Sociologiske perspektiver på citationer

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Hvorfor citationer?

Citationer som "stratifier" og statusmarkør

- "Atoms of peer-recognition" (Merton, 1988)
- "The most objectified of the indices of symbolic capital" (Bourdieu 1990)
- "Critical micro-level stratifying mechanisms" (Baldi 1998)

Citationer som evalueringsværktøj

- Ansættelser
- Forfremmelsesprogrammer
- Funding
- Priser
- Benchmarks

1. Voksende globale ubalancer i citationsfordelinger

Global citation inequality is on the rise

Mathias Wullum Nielsen[a,1,2] and Jens Peter Andersen[b,1]

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Edited by Yu Xie, Princeton University, Princeton, NJ, and approved December 28, 2020 (received for review June 12, 2020)

Citations are important building blocks for status and success in science. We used a linked dataset of more than 4 million authors and 26 million scientific papers to quantify trends in cumulative citation inequality and concentration at the author level. Our analysis, which spans 15 y and 118 scientific disciplines, suggests that a small stratum of elite scientists accrues increasing citation shares and that citation inequality is on the rise across the natural sciences, medical sciences, and agricultural sciences. The rise in citation concentration has coincided with a general inclination toward more collaboration. While increasing collaboration and full-count publication rates go hand in hand for the top 1% most cited, ordinary scientists are engaging in more and larger collaborations over time, but publishing slightly less. Moreover, fractionalized publication rates are generally on the decline, but the top 1% most cited have seen larger increases in coauthored papers and smaller relative decreases in fractional-count publication rates than scientists in the lower percentiles of the citation distribution. Taken together, these trends have enabled the top 1% to extend its share of fractional- and full-count publications and citations. Further analysis shows that top-cited scientists increasingly reside in high-ranking universities in western Europe and Australasia, while the United States has seen a slight decline in elite concentration. Our findings align with recent evidence suggesting intensified international competition and widening author-level disparities in science.

scientific elites | citations | inequality | science | sociology of science

were produced by a mere 6% of all scientists (26). More recent research demonstrates even larger disparities in citation distributions at the author level (2, 6, 11, 27, 28), but variations in citation concentration across disciplinary, institutional, and national boundaries remain uncertain. Further, it is unclear whether the observed inequalities in citation shares have intensified over time.

Advances in author-disambiguation methods (29) allow us to investigate these questions on a global scale. We used a linked dataset of 4,042,612 authors and 25,986,133 articles to examine temporal trends in the concentration of citations at the author level, and differences in the degree of concentration across fields, countries, and institutions.

Publication and citation data were retrieved from Clarivate's Web of Science (WoS). We limited our focus to disciplines within the medical and health sciences, natural sciences, and agricultural sciences, where journal publication is the primary form of scholarly communication (*Materials and Methods*). We used a disambiguation algorithm to create publication profiles for all authors with five or more publication entries in WoS. The disambiguated dataset allowed us to measure developments in citation concentration from 2000 onward.

Per-author citation impact was measured using field-normalized citation scores (*ncs*). *ncs* is calculated by dividing the raw per-paper citation scores with the average citation counts of comparable papers published in the same year and subfield. *ncs* was rescaled to account for citation inflation, represented here as *nics*. We report per-author cumulative citation impact based on a full and fractional

SOCIAL SCIENCES

2. Kønsforskelle i citationsrater

META-RESEARCH

Gender variations in citation distributions in medicine are very small and due to self-citation and journal prestige

Abstract A number of studies suggest that scientific papers with women in leading-author positions attract fewer citations than those with men in leading-author positions. We report the results of a matched case-control study of 1,269,542 papers in selected areas of medicine published between 2008 and 2014. We find that papers with female authors are, on average, cited between 6.5 and 12.6% less than papers with male authors. However, the standardized mean differences are very small, and the percentage overlaps between the distributions for male and female authors are extensive. Adjusting for self-citations, number of authors, international collaboration and journal prestige, we find near-identical per-paper citation impact for women and men in first and last author positions, with self-citations and journal prestige accounting for most of the small average differences. Our study demonstrates the importance of focusing greater attention on within-group variability and between-group overlap of distributions when interpreting and reporting results of gender-based comparisons of citation impact.

