Article

Communication Research
1–24

DOI: 10.1177/00936502221124389
journals.sagepub.com/home/crx
SAGE

The Matilda Effect in Communication Research: The Effects of Gender and Geography on Usage and Citations Across 11 Countries

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Abstract

Across liberal democracies, optimalizing gender balance in communication research production and impact is a growing aspiration of scientific leaders and research-intensive universities alike. Despite eloquent motivations, the gender proportions of the most prolific scholars remain undetermined, along with the role gender plays in explaining research usage (i.e., views) and impact (i.e., citations) across countries. Drawing upon performance data of 5,500 communication scholars from 11 countries, this study found that amongst the most prolific communication authors, female scholars are still significantly underrepresented in all the analyzed regions. Furthermore, when examining views and citation scores, findings illustrate that female scholars' papers are systematically more viewed, yet significantly less cited than male scholarship. All things considered, we provide insightful empirical evidence that point to a twofold Matilda effect playing at both the production and performance levels in communication studies, arguing that gender inequalities are still rampant in the field.

Keywords

Matilda effect, communication research, research performance, research production, research usage, gender inequalities, cross-country study

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Gender imbalances in sciences are being widely analyzed and discussed in general (Bonitz, 2002; Judge et al., 2007), and in communication and media studies in particular (Knobloch-Westerwick & Glynn, 2013; Knobloch-Westerwick et al., 2013). A burgeoning literature on this phenomenon, known as the Matilda effect (Rossiter, 1993) aims to uncover the drivers behind a possible gender bias against female authors, addressing the theoretical and empirical implications. Some studies have produced controversial findings (Baldi, 1998; Hakanson, 2005; Lutz, 1990) while others deny the existence of the Matilda effect altogether (Haslam et al., 2008; Over, 1990). In this context, examining gender balance in science has a growing importance, as several initiatives aim to raise the representation and visualization of female scholars' work at different levels of research production and impact (Goos & Kelly, 2021).

Generally, the analysis of gender inequalities in research focuses on two overlapping factors: research production, with a specific emphasis on the publication patterns of the most prolific scholars (Chan & Torgler, 2020; Huang et al., 2020) and research performance, with a specific focus on citations and impact (Knobloch-Westerwick & Glynn, 2013). However, little is known about how the gender aspects of productivity relate to performance, lacking as a result a complex model aiming to account for different aspects of the Matilda effect and their interconnections. Although evidence tends to show that female scholars are underrepresented among the most productive scholars (Demeter & Toth, 2020), and receive fewer citations than their male peers (Halevi, 2019; Maliniak et al., 2013), no study examines how productivity, citations, and publication views (Zhang et al., 2021) affect, and are being affected, by potential gender bias jointly. Moreover, while most studies focus on a specific country or geographic region (Larivière et al., 2013), typically the U.S. (Crew, 2019), it remains unclear how gender balance in communication research differs across countries. Finally, while citation patterns were extensively scrutinized in former research (Larivière et al., 2013), the contribution of usage—measured by the number of views—has been systematically neglected (Bornmann et al., 2019; Thelwall & Kousha, 2014).

Accordingly, this project extends past work, aiming at providing a complex explanation of (1) how the Matilda effect works on the level of productivity, (2) how different measurements of research impact and usage are influenced by potential Matilda effects, and (3) how geographical locations might intensify gender imbalances in research production, usage and citations. Based on the data on the research production and performance of 5,500 communication scholars from 11 countries, our analysis demonstrates that among the most prolific scholars, female authors are significantly underrepresented in all the analyzed countries, and they are generally more viewed yet less cited than their male peers. Thus—albeit in a more complex way than usually considered (Baldi, 1998; Hakanson, 2005; Lutz, 1990)—our study suggests there may be a structural Matilda effect operating on both the production and performance levels in communication research.

The Matilda Effect and Its Possible Causes

Since the introduction of Merton's concept of the "Matthew effect" (Merton, 1968), significant scientific attention has been paid to the systemic over- and underrecognition of certain scientists and the possible causes thereof (e.g., Bonitz, 2002; Gaston, 1978; Judge et al., 2007). A corresponding phenomenon that shows a potential gender bias in favor of male scholars was named the Matilda effect by Rossiter (1993). Empirical evidence proves that female scholars experience a negative bias against them all over the world and in virtually all disciplines. They are underrepresented in the higher ranks of academia (e.g., European Commission, 2012; National Science Foundation, 2006), are less likely to win scientific awards (Lincoln et al., 2012), and receive smaller grants and less often than their male colleagues (Bornmann et al., 2007; RAND, 2005). However, the main causes of this imbalance have still not been adequately identified, as there could be several interconnected, interacting system-level phenomena to explain how and why female scientists are systematically underrepresented and underrecognized.

According to a possible explanation, the traditional distribution of family responsibilities, which is doubtless unfavorable for women, may hinder female productivity in several ways. Examining the existence of the Matilda effect, Huang et al. (2020), looked at 1.5 million publications with authors of identifiable gender who completed their publication careers between 1955 and 2010, covering 83 countries and 13 disciplines. The analysis revealed that not only did the increasing presence of women fail to mitigate gender inequalities, it even increased them: the gender gap in productivity increased from 10% to 36% in favor of men, and from 0% to 34% in the impact of publications, which convincingly refutes the assumption that gender equality can be achieved by simply increasing the presence of women in science.

Scholars have also tried to explain gender bias through differences in household roles and family responsibilities (Stack, 2004), career absences (Cameron et al., 2016), resource allocation (Duch et al., 2012), role stereotypes (Eagly et al., 2020; Knobloch-Westerwick et al., 2013; Shen, 2013), the gendered nature of the labor market and the distribution of salaries (Block et al., 2018), academic rank (van Den Besselaar & Sandström, 2017), specialization (Leahey, 2006), work climate (Bronstein & Farnsworth, 1998), dropout probability (Huang et al., 2020), along with the numerous other ways in which these inequalities are being conceptualized and measured (e.g., Nygaard & Bahgat, 2018).

As suggested by extant research, the accumulation of the advantages of male scientists is especially marked at scientific elite levels (i.e., the most productive and cited scholars). Chan and Torgler (2020) analyzed the publication activity of the 94,000 highest ranked scientists (the top 1.5% in terms of impact, based on citation indicators) over a period of nearly seven decades (1960–2017), looking at the relative gender representation globally as well as by countries and by scientific disciplines. The authors found that a mere 11.83% of the most cited authors globally were women. Communication studies, however, was among the most balanced disciplines, with a proportion of female scholars of 33.7% amongst the most cited scholars.

