



Behind the Publications: Challenges Faced by Women in Academia and their Academic and Psychological Consequences

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DOI : <https://doi.org/10.5281/zenodo.22083147>

ARTICLE DETAILS

Research Paper

Received: 28-06-2026

Accepted: 18-07-2026

Published: 20-08-2026

Keywords:

*Women in Academia,
Psychological Well-being,
Academic Publishing,
Gender Inequality, Gender
Bias, Career Progression*

ABSTRACT

Women's participation in academic research has increased considerably over the years, but gender differences in academic publishing are still visible in many areas. This paper discusses the major issues and challenges faced by women in research publication and examines their possible academic and psychological consequences. The discussion covers women's participation in research, publication output, career progression, mobility, collaboration, peer review, editorial positions, and workplace experiences. Available evidence shows that women, on average, publish fewer papers and receive fewer citations than men, and they are also less represented in senior academic and editorial positions. These differences are influenced by several factors such as gender bias, limited professional networks, unequal access to research opportunities, career breaks, family responsibilities, discrimination, and lack of supportive workplace environments. The challenges became more visible during the COVID-19 period, when women researchers faced additional responsibilities related to childcare and household work. Such difficulties can affect not only publication and career progression but also women's confidence, sense of belonging, stress levels, and perception of their own academic abilities. Therefore, gender inequality in academic publishing should not be considered only as an issue of

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numbers and productivity. Creating supportive institutional policies, fair publishing practices, and inclusive academic environments is important for improving both the academic and psychological well-being of women researchers.

Introduction

Gender diversity and inclusion are of growing importance and focus in many sectors, including business, education, government, and research. Increasing women's participation has been seen to have a positive impact on productivity, boosting problem-solving, and increasing innovation, which are all essential outcomes for tackling the great challenges of our time. Similarly, promoting women's participation and inclusion in research publications is also an important part of this ongoing effort. In the past fifty years, the world has witnessed enormous strides by women in research. Women now comprise a greater share of science, technology, and medicine (STM) graduates than ever before, and there is increased focus and energy on balanced participation, factoring gender into research, and research on gender itself (Ali et al., 2011). While we have these positives, current findings indicate that disparities still linger, with slower growth of articles published by women, higher numbers of women leaving research, and understudied research areas by women. The academic publishing system also shows a systematic underrepresentation of women as authors, referees, and editors.

Studies have shown that gender diversity in the workforce correlates with profitability and value creation and that gender-diverse leadership improves productivity. In an age when research must demonstrate return on investment, the benefits of gender diversity are increasingly important. Furthermore, research is increasingly collaborative, and studies have demonstrated that the proportion of women in a group is one of three key factors that correlate with the collective intelligence of that group. Yet, the gender gap among researchers within the global scientific workforce persists across subject areas and geographic regions. Here we now look into the current status of women in participation, career progression, and among many other areas of academic research publications, and dwell on the challenges and issues faced in these areas.

Participation in Research Publication

Research participation is widely visible in the form of research publications and authorship of research publications is one way that researchers contribute to the advancement of knowledge. The demographics of the author pool may reflect gender differences if research does not appeal to women and men to the same degree. The appeal of research to women compared to men can differ because of cultural differences in how



research is portrayed or perceived, or how welcoming the research environment is to women compared to men. This difference in the appeal of research ultimately manifests as differences in who is recruited and retained as part of the research workforce.

Women account for a minority of the world's researchers. In 2019, 29.3% of researchers globally were women per the UNESCO institute for Statistics. According to the data, the regional averages for the share of female researchers are 48.2% for Central Asia, 45.1% for Latin America and the Caribbean, 41.5% for the Arab States, 39.3% for Central and Eastern Europe, 32.7% for North America and Western Europe, 31.8% for Sub-Saharan Africa, 29.3% for World, 23.9% for East Asia and the Pacific and 18.5% for South and West Asia. As far as India is concerned, data corresponding to 2015 shows 13.9% participation of women in research (UNESCO, 2019). Elsevier's (2017) report, *Gender in the Global Research Landscape*, reported that the proportion of women among researchers ranges from 20% to 49% across 12 countries and regions. Participation in research by women also varies by subject area, with relatively higher proportions of women in the biomedical sciences and lower proportions in the physical sciences. Suboptimal gender balance among researchers increases the risk of suboptimal productivity, creativity, and innovation within the global scientific endeavour. Nursing and psychology stand apart with more women than men among authors. Japan, a country with a high HDI, has the lowest ratio of women to men among authors in every subject area. Also, the greatest increase in the proportion of women among authors is seen in nursing and psychology and the smallest increase is seen in the physical sciences. Men are more highly represented among authors with a long publication history while women are highly represented among authors with a short publication history. Last authors and corresponding authors consist of proportionally more men than women compared with the overall author population in every country.