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JENS PETER ANDERSEN*, JESPER WIBORG SCHNEIDER, RESHMA JAGSI AND MATHIAS WULLUM NIELSEN

1. Hvorfor elite fokus?

"The study of elites is the study of power and inequality, from above. It involves looking at the **distribution of social resources**, which can include economic, social, cultural, political, or **knowledge capital**. It also means exploring the role of institutions in how such resources are organized and distributed" (Khan 2012)

Global citation inequality is on the rise

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Edited by Yu Xie, Princeton University, Princeton, NJ, and approved December 28, 2020 (received for review June 12, 2020)

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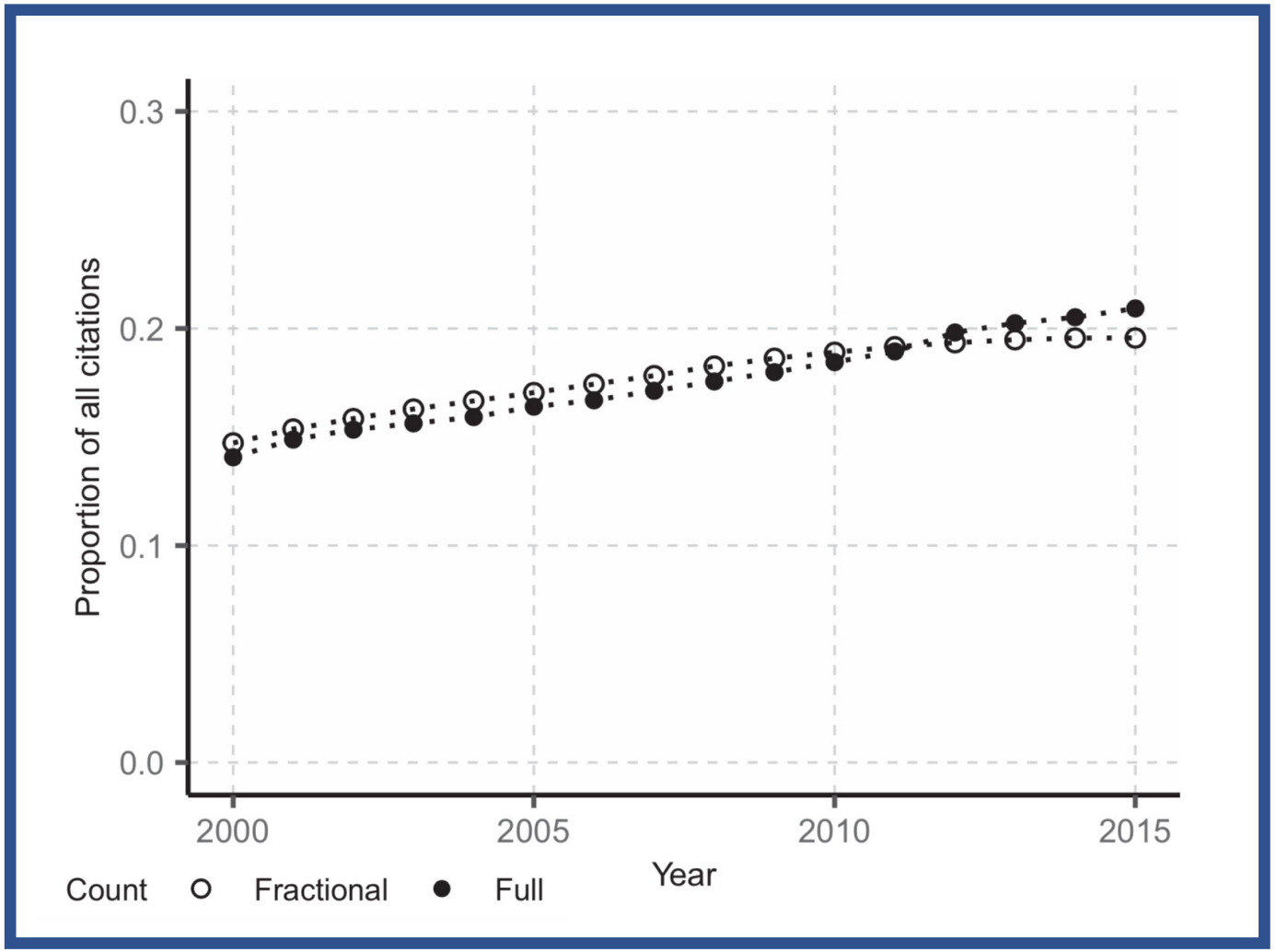
SOCIAL SCIENCES