Geographic Regions and the Matilda Effect

Several studies have been published on the differences in recognition between geographic regions with relation to low- versus high-prestige institutions (Gaston, 1978; The KNUDOP Search Group, 2008), as well as countries (Bonitz, 2002). There are also significant differences in the Matilda effect, that is, the situation and recognition (or non-recognition) of women in the scientific sphere across countries and regions. For example, Chan and Torgler (2020) found that among the 43 countries examined, the proportion of women among top-ranking scientists is highest (20.45%) in Finland, the country that implements specific institutional efforts for gender equality, while it is lowest in Saudi Arabia (2.08%). This also illustrates another important conclusion, namely, that science is not immune to cultural norms and institutional conditions: societies that are more committed to gender equality and which have less discriminatory attitudes toward women and better female political representation might also have a higher proportion of women among their top scientists (Chan & Torgler, 2020).

Demeter and Toth (2020) analyzed the career trajectories of 3,325 sociologists and found significant differences in terms of gender balance across world regions. Western European faculties (with 60% male scholars) were less imbalanced than the global average (55%), with the most balanced departments being found in the U.K. and Scandinavian countries with almost equal male–female ratios of faculty members.

Taking into consideration the results of previous research, this study asks whether the Matilda effect is detectable among the most prolific authors and looks at the ratios of male and female researchers in 11 different countries. Accordingly, the study poses the following research questions:

RQ1a) Are there equal proportions of male and female scholars among the most prolific scholars in *each* of the 11 countries under analysis? RQ1b) Considering the female first authors frequencies in the field in 2019, do the most prolific scholars in *each* of the 11 countries follow a similar distribution?

Several earlier studies (e.g., Chan & Torgler, 2020; Knobloch-Westerwick et al., 2013) found that the attitudes, values, and gender role conceptions of academia and society at large play a major role in how women scientists and—especially—successful women scientists are valued. The latest Human Development Report (HDR) (2020) found significant gender differences between world regions in several measurements.

Gender inequality, as expressed by the Gender Inequality Index (which measures gender inequality in terms of reproductive health, empowerment, and the labor market) was the lowest in Western European countries, and much higher in most Eastern European countries. However, despite high human development scores, important gender inequality was found in the US as well (Human Development Report (HDR), 2020). The latest Global Gender Gap Report (GGGR) (2020)), which measures gender inequality in four indices—Economic Participation and Opportunity, Educational Attainment, Health and Survival, as well as Political Empowerment—shows a more complex situation. However, Western European countries and the US tend to perform better than Eastern European countries on average. Besides a more general analysis of the gender gap (Huang et al., 2020), the significant prevalence of Eastern European gender inequality has been discussed in the context of academia as well (Lendák-Kabók, 2021). Unsurprisingly, Chan and Torgler (2020) also found that gender inequality in research performance is stronger in Eastern European countries than in Western Europe, and that the most balanced region is the United States. Taking these findings as references, our study aims to examine whether geographic location is associated with gender representation amongst the most prolific scholars. Accordingly, we posed the following research questions:

RQ2a) Is there an association between scholars' geographical location (i.e., 11 countries) and gender (male/female) proportions? If so, RQ2b) in which geographical locations (i.e., countries) are gender imbalances among the most prolific scholars more salient?

General Gender Gaps in Usage and Citation Patterns

Compared with productivity and impact, limited empirical research has focused on the gender aspects of research papers' usage. In most studies, the number of views is considered indicative of the attractiveness of abstracts, or research papers' performance on social media and other non-academic fields (Zhang et al., 2021), typically analyzed through Altmetrics (Bornmann et al., 2019; Zhang et al., 2021). In SciVal, views counts are also associated with the usage impact, thus measuring the views an author's publications have received.

Regarding gender balance, research found that papers written by female scholars are typically viewed more than those of their male peers (Thelwall & Kousha, 2014). As contrasted with citations, Paul-Hus et al. (2015) found that Altmetrics and social media metrics are more gender balanced, and Thelwall (2018) reported that papers with female authors even have a wider audience. Based on an analysis of Norwegian academics' publication and impact, Zhang et al. (2021) also found that the usage of female authors' publications is higher than male peers. To explain the higher number of views for papers published by female scholars, Zhang et al. (2021) suggest that it may be due to the gendered nature of publication habits. While male authors rather focus on scientific progress, female scholars tend to favor research aiming at social progress. This gender dissimilarity may lead to more views, but less citations for female scientists (Garfeld, 1979). However, as also observed by Zhang et al. (2021), while the number of views might be relatively independent from authors, they may also influence the number of citations a paper receives.

Scientometrics research usually considers citations as measures of the impact of scientific work (Thelwall & Nevill, 2019). The Matilda effect as applied to citations is a distortion effect that can highlight cases of imbalances in citation patterns affecting female authors (Maliniak et al., 2013; Thelwall & Nevill, 2019). Following Rossiter's (1993) paper introducing the concept of the Matilda effect, numerous citation analyses were conducted in different disciplines, a significant proportion of which found evidence for the Matilda effect (Baldi, 1998; Hakanson, 2005; Lutz, 1990), while others did not (Haslam et al., 2008; Over, 1990; Sanchez et al., 2006), presumably due to differences between the disciplines studied, the acceptance of women in the given discipline, the different intervals of time studied, and the methodologies applied.

Specifically, in communication research, Knobloch-Westerwick and Glynn (2013) found convincing evidence for the existence of the Matilda effect in their study of 15 years of two prominent journals of communication studies. First, in line with role congruity theory, they revealed that male scholars get more citations than their female peers on average, and second, that the gender gap in citations is stronger in the case of the most prolific scholars. A current research accross eight communication journals also found that female authors are cited less often than male authors (Feeley & Yang, 2022). Moreover, Knobloch-Westerwick et al. (2013) demonstrated the importance of the selection of the topic in a controlled experiment (Knobloch-Westerwick et al., 2013), pointing out that the presumed gender of the authors affected the assessment of the "scientific quality" of the same scientific papers (or their abstracts). Judges gave higher evaluations if they thought that the author was male, and lower if they thought she was female, an effect that was stronger when the paper was also about a traditionally "masculine" topic.

Dion et al. (2018) studied the citation gender gap in light of the relative presence of women in different disciplines. They hypothesized that the more balanced the ratios of the sexes in a given discipline, the smaller the citation gender gap will be in favor of men. Their results are no cause for much optimism, as they found that even in a journal devoted specifically to feminine topics and dominated by women, there was a higher proportion of citations from men than from women authors when the citing author is male, a team consisting only of men, or a mixed gender team. Temporal changes also give no reason for high expectations: while the proportion of female authors has increased somewhat in the journals studied, this was not reflected in the gender distribution of the authors of the cited papers.

All things considered, authors paid special attention to the gender-based differences of citations in studies of the Matilda effect (Dion et al., 2018; Frandsen et al., 2020), but neglected the most productive scholars. In this study, we examine whether the presence of the Matilda effect can also be demonstrated in the citation patterns of the most prolific authors. Previous research has also neglected papers' usage (i.e., the number of views), and has only considered altmetrics (Bornmann et al., 2019; Paul-Hus et al., 2015; Thelwall & Kousha, 2014). By taking the technological advancements of SciVal our study is, to the best of our knowledge, the first that attempts to test gender differences in communication research views. In line with the relevant literature, we hypothesize that views will be higher, but citations scores will be lower for female authors.