The reasons underlying the gender gap in the scientific workforce and how to address it is a topic of intense study. The *She Figures* (2018) report noted near gender parity among researchers at the graduate level, but far fewer women at top positions within their fields. This underrepresentation of women in leadership positions has been attributed to various factors, from gender differences in STM (science, technology, and medicine) education, to challenges with work-life balance and systemic gender bias in hiring, promotion, publishing, and funding.

Author Publication Output

Research publications are an important research output. They are a means of communicating research findings to the academic community. Several studies have described gender disparity in terms of scholarly output—the number of articles, reviews, and abstracts—published by men and women researchers, showing



that, on average, women author fewer publications than men, with differences in scholarly output varying by subject area, geography, journal type, and authorship position.

Citations of research publications are a means of crediting the originators of an idea or finding, as well as recognized expertise. The number of citations received by a publication is indicative of uptake of knowledge and can serve as a proxy for the academic impact of the publication. Several studies have noted a gender difference in how citations accrue, with work authored by women cited less often than that by men, and variations in the citation gap across subject areas and authorship position that may be related to gender-based differences in self-citation and journal prestige. The gender gap in scholarly output and citation accrual has been attributed to various factors. Recent studies have described a “**Matilda effect**”—the perception that the scholarly work of women is lower quality than that of men—which leads to fewer citations or invitations to collaborate and has a negative effect on future scholarly output (Andersen & Nielsen, 2018).

Women are also more likely than men to take career breaks or switch to a part-time position to achieve work-life balance or care for a family member; these breaks can reduce productivity. Successfully publishing again after returning to research can be difficult, particularly if institutional support structures are lacking. As publication output is often used to measure performance in academic research, gender-based differences in the number of publications, as well as the impact of those publications, can have a significant effect on the career progression of women researchers. As per, the Elsevier (2020) report, *The Researcher Journey through a Gender Lens*, on average, women published less than men in a five-year period in every country assessed (European and American Countries), regardless of authorship position. The least difference in the average number of publications by women compared to men is observed among first authors and the biggest difference is observed among all authors. Differences have been observed in the number of grant awards received as they may have implications for the resources that are available to women to carry out research. It may also have consequences in terms of women’s ability to publish: if less funding means fewer projects, it can be assumed that this would also negatively impact the number of publications produced. A similar logic may affect the number of patents filed. Since research funding, publications and patents are often used as measures of success of a researcher’s career, it is possible that the observed gender gap across these various types of research output impacts how women fare in the research world and inhibit the advancement of women to senior roles.



Publication Career and Mobility

Publishing records of an individual are affected by researcher mobility and thus it may affect their longevity of research careers. The ability to move to other countries to pursue research opportunities has a positive effect on career advancement. The Elsevier (2017) Gender in the Global Research Landscape report, revealed that men researchers are more mobile than women, publishing more often outside their country of origin. The report further found that publications from mobile researchers are more impactful than those from researchers who never left their country of origin. Differences in mobility may thus contribute to gender disparities in research career advancement and publication records.

In fact, it was revealed that women leaving research careers tend to mention family commitments and harassment or discrimination more frequently than men. Of these two reasons for leaving research, the first may be rooted in personal choice as well as the cultural and societal expectations placed on women. The second reason may be addressed through the development and implementation of policies and procedures that ensure safe and respectful workplaces at research institutions.

Collaborative Networks

Studies have demonstrated that gender composition in a collaborative context affects both collaboration practices and team performance. Network homophily based on gender status is a relevant aspect of a collaboration system because co-authorship connections are often driven by gender status inclusion and exclusion processes (i.e., conscious or unconscious decisions to seek out gender-similar collaborators). When present, such preferences have implications for women's downstream research productivity. The presence of gender homophily also has implications for the importance of women's representation in a field. Across many subject areas and countries, men tend to have more co-authors than women and this difference is wider for authors with a longer publication history. In the underrepresented fields of sciences, men may have less preference for collaborating with women who are already less in proportion to other fields, which in turn affects their publication career.