Fra 2000 til 2015, udvidede top 1% sin citationsandel fra 14.1 til 21% (relativ stigning = 49%).

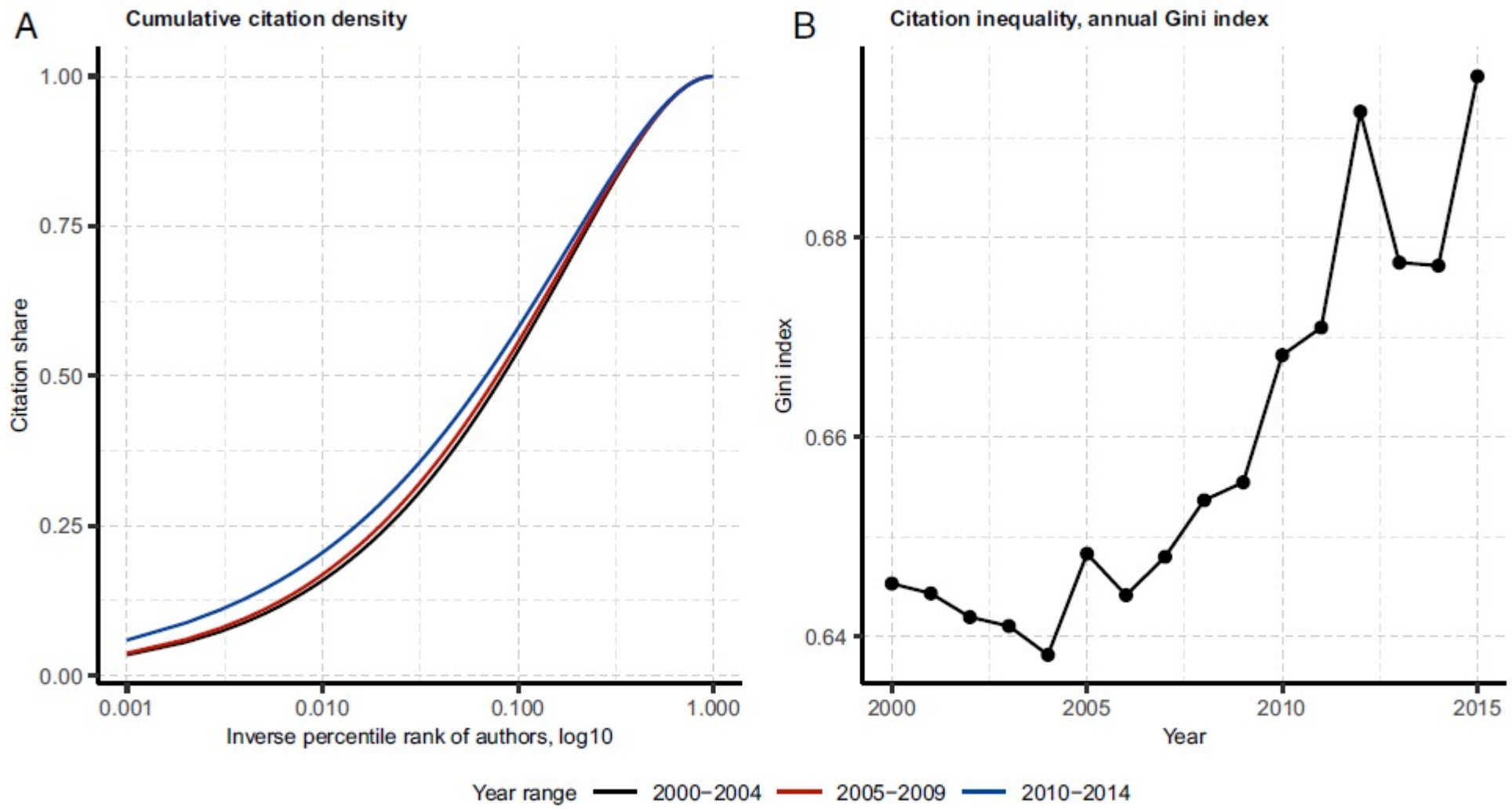


Fig. 3. Citation gap. (*A*) Citation density (full count) by fraction of authors, stratified by 5-y intervals. The *x* axis is on a logarithmic scale. (*B*) Gini coefficients of citation density (full count) by percentile rank, per year, from 2000 to 2015.