H1) The most productive female scholars have higher view values (Matilda Effect 1) in: (a) the pooled sample and (b) each of the 11 countries under analysis;

H2) The most productive female scholars have lower citation scores (Matilda Effect 2) in: (a) the pooled sample and (b) each of the 11 countries under analysis.

Methodology

Data Collection

For data collection, we used Scopus/SciVal, which lists the 500 most productive authors in different disciplines. We selected a recent 10-year period (2010–2019) for further analysis and exported data of the most productive authors in communication studies, as measured by the number of published papers. In the "Communication" category, Scopus/SciVal only counts papers that are: (1) published in Scopus-indexed journals, or (2) classified as communication journals. We focus our analysis on Europe and the United States, aiming at providing a nuanced understanding of gender imbalances across countries. Accordingly, beyond the US, we include a diverse set of Western European countries with the highest research output—defined by the number of Scopus-indexed papers between 2010 and 2019: the United Kingdom, France, Spain, Germany, and Italy, as well as Eastern Europe (Russia, Poland, Hungary, Romania, and Ukraine). We exported the list of the most productive authors from each country, resulting in a sample of 5,500 scholars.

Measurements

Dependent variables

Number of views. Data was imported from Scopus/SciVal, and the views count was computed as the number of individual views that authors' papers received between 2010 and 2019. The metric is the sum of abstract views and clicks on the link to view the full text at the publisher's website. According to SciVal, two main rationales are salient in explaining the relevance of view numbers: (1) they are more immediate than citation activity, (2) they reflect the interest of the whole research community, including undergraduate and graduate students, and researchers operating in the corporate sector, who tend not to publish and cite, and (3) they could help to show the impact of research that is published with the expectation of being read rather than being extensively cited (SciVal, 2021). Usage data is restricted to the analyzed time frame, thus adjusting similar conditions for all authors in the data.

Number of citations. Data was imported from Scopus/SciVal, and the citations count was computed by the number of individual citations that authors' papers in the study received between 2010 and 2019. Only those citations within this time frame were counted, thus adjusting similar conditions for all authors in the data.

Independent variable

Gender. Gender was manually coded by looking at department websites. In case of doubt, a Google search was applied. To test the reliability, a second coder repeated the coding on a subset of data. In line with Neuendorf's (2017) recommendations, a random selection of 170 names for a second coding was implemented, yielding an intercoder reliability of 98.3% agreement and 0.963 Kohen's Kappa, which is considered substantial (Neuendorf, 2017).

Controls

Scholarly output. As the number of published papers may influence the number of citations and views (Larivière & Costas, 2016), our models controlled for the overall scholarly output within the time frame under analysis, thus adjusting similar conditions for all authors in the data. If senior scholars publish more than junior researchers (Abramo et al., 2016), and male scholars tend to publish more than their female peers (Aiston & Jung, 2015), it is most likely that senior male scholars will be significantly overcited. Accordingly, our models controlled for the number of published documents in both citation and usage predictions. SciVal counts the number of published documents without reference to author order.

Both usage and citations encompass different aspects of impact and are most likely associated with each other (Zhang et al., 2021). Theoretically speaking, higher usage may lead to higher citation scores, as it can be expected that for citing a paper one should first read it. Likewise, scholars' cumulative citations may influence readers' likelihood of viewing their scholarship due to their significant influence in the field. Accordingly, to avoid potential confounds in our predictions, when accounting for citations, we controlled for views, while when predicting views, we controlled for citations. Scholarly output was imported from Scopus/SciVal and was computed as the total number of papers authors have published between 2010 and 2019 in Scopus-indexed journals. According to SciVal (2021), scholarly output measures the prolificacy of scholars, and it is especially useful when comparing the productivity of researchers within the same discipline.

Gender inequality index. To predict the association between gender and both usage and citations scores in the pooled sample, our models controlled for the Gender Inequality Index (GII). Among other data, GII reports the female and male labor force participation rates thus potentially affecting our predictions across countries. The country GII index was imported from the Human Development Report (HDR) (2020), as it is directly related to gender inequalities in the labor market.

Statistical Techniques and Analysis Strategy

To answer research questions and test our hypothesis, we implemented different statistical techniques: (1) Chi-Square goodness of fit test, assuming equal proportions (RQ1a), and unequal proportions (RQ1b), (2) Chi-Square test of independence aka $R \times C$ table (RQ2a and RQ2b), and (3) Hierarchical Ordinary Least Squares (OLS) regression, (H1a, H1b, H2a, and H2b). For answering RQ1, we tested equal proportions between male and female scholars *within* each country, while for resolving RQ1b we took as reference the proportion of female first authors in the field, which yields 57% (Goyanes et al., 2022). For RQ2a we tested if there is an association between geographical location (i.e., *each* of the 11 countries under analysis) and the gender (male/female) of the 500 most prolific scholars, and follow-up with an examination of adjusted standardized residuals (RQ2b).

Table 1. Zero-order Correlations in the Pooled Sample.

	Mean	SD	1	2	3	4
GII	0.15	0.08	1			
Number of papers	5.36	6.12	–.124***	1		
Number of views	112.78	192.13	–.064	.793***	1	
Number of citations	58.57	137.82	.003	.698***	.817***	1

Note. Sample size = 5,500. Cell entries are two-tailed zero-order correlation coefficients. Pearson coefficients based on bootstrapping to 1,000 samples with confidence intervals set at 95%.
***$p < .001$.

Table 2. Zero-order Correlations in the Pooled Sample Split by Gender.

Gender		Mean	SD	1	2	3	4
Male	GII	0.15	0.07	1			
	Number of papers	5.19	6.25	–.136***	1		
	Number of views	99.15	182.84	–.068***	.803***	1	
	Number of citations	55.28	136.26	–.009	.691***	.809***	1
Female	GII	0.15	0.07	1			
	Number of papers	5.80	5.73	–.095***	1		
	Number of views	147.62	210.13	–.064*	.785***	1	
	Number of citations	66.97	141.43	.031	.718***	.843***	1

Note. Sample size females = 1,546. Cell entries are two-tailed zero-order correlation coefficients. Pearson coefficients based on bootstrapping to 1,000 samples with confidence intervals set at 95%.
***$p < .001$. *$p < .05$.