Across the globe, on average, authors tend to preferentially collaborate with authors of the same gender across most of the subject areas. Women and men are more similar in the way they are connected to their potential collaborative space (second-order collaborators) through their direct collaborators. Women and men researchers are similar with respect to their share of international collaborators, except for the European countries, where men have a slightly higher tendency to establish international collaborations than women (Bear & Woolley, 2011).



Scientific collaboration is impacted by gender, as well as other social identities. Because gender is a factor that has been shown to influence social interactions, gender may also determine exclusion or subordination within scientific institutions. Therefore, it is relevant to examine how men and women are positioned in collaboration networks, as their network characteristics may be shaped by gender differences and form the basis for future and downstream scientific activity.

Responses to Elsevier's (2019) survey of active researchers provided insights into the quality of their social networks. Active researchers (self-identified as spending at least 20% of their academic/work activity conducting research on an ongoing basis) were asked if they know (i.e., if they are able to remember the name of the person/ job holder and easily start a conversation when encountering them) people who hold certain job positions of varying levels of prestige within their fields. Women reported having more close ties with people in positions of moderate prestige, whereas men reported knowing people considered to be in positions of high prestige. These influential connections, as a measure of research network quality, could allow for greater career mobility and a distinct advantage in career publication opportunities for men.

The survey also found that, when defining seniority by years in research, similar percentages of men (59%) and women (57%) in later stages of their research careers (i.e., actively involved in research for 10 or more years) reported having at least one high-prestige connection. Among early-career researchers (i.e., actively involved in research for less than 10 years), significantly fewer women (38%) reported having at least one high prestige connection compared to men (49%). These differences in social network quality may contribute to the observation that fewer women gain senior leadership roles. Also, significantly more women (70%) than men (64%) agreed that it is easy to collaborate with colleagues in their field of research. This suggests that women may be better at creating close-tie connections, or that men may be actively reaching out to collaborate more often, but these attempts do not always result in a collaboration (last five years is an increased awareness of gender diversity with regard to leadership and in research teams).

Peer Review Process

The academic publishing system shows a systematic underrepresentation of women as authors, referees, and editors. This underrepresentation is persistent and well documented in various fields of research. A recent study of 1.5 million academics suggested that the relative increase of participation of women in science, technology, and medicine (STM) fields over the past 60 years has not reduced the gap in women's academic productivity and impact. Even in fields such as the humanities, psychology, and the social sciences, where the gender composition of the community has been more favourable to women for decades, men still publish more manuscripts and in more prestigious journals.



In the current hypercompetitive academic environment, such a publication gap could explain why women often have a higher probability of dropout from academia, fewer grants, lower salaries, and less prestigious careers. In this context, the peer review process of scholarly journals is often blamed for this gender gap. However, whether peer review and journal editorial processes are the root cause of these gender penalties is disputed. As in some fields like political science and economics to name a few, negligible effects of gender on the assessment of manuscripts have been found (Brown et al., 2020). On the other hand, research in other fields, such as ecology, found that manuscripts submitted by women as first authors received slightly worse peer review scores and were more likely to be rejected after peer review. While the publication gap between men and women is generally explained by persistent differences in submission rates by women in almost all fields of research, peer review and editorial processes may also contribute to it in some fields and regions. Manuscripts by women receive systematically more positive reviews in biomedicine and health sciences, as well as in social sciences, whereas they were less positively treated in life sciences and physical sciences journals (Squazzoni et al., 2021a).

Furthermore, the fact that women are systematically less involved in peer review and are rarely appointed to prestigious editorial positions could influence women's perceptions of their adequacy and potential success as authors. For instance, recent research suggests that women would submit fewer manuscripts, of comparably higher quality than those written by men, because they anticipate possible editorial bias and invest more in their manuscripts. A recent survey of a sample of 2440 American Political Science Association members revealed that women prefer not to target certain journals as they perceive that they will have lower chances than men with similar expertise. Also, data on desk rejections were not consistently available for analysis, therefore it is uncertain how much bias is at this level from the editors. Promoting more gender diversity in editorial teams and pools of referees could help scholarly journals to inform potential authors and referees about their attention towards the inclusion and participation of women and to stimulate such cause.

COVID-19 and Publication

Researchers experienced the same challenges during the lockdown as everybody else. Analyses suggest that female academics are posting fewer preprints and starting fewer research projects than their male peers. During the first wave of the pandemic, women submitted proportionally fewer manuscripts than men (Andersen et al., 2020). This deficit was especially pronounced among more junior cohorts of women academics. But the rate of the peer-review invitation acceptance showed a less pronounced gender pattern with women taking on a greater service responsibility for journals, except for health & medicine, the field



where the impact of COVID-19 research has been more prominent. These findings suggest that the first wave of the pandemic has created potentially cumulative advantages for men (Squazzoni et al., 2021b).

