (please explain), [ ] I don't know
Materials and methods
Are the methods and analyses sufficiently detailed to allow replication by other researchers? [X] Yes, [ ] No (please explain), [ ] I don't know
Are the methods and statistical analyses appropriate and well described? [X] Yes, [ ] No (please explain), [ ] I don't know
Results
In the case of negative results, is there a statistical power analysis (or an adequate Bayesian analysis or equivalence testing)? [ ] Yes, [ ] No (please explain), [X] I don't know
Are the results described and interpreted correctly? [X] Yes, [ ] No (please explain), [ ] I don't know
Discussion

Have the authors appropriately emphasized the strengths and limitations of their study/theory/methods/argument? [X] Yes, [ ] No (please explain), [ ] I don't know

Are the conclusions adequately supported by the results (without overstating the implications of the findings)? [X] Yes, [ ] No (please explain), [ ] I don't know