To test H1a and H2a, we ran two OLS regressions with view and citation scores as dependent variables. As discussed above, in both cases, we controlled for the country GII and for the number of papers published. In addition, we controlled for the number of citations when predicting view values, and the number of views when predicting citations values. Finally, for addressing H1b and H2b, we implemented a follow-up analysis by splitting the dataset by country, following the same procedure as outlined above, while removing the country GII (as data is redundant with country data). Descriptive statistics and zero-order correlations are reported in Tables 1 and 2. In absolute terms, female scholars among the most productive scholars publish significantly more papers ($\chi^2(1) = 31.93$, $p = .000$), views ($\chi^2(1) = 164.42$, $p = .000$), and citations ($\chi^2(1) = 22.51$, $p = .000$) than males. Despite these promising numbers, as we later explain, the reality of female scholars is quite different when controlling for potential confounds.

Results

Of the 5,500 most productive scholars in communication that form the sample, 3,954 were male and 1,546 were female. A Chi-Square goodness of fit test was conducted to determine whether the gender of the most productive scholars across countries were equally distributed (RQ1a). In each country, the minimum expected frequency was 250, while in the total sample, the minimum expected frequency was 2,750. The Chi-Square goodness of fit test indicated that the gender of the most productive scholars was not similarly distributed *within each* of the 11 countries under analysis. As reflected in Table 3—column "Equal Prop."—the proportion of males is significantly greater in all countries. Therefore, the most productive scholars are gendered, with males dominating across the world regions analyzed.

The situation is even worse when we take as reference the number of female first authors in the field, as they outnumber male authors. In this case, the minimum expected frequency was 285. As results show—column "Unequal Prop. (Field level)"—the gender of the most productive scholars in each country does not follow gender proportions of first authors in the field. Accordingly, while female scholars represent 57% of first authors in the field in 2019, when it comes to the most productive scholars across regions, females only represent 28%, a statistically significant difference.

To answer RQ2a, a Chi-Square test of independence was implemented between country affiliation and gender. All expected cell frequencies were greater than 5. There was a statistically significant association between geographical location and gender, $\chi^2(10) <=< 133.83$, $p = .000$. The association was small (Cohen, 1988), Cramer's $V = 0.156$. The four largest adjusted standardized residuals (RQ2b) were in the United States, Ukraine, Germany, and Spain. For both the US (count: 195; expected: 140.5) and Spain (count: 187; expected: 140.5), there were more females among the most prolific scholars compared to what would be expected, while in Ukraine (count: 87; expected: 140.5) and Germany (count: 94; expected: 140.5) there were less females compared to what would be expected. Significant measures to achieve a greater gender balance should be implemented across regions, but the German and Ukrainian cases are especially salient among the most prolific scholars (Table 4).

H1a presumed higher view scores for females in the pooled sample. After controlling for country GII ($\beta = -.01$; $p < .05$), the total number of papers ($\beta = .43$; $p < .001$), and citations scores ($\beta = .52$; $p < .001$), the regression analysis in Table 5 revealed that female scholars have significantly more views than male peers ($\beta = .07$; $p < .001$). Accordingly, H1a was supported, and an "inverse Matilda effect" was found.

A follow-up analysis (H1b) revealed that in all countries except France, female scholars have more views to their papers than males, after controlling for number of papers, and number of citations (Table 6). In the case of France, the differences in views were not statistically significant.

Finally, H2a predicted lower citation scores for females in the pooled sample. After controlling for country GII ($\beta = .07$; $p < .001$), the total number of papers ($\beta = .14$; $p < .01$), and the total number of views ($\beta = .72$; $p < .001$), the regression analysis in Table 7 revealed that female scholars have significantly lower level of citations than male peers ($\beta = -.05$; $p < .001$). Accordingly, H2a was empirically supported.

A follow-up analysis (H2b) revealed that in France, Poland, Hungary, Romania, and the United States, female scholars are significantly less cited than their male

Table 3. Distribution of the Most Productive Scholars Within Countries According to Their Gender, Assuming Both Equal and Unequal Proportions (i.e., Proportion Of Female First Authors in the Field).

Country	Male	Female	Equal prop.	Adj. residuals	$\chi^2(df)$	Unequal prop. (field level)	Adj. residuals	$\chi^2(df)$
United Kingdom	333	167	250	–83	55.11(1)***	285	–118	113.61(1)***
France	338	112	250	–138	152.35(1)***	285	–173	244.21(1)***
Germany	406	94	250	–156	194.68(1)***	285	–191	297.68(1)***
Italy	357	143	250	–107	91.59(1)***	285	–142	164.53(1)***
Spain	313	187	250	–63	31.75(1)***	285	–98	78.36(1)***
Poland	392	108	250	–142	161.31(1)***	285	–177	255.64(1)***
Hungary	366	134	250	–116	107.64(1)***	285	–151	186.05(1)***
Russia	344	156	250	–94	70.68(1)***	285	–129	135.78(1)***
Romania	337	163	250	–87	60.55(1)***	285	–122	121.45(1)***
Ukraine	413	87	250	–163	212.55(1)***	285	–198	319.90(1)***
United States	305	195	250	–55	24.20(1)***	285	–90	66.09(1)***
TOTAL	3,954	1,546	2,750	–1,204	1,054.26(1)***	3,135	–1,589	1,873.01(1)***

Note. Adjusted standardized residuals and unequal proportions represent female scholars.
***$p < .001$.

Table 4. Association Between Gender and Country of Affiliation.

Male	UK	France	Germany	Italy	Spain	Poland	Hungary	Russia	Romania	Ukraine	US
Count	333	388	406	357	313	392	366	344	337	413	305
Expected count	359.5	359.5	359.5	359.5	359.5	359.5	359.5	359.5	359.5	359.5	359.5
Adjusted residual	–2.8	3	4.9	–0.3	–4.8	3.4	0.7	–1.6	–2.3	5.6	–5.7
Female	UK	France	Germany	Italy	Spain	Poland	Hungary	Russia	Romania	Ukraine	US
Count	167	112	94	143	187	108	134	156	163	87	195
Expected count	140.5	140.5	140.5	140.5	140.5	140.5	140.5	140.5	140.5	140.5	140.5
Adjusted residual	–2.8	3	4.9	–0.3	–4.8	3.4	0.7	–1.6	–2.3	5.6	–5.7

Table 5. Ordinary Least Square (OLS) Regression Model Testing View Scores.

Bootstrap CI 95% [BCa]				
	View scores	Lower bound	Upper bound	Std. error
Step 1				
Country GII	–.01*	–62.40	–4.57	14.76
ΔR^2 (%)	0.4			
Step 2				
Number of papers	.43***	11.47	15.44	1.02
Number of citations	.52***	0.63	0.82	0.05
ΔR^2 (%)	76.1			
Step 3				
Gender $_{(female)}$	.07***	26.74	37.78	2.91
ΔR^2 (%)	0.6			
Total R^2	77.1			

Note. Sample size = 5,500. Cell entries of view scores are final-entry standardized Beta (β) coefficients. Coefficients effects accounted for robust standard errors test based on bootstrapping to 1,000 resamples with biased corrected confidence to assess statistical significance. R^2 are represented in percentages.
***$p < .001$. *$p < .05$.

peers, after controlling for number of papers and number of views (Table 8). All in all, our analysis suggests three main findings: (1) female scholars are significantly underrepresented among the most prolific scholars across countries, (2) Germany and Ukraine are the countries with the most salient gender imbalances among the most prolific scholars, while in Spain and the United States the situation is healthier, although far from equal, and (3) after accounting for controls, the most productive female scholars are significantly more viewed, yet significantly less cited compared to their male peers.