The top reasons for women lagging in the publication are caring responsibilities, not only for children but also for elderly or sick relatives. Evidence suggests that male academics are more likely to have a partner who does not work outside the home; their female colleagues, especially those in the natural sciences, are more likely to have a partner who is also an academic. Even in those dual-academic households, the evidence shows that women perform more household labour than men do. It seems like female researchers are taking on more domestic work during the pandemic. One study found that male faculty members are four times more likely to have a partner engaged in full-time domestic work, compared to their female colleagues. While gender disparity among STM fields is not uncommon, academicians believe that, unfortunately, the current pandemic will cause some of the progress that has been made in tackling gender disparity in the last ten years to be lost (Viglione, 2020).

Issues and Challenges in Research and Workplace

While in the context of publication, the current scenario of women's participation has been discussed along with the issues and challenges they are facing. It is worth discussing the nature of research and workplace environment, which is the predecessor to eventual research work publication. Moreover, attitudes of men particularly in male dominated are essential to be assessed as these will heavily determine the progress of the newer generation of women who aspire to join this field.

Structural and Interpersonal Challenges

In 2019, Elsevier's Customer Insights team was surveyed to examine the perceptions of active researchers around career progression and gender balance in scholarly research and publication. The survey revealed that 42% of women surveyed described their workplace culture as gender-biased, and 38% of women reported bias or discrimination in recruitment, hiring, and promotion processes. In addition, 37% of active researchers think that gender imbalance in their field may be due to a lack of encouragement for women to pursue education or careers in that field starting from an early age.

As in some fields, women's representation is low and has been historically considered a men field, research studies show that compared to female faculty members in social sciences, female faculty members in the natural sciences (STM) reported more perceived gender discrimination related to hiring, promotion, salary, space, equipment, access to administrative staff, and graduate student or resident/fellow assignments, as well as more sexual harassment. Among faculty in STM, women also reported more gender discrimination



than men; here female faculty members, compared to their male counterparts, reported more gender derogation — negative, insensitive, or disparaging comments made about one's own gender, and viewed their workplace as more tolerant of sexism. They also report scholarly isolation i.e., feeling excluded from scholarly interactions with other faculty members (Settles, 2014).

Attitudes

Researcher attitudes towards gender diversity and equity vary widely among men and women. Most of the differences in viewpoints are related to the importance individual places on gender balance and to the perception of fairness in the academic system. There are two opposing opinions on the causes of gender imbalance and inequality in academia. Some groups (men and women) attribute gender inequality to the attitudes and ambition levels of women. Other groups attribute gender inequality to a systemic and cultural (unconscious) bias against women. Researchers perceive that family duties can have a negative impact on research publication (for both women and involved men, but more for women) (Huang, et al., 2020).

Researchers suggested interventions to increase gender balance and equity that reflect their perception of causes of the gender inequality. Those suggested are either aimed at increasing the assertiveness and self-confidence of women or at changing the male-dominated culture and reducing the possibility of (unconscious) bias. The lack of consensus over a single best intervention may be interpreted as a lack of a “one size fits all” intervention. Additional research is needed to understand the viewpoints of women and men researchers who are indifferent to the gender equity discussion and men who are negative about current interventions that they perceive discriminate against men (Settles et al., 2013).

Conclusion

Gender equality is not an isolated problem—it is related to age, race, ability, culture, sexuality, and geography, among other factors. Diversity within the scientific workforce, including gender diversity, brings unique perspectives, drives creativity and innovation, and provides new contexts for understanding and applying research findings. Acknowledgment of the gender gap in research and its negative impact on progress has led to various institutional, national, and global efforts to address the factors that steer girls and women away from seeking or staying in a research career. Although a gender gap persists in many fields and countries, the gap is closing more slowly in certain subject areas and countries, which is indeed a good sign. Understanding the dynamics of participation of men and women in research will help inform strategies to further reduce the gender gap in the global scientific workforce and come up with solutions to the issues and challenges faced by women during the course of their careers. While too much focus has been on how



women can overcome this disparity, it is a must to take men together so they can contribute in this pushback against gender disparity. Bringing steady changes in attitudes and biases and voicing for ensuring a more balanced representation of women is how they can join in this fight.

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