Model Diagnostics

Multicollinearity was not a concern as no variance inflation factors (VIF) exceeded the conservative threshold of five (O'brien, 2007), both across countries and in the pooled sample. In the pooled sample, number of papers (VIF = 2.01), and number of citations (VIF = 1.98), independently contributed variance on number of views. VIFs were also low when predicting citations (number of papers = 2.74 and number of views = 2.74), also across countries.

Additional Analysis

To test the potential effects of controls in accounting for gender bias on views and citations, we conducted an additional analysis. When predicting views, if GII is removed

Table 6. Ordinary Least Square (OLS) Regression Model Testing View Scores Across Countries.

	View scores										
	UK	France	Germany	Italy	Spain	Poland	Hungary	Russia	Romania	Ukraine	US
Step 1											
Number of papers	0.21**	0.25***	0.37***	0.58***	0.38***	0.26***	0.28***	0.50***	0.23**	0.56***	0.29***
Number of citations	.70***	.53***	.48***	.42***	.40***	.55***	.76***	.38	.61***	.22*	.65***
ΔR^2 (%)	67.3	45.5	57.9	84.5	41.8	55.3	80	53.8	51	48.9	66.4
Step 2											
Gender $_{\text{(female)}}$	0.07**	0.08	0.13***	0.06**	0.12***	0.13***	0.09***	0.14***	0.09**	0.13*	0.11***
ΔR^2 (%)	0.6	0.7	1.6	0.3	1.5	1.7	0.7	1.9	0.8	1.6	1.2
Total R^2	67.9	46.2	59.5	84.8	43.3	57	80.7	55.7	51.8	50.5	67.6

Note. Sample size = 500 per country. Cell entries of citation scores are final-entry standardized Beta (β) coefficients. Coefficients effects accounted for robust standard errors test based on bootstrapping to 1,000 resamples with biased corrected confidence to assess statistical significance. R^2 are represented in percentages.
***$p < .001$. **$p < .01$.

Table 7. Ordinary Least Square (OLS) Regression Model Testing Citation Scores.

Bootstrap CI 95% [BCa]				
	Citation scores	Lower bound	Upper bound	Std. error
Step 1				
Country GII	.07***	95.04	141.59	12.17
ΔR^2 (%)	0			
Step 2				
Number of papers	.14**	1.37	4.92	0.91
Number of views	.72***	0.44	0.59	0.04
ΔR^2 (%)	67.9			
Step 3				
Gender $_{(female)}$	–.05***	–21.34	–10.20	2.87
ΔR^2 (%)	0.3			
Total R^2	68.2			

Note. Sample size = 5,500. Cell entries of citation scores are final-entry standardized Beta (β) coefficients. Coefficients effects accounted for robust standard errors test based on bootstrapping to 1,000 resamples with biased corrected confidence to assess statistical significance. R^2 are represented in percentages.
***$p < .001$. **$p < .01$.

and both number of citations (VIF = 1.94) and papers (VIF = 1.94) are controlled for, the association between gender and views remains statistically significant (β = .75; $p < .001$; $\Delta R^2 = 0.6\%$; Total $R^2 = 77\%$), and thus female scholars are significantly more viewed than males. Likewise, removing GII and number of citations, controlling for number of papers (VIF = 1.94), female scholars are significantly more viewed (β = .078; $p < .001$; $\Delta R^2 = 0.6\%$; Total $R^2 = 63.5\%$) (i.e., at the same level of productivity, female papers are significantly more viewed).

When predicting citations, results are slightly different. First, removing GII and controlling both for number of views (VIF = 2.73) and papers (VIF = 2.70), the relationship remains statistically significant (β = −.050; $p < .001$; $\Delta R^2 = 0.2\%$; Total $R^2 = 67.7\%$), and thus female scholars are significantly less cited than males. However, when removing GII and number of views, controlling for number of papers (VIF = 1.00), there are not citation differences between males and females (β = .007; $p = .476$; $\Delta R^2 = 0\%$; Total $R^2 = 48.6\%$) (i.e., at the same level of productivity, females and males have similar number of citations). This suggest that number of views plays a crucial role in explaining citation differences: despite having more views, female scholars have less citations. In other words, at the same levels of views (VIF = 1.01), female scholars are less cited (β = −.055; $p < .001$; $\Delta R^2 = 0.3\%$; Total $R^2 = 67.1\%$). Assuming that the first move to cite a paper is reading it first, female scholars need more paper views to have similar citation levels as males.

Table 8. Ordinary Least Square (OLS) Regression Model Testing Citation Scores.

	Citation scores										
	UK	France	Germany	Italy	Spain	Poland	Hungary	Russia	Romania	Ukraine	US
Step 1											
Number of papers	.06	.16	.22	–.07	.10*	.29**	–.18**	–.08	.06	.29	.00
Number of views	.77***	.56***	.56***	.88**	.48***	.55***	.96***	.60	.66**	.31	.78***
ΔR^2 (%)	64.6	42.2	52.4	67.5	30.3	56.2	75.3	28	47.1	29.8	60.4
Step 2											
Gender $_{(female)}$	–.05	–.09**	–.04	–.03	–.05	–.09**	–.05*	–.10	–.07*	.30	–.09**
ΔR^2 (%)	0.2	0.8	0.2	0.1	0.3	0.7	0.3	1	0.5	0	0.8
Total R^2	64.8	43	52.6	67.6	30.6	56.9	75.6	29	47.6	0.30	61.2

Note. Sample size = 500. Cell entries of citation scores are final-entry standardized Beta (β) coefficients. Coefficients effects accounted for robust standard errors test based on bootstrapping to 1,000 resamples with biased corrected confidence to assess statistical significance. R^2 are represented in percentages.
***$p < .001$. **$p < .01$.

Discussion

There is growing evidence suggesting that female scholars face a negative bias in global academia in general (Bornmann et al., 2007; Huang et al., 2020), and in communication in particular (Knobloch-Westerwick & Glynn, 2013; Knobloch-Westerwick et al., 2013). However, the history of the analysis of gender imbalances in the field is fragmented in at least two ways. First, research focusing on the share of females among the most productive scholars (Huang et al., 2020) is usually disconnected from potential citation bias (Chan & Torgler, 2020; Halevi, 2019; Maliniak et al., 2013), and restricted to scholars' performance in a limited set of journals (Knobloch-Westerwick & Glynn, 2013). Second, both research on women's participation among the most prolific scholars and citation bias lack a geographically comparative perspective, limiting the empirical knowledge on how gender imbalance unfolds in different world regions. Building upon comparative data from 11 countries, our study provides a complex analysis on gender bias in production, citation, and usage (i.e., views) among the most prolific scholars in communication studies.

First, while several studies suggested that the participation of female scholars have grown in science over time (Huang et al., 2020), and that the share of female first authors in communication research has significantly increased in the last decades (Goyanes et al., 2022), our findings show a severe gender imbalance amongst the most prolific scholars in each country under study. This finding directly points to a glass ceiling in which paper production at the field level is disconnected from top performance: while the field production is led by female first authors (Demeter & Toth, 2020), the ranks of the most prolific scholars are still dominated by males.

Multiple structural and empirical motivations may explain this paradoxical *gender imbalance*. First, it can be assumed that the lower share of female scholars a few decades ago may explain the gender gap among the most prolific scholars today. However, the "publish or perish" paradigm (Bonitz, 2002), has been more prevalent in the last decade than ever and, to the best of our knowledge, the pressure on younger academics to publish is similarly distributed regardless of gender. Consequently, current gender productivity among the most prolific scholars cannot be fully explained by assuming that older male scholars publish more: in fact, there is evidence to the contrary (Marini, 2017; Mishra & Smyth, 2013).

Others may even state that male authors are more eager to be promoted, recognized, or even more willing to leave an intellectual legacy, which consequently leads to their being more productive. Lacking these controls, gender gaps among the most productive scholars may be, for some, treated as *imbalances*, but not necessarily inequalities. However, it can also be assumed that those research and scientific ambitions may be fairly distributed—in fact, female first authors dominate the field—and if not, other socio-contextual factors may be at play, such as the structural and systemic hurdles experienced by female scholars because they are females. In this case, imbalances are no longer fair, and consequently turn into *inequalities*, as they deleteriously distort female research prospects only.

All in all, our study cannot rule out the possibility of the existence of either gender *imbalances* or gender *inequalities*, but it provides strong empirical evidence showing that gender proportions among the most prolific scholars are far removed from normative considerations of gender *equality*, and this has severe theoretical and empirical implications indeed: the neglect of the top-level intellectual contributions of half of the scientific population. Conceptualizing this gender gap as *fair imbalance* or *deleterious inequality* will not change the nature of the paradox itself: while the field production is led by women, female scholars are systemically under-represented among the most prolific scholars in *all* countries under analysis.

Our second research question underscores the potential geographical differences in gender balance among the most prolific scholars, showing significant country-level differences. In contrast with several studies that found disparities in gender balance between Eastern European and Western European countries (Human Development Report (HDR), 2020), our results show quite counterintuitive results. For instance, several Western European countries such as France and Germany have a worse gender balance amongst the most prolific communication scholars than some Eastern European countries like Russia or Romania, which were typically thought to have low gender equality values (Chan & Torgler, 2020).

Past research has explained the higher share of female academics in peripheral countries by presuming that lower salaries might dissuade males from the academic field (Block et al., 2018). As persuasive as this assumption may be, and as previously showed, in communication, the number of female scholars as first authors is not aligned with their proportion among the most prolific scholars. Second, there are countries with less developed economies—such as Ukraine—where the proportion of male scholars is higher. The lowest imbalance was found in the United States, which is the wealthiest region in the sample, but Germany, with an equally developed economy, was the second most imbalanced region.

Accordingly, beyond the general gender inequality or the state of development of the national economy, a more reasonable explanation of the gender gap between male and females across countries may be rooted in the academic culture. For example, the traditional academic culture can be mirrored in promotion and leadership that influence production and impact. In several countries, including Germany (Matthies & Torka, 2019), most departments are led by a full professor, and other affiliated scholars must work under their supervision. Accordingly, a possible bias in awarding such professorships to males can be a reason why papers and citations are more male-dominated in Germany, as well as in other countries that use a similar academic model.

When testing the association between gender and usage scores (i.e., views), results show that female papers are significantly more viewed in both the pooled sample and in all analyzed countries (except France) after controlling for the number of papers, citation scores, and GII in the case of the pooled sample. This finding is consistent with prior research, which mainly examined usage patterns in Altmetrics (Bornmann et al., 2019). Directing the spotlight to the most prolific scholars in communication, the advantage in usage of papers from female authors remains. According to SciVal (2021), higher usage values are associated with higher levels of interest of stakeholders from non-academic fields, such as students and researchers in the corporate sector. Accordingly, it can be inferred that female scholars' works in the field of communication might be more useful and interesting for educational and corporate purposes than male-authored papers.

However, when testing the association between gender and citation scores, after controlling for the number of views, number of papers, and country GII in the case of the pooled sample, our results show that male scholars were significantly more cited than females in general (pooled sample), and in France, Poland, Hungary, Romania, and the United States in particular. All things considered, our results show that female scholars' papers attract more usage, but get fewer citations despite being significantly more productive than male scholars. This finding suggests a more complex view on gender bias in citations, in which both article views play a paramount role (Haslam et al., 2008; Over, 1990; Sanchez et al., 2006). Accordingly, we argue that, despite female authors having even higher citation scores than males, when controlling for number of documents and views, a Matilda effect in citation scores emerges. In short, female scholars need to have more paper views to have similar citation numbers as males in several geographies.

Conclusion

Based on our findings, we can delineate a model of how gender inequalities work among the most prolific scholars in communication. Our explanatory model suggests that the most important gender bias is caused by structural inequalities at the production level: it is significantly less likely for female scholars to get into the hall of fame of most productive authors in all the analyzed countries. However, once they succeed, female scholars are even more viewed and productive than male peers. While being more viewed and productive, female citations are lower than those of male authors, after controlling for views, number of documents, and country GII in the case of the pooled sample, thus showing a significant performance-level Matilda effect. In short, considering the same level of papers published, views, and country GII, female scholars are significantly less cited than males in communication research.

Limitations and Future Research

Our study presents several limitations that open stimulating opportunities for future research. First, in the absence of appropriate data in SciVal, the models reported did not include journal prestige as potential confound. However, it may be plausible that male and female scholars publish their papers in quite different journals, thus affecting usage and citation scores. While earlier research found that the most prolific scholars usually tend to publish in prestigious journals (Larivière & Costas, 2016) and thus journal prestige might have no direct effect on our findings, future research might control for the journal impact factor (IF) or Scopus's SJR values. In any case, if prestige differences between male and female do exist, they are most likely also due to gender inequalities.

Also, our models did not control for the academic age of the analyzed scholars, as no international database disclose such private information. Prior research has restricted the analysis to regions that have a national database on employed academics, like Norway (Zhang et al., 2021). To minimalize the effect of this limitation, we controlled for the number of papers and constrain our analysis to a given time frame. Consequently, our analysis only considered those papers, views and citations that were produced between 2010 and 2019, thus adjusting similar conditions to all scholars in the sample.

Another limitation of the study is that it focuses on Europe and the US. However, gender imbalances might vary across different cultures. Specifically, China and other Asian geographies growingly contribute to global communication studies and, accordingly, it is reasonable to presume that gender distribution might be also different. Similarly, several Latin-American countries have a long history in the field. To test if and how the Matilda-effect is prevailing across different geographical regions, further studies should extend the analysis beyond the Euro-American world.

Moreover, our analysis is restricted to Scopus journals. However, this limitation does not necessarily affect the distribution we found. Even if, by the characteristics of Scopus/SciVal, our research is limited to those viewers that access the analyzed journals online, we can assume that if gender imbalance can be experienced amongst these scholars, then other scholars—those without a subscription or those that read journals offline—might have similar usage patterns. In short, while the nature of the database evidently limits the results, we do not think that it significantly distorts our findings.

Finally, publication and citation patterns are most likely subjected to change, thus findings reported in this paper intentionally capture a limited time frame. In order to ascertain potential gender differences in research patterns in communication research over time, future studies may replicate our work in the future.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Research was funded by project No. TKP2021-NKTA-51, implemented with the support provided by the Ministry of Innovation and Technology of Hungary from the National Research, Development and Innovation Fund, financed under the TKP2021-NKTA funding scheme.

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References

Abramo, G., D'Angelo, C. A., & Murgia, G. (2016). The combined effects of age and seniority on research performance of full professors. *Science and Public Policy*, *43*(3), 301–319. https://doi.org/10.1093/scipol/scv037

Aiston, S. J., & Jung, J. (2015). Women academics and research productivity: An international comparison. *Gender and Education*, *27*(3), 205–220. https://doi.org/10.1080/09540253.2015.1024617

Baldi, S. (1998). Normative versus social constructivist processes in the allocation of citations: A networkanalytic model. *American Sociological Review*, *63*, 829–846. https://doi.org/10.2307/2657504

Block, K., Gonzalez, A. M., Schmader, T., & Baron, A. S. (2018). Early gender differences in core values predict anticipated family versus career orientation. *Psychological Science*, *29*(9), 1540–1547. https://doi.org/10.1177/0956797618776942

Bonitz, M. (2002). Ranking of nations and heightened competition in Matthew core journals: Two faces of the Matthew effect for countries. *Library Trends*, *50*(3), 440–460.

Bornmann, L., Haunschild, R., & Adams, J. (2019). Do altmetrics assess societal impact in a comparable way to case studies? An empirical test of the convergent validity of altmetrics based on data from the UK research excellence framework (REF). *Journal of Informetrics*, *13*(1), 325–340.

Bornmann, L., Mutz, R., & Daniel, H. (2007). Gender differences in grant peer review: A meta-analysis. *Journal of Infometrics*, *1*, 226–238. https://doi.org/10.1016/j.joi.2007.03.001

Bronstein, P., & Farnsworth, L. (1998). Gender differences in faculty experiences of interpersonal climate and processes for advancement. *Research in Higher Education*, *39*(5), 557–585. https://doi.org/10.1023/A:1018701722855

Cameron, E. Z., White, A. M., & Gray, M. E. (2016). Solving the productivity and impact puzzle: Do men outperform women, or are metrics biased? *Bioscience*, *66*(3), 245–252. https://doi.org/10.1093/biosci/biv173

Chan, H. F., & Torgler, B. (2020). Gender differences in performance of top cited scientists by field and country. *Scientometrics*, *125*(3), 2421–2447. https://doi.org/10.1007/s11192-020-03733-w

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Psychology Press.

Crew, B. (2019, July 1). The top 10 countries for scientific research in 2018. *Nature Index*. https://www.natureindex.com/news-blog/top-ten-countries-research-science-twenty-nineteen

Demeter, M., & Toth, T. (2020). The world-systemic network of global elite sociology: The western male monoculture at faculties of the top one-hundred sociology departments of the world. *Scientometrics*, *124*, 2469–2495. https://doi.org/10.1007/s11192-020-03563-w

Dion, M. L., Sumner, J. L., & Mitchell, S. M. (2018). Gendered citation patterns across political science and social science methodology fields. *Political Analysis*, *26*(3), 312–327. https://doi.org/10.1017/pan.2018.12

Duch, J., Zeng, X. H., Sales-Pardo, M., Radicchi, F., Otis, S., Woodruff, T. K., & Nunes Amaral, L. A. (2012). The possible role of resource requirements and academic career-choice risk on gender differences in publication rate and impact. *PLoS One*, *7*(12), e51332. https://doi.org/10.1371/journal.pone.0051332

Eagly, A. H., Nater, C., Miller, D. I., Kaufmann, M., & Sczesny, S. (2020). Gender stereotypes have changed: A cross-temporal meta-analysis of U.S. public opinion polls from 1946 to 2018. *American Psychologist*, *75*(3), 301–315. https://doi.org/10.1037/amp0000494

European Commission. (2012). *Meta-analysis of gender and science research*. https://op.europa.eu/en/publication-detail/-/publication/3516275d-c56d-4097-abc3-602863bcefc8

Feeley, T. H., & Yang, Z. (2022). Is there a Matilda effect in communication journals? *Communication Reports*, *35*(1), 1–11. https://doi.org/10.1080/08934215.2021.1974505

Frandsen, T. F., Jacobsen, R. H., & Ousager, J. (2020). Gender gaps in scientific performance: A longitudinal matching study of health sciences researchers. *Scientometrics*, *124*(2), 1511–1527. https://doi.org/10.1007/s11192-020-03528-z

Garfeld, E. (1979). *Citation indexing—Its theory and application in science, technology and humanities*. Wiley Blackwell.

Gaston, J. (1978). *The reward system in British and American science*. Wiley Blackwell.

Global Gender Gap Report (GGGR). (2020). *World economic forum*. http://www3.weforum.org/docs/WEF_GGGR_2020.pdf

Goos, M., & Kelly, R. (2021). Addressing the gender gap in science: Lessons from examining international initiatives. *Pure and Applied Chemistry*, *93*(8), 949–954. https://doi.org/10.1515/pac-2021-0102

Goyanes, M., Demeter, M., Grané, A., Tóth, T., Gil, de, & Zúñiga, H. (2022). Research patterns in communication (2009-2019): Testing female representation and productivity differences, within the most cited authors and the field. *Scientometrics*. Advance online publication.

Hakanson, M. (2005). The impact of gender on citation. *College & Research Libraries*, *66*, 312–323. https://doi.org/10.5860/crl.66.4.312

Halevi, G. (2019). Bibliometric studies on gender disparities in science. In W. Glänzel, H. F. Moed, U. Schmoch, & M. Thelwall (Eds.), *Springer handbook of science and technology indicators* (pp. 563–580). Springer Verlag.

Haslam, N., Ban, L., Kaufmann, L., Loughnan, S., Peters, K., Whelan, J., & Wilson, S. (2008). What makes an article influential? Predicting impact in social and personality psychology. *Scientometrics*, *76*, 169–185. https://doi.org/10.1007/s11192-007-1892-8

Huang, J., Gates, A. J., Sinatra, R., & Barabási, A. L. (2020). Historical comparison of gender inequality in scientific careers across countries and disciplines. *Proceedings of the National Academy of Sciences*, *117*(9), 4609–4616. https://doi.org/10.1073/pnas.1914221117

Human Development Report (HDR). (2020). *The United Nations Development Programme*. https://hdr.undp.org/

Judge, T. A., Cable, D. M., Colbert, A. E., & Rynes, S. L. (2007). What causes a management article to be cited—article, author, or journal? *Academy of Management Journal*, *50*(3), 491–506. https://doi.org/10.5465/amj.2007.25525577

Knobloch-Westerwick, S., & Glynn, C. J. (2013). The Matilda effect—role congruity effects on scholarly communication: A citation analysis of Communication Research and Journal of Communication articles. *Communication Research*, *40*(1), 3–26. https://doi.org/10.1177/0093650211418339

Knobloch-Westerwick, S., Glynn, C. J., & Huge, M. (2013). The Matilda effect in science communication: An experiment on gender bias in publication quality perceptions and collaboration interest. *Science Communication*, *35*(5), 603–625. https://doi.org/10.1177/1075547012472684

Larivière, V., & Costas, R. (2016). How many is too many? On the relationship between research productivity and impact. *PLoS One*, *11*(9), e0162709. https://doi.org/10.1371/journal.pone.0162709

Larivière, V., Ni, C., Gingras, Y., Cronin, B., & Sugimoto, C. R. (2013). Bibliometrics: Global gender disparities in science. *Nature*, *504*(7479), 211–213. https://doi.org/10.1038/504211a

Leahey, E. (2006). Gender differences in productivity: Research specialization as a missing link. *Gender & Society*, *20*(6), 754–780. https://doi.org/10.1177/0891243206293030

Lendák-Kabók, K. (2021). Ethnic minority women in the Serbian academic community. *European Journal of Women s Studies*, *28*(4), 502–517. https://doi.org/10.1177/1350506820958740

Lincoln, A. E., Pincus, S., Koster, J. B., & Leboy, P. S. (2012). The Matilda effect in science: Awards and prizes in the US, 1990s and 2000s. *Social Studies of Science*, *42*, 307–320. https://doi.org/10.1177/0306312711435830

Lutz, C. (1990). The erasure of women's writing in sociocultural anthropology. *American Ethnologist*, *17*, 611–627. https://doi.org/10.1525/ae.1990.17.4.02a00010

Maliniak, D., Powers, R., & Walter, B. F. (2013). The gender citation gap in international relations. *International Organization*, *67*(4), 889–922. https://doi.org/10.1017/s0020818313000209

Marini, G. (2017). New promotion patterns in Italian universities: Less seniority and more productivity? Data from ASN. *Higher Education*, *73*, 189–205. https://doi.org/10.1007/s10734-016-0008-x

Matthies, H., & Torka, M. (2019). Academic habitus and institutional change: Comparing two generations of German scholars. *Minerva*, *57*, 345–371. https://doi.org/10.1007/s11024-019-09370-9

Merton, R. K. (1968). The Matthew effect in science. *Science*, *159*(3810), 56–63. https://doi.org/10.1126/science.159.3810.56

Mishra, V., & Smyth, R. (2013). Are more senior academics really more research productive than junior academics? Evidence from Australian law schools. *Scientometrics*, *96*, 411–425. https://doi.org/10.1007/s11192-012-0886-3

National Science Foundation. (2006). *Beyond bias and barriers: Fulfilling the potential of women in academic science and engineering*. The National Academies Press.

Neuendorf, K. A. (2017). *The content analysis guidebook* (2nd ed.). SAGE Publications.

Nygaard, L. P., & Bahgat, K. (2018). What's in a number? How (and why) measuring research productivity in different ways changes the gender gap. *Journal of English for Academic Purposes*, *32*, 67–79. https://doi.org/10.1016/j.jeap.2018.03.009

O'brien, R.M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality and Quantity, 41*, 673–690. https://doi.org/10.1007/s11135-006-9018-6

Over, R. (1990). The scholarly impact of articles published by men and women in psychology journals. *Scientometrics*, *18*, 331–340. https://doi.org/10.1007/bf02020149

Paul-Hus, A., Sugimoto, C. R., Haustein, S., & Larivière, V. (2015, June 29–July 4). *Is there a gender gap in social media metrics?* [Paper presentation]. The 15th International Conference on Scientometrics & Informetrics, Instanbul, Turkey. https://core.ac.uk/download/pdf/33186912.pdf

RAND. (2005). *Is there gender bias in federal grant programs?* (No. RB-9147-NSF). https://www.rand.org/content/dam/rand/pubs/research_briefs/2005/RAND_RB9147.pdf

Rossiter, M. W. (1993). The Matthew Matilda effect in science. *Social Studies of Science, London*, *23*(2), 325–341. https://doi.org/10.1177/030631293023002004

Shen, H. (2013). Mind the gender gap. *Nature*, *495*(7439), 22–24. https://doi.org/10.1038/495022a

Stack, S. (2004). Gender, children and research productivity. *Research in Higher Education*, *45*(8), 891–920. https://doi.org/10.1007/s11162-004-5953-z

The KNUDOP Search Group. (2008). Podunk effect. *ISSI Newsletter*, *4*(2), 23.

Thelwall, M. (2018). Do females create higher impact research? Scopus citations and Mendeley readers for articles from five countries. *Journal of Informetrics*, *12*(4), 1031–1041.

Thelwall, M., & Kousha, K. (2014). Academia.edu: Social network or academic network? *Journal of the American Society for Information Science and Technology*, *65*(4), 721–731.

Thelwall, M., & Nevill, T. (2019). No evidence of citation bias as a determinant of STEM gender disparities in US biochemistry, genetics and molecular biology research. *Scientometrics*, *121*(3), 1793–1801. https://doi.org/10.1007/s11192-019-03271-0

van Den Besselaar, P., & Sandström, U. (2017). Vicious circles of gender bias, lower positions, and lower performance: Gender differences in scholarly productivity and impact. *PLoS One*, *12*(8), e0183301. https://doi.org/10.1371/journal.pone.0183301

Zhang, L., Sivertsen, G., Du, H., Huang, Y., & Glänzel, W. (2021). Gender differences in the aims and impacts of research. *Scientometrics*, *126*, 8861–8886.

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