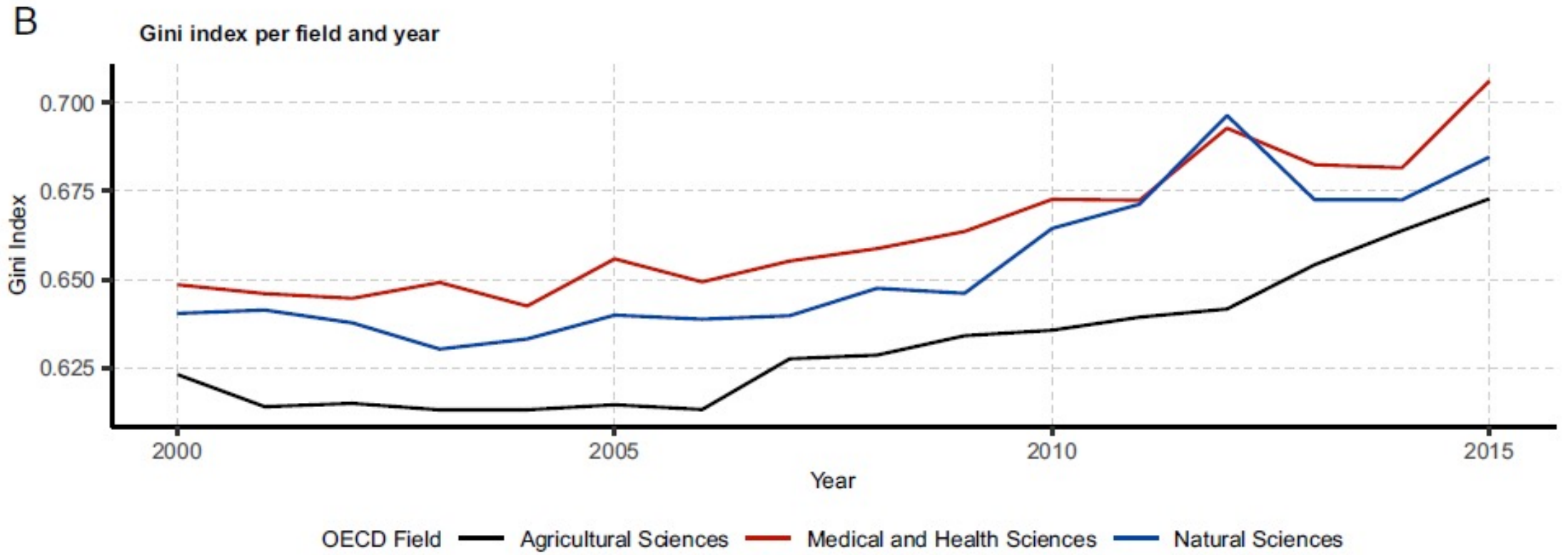


Fig. 4. Citation concentration and inequality by field. (*A*) Citation density (full counting) by fraction of authors, stratified by 5-y intervals for agricultural sciences, medical and health sciences, and natural sciences. The *x* axes are on a logarithmic scale. (*B*) Field-specific Gini coefficients of citation density (full count) by percentile rank, per year from 2000 to 2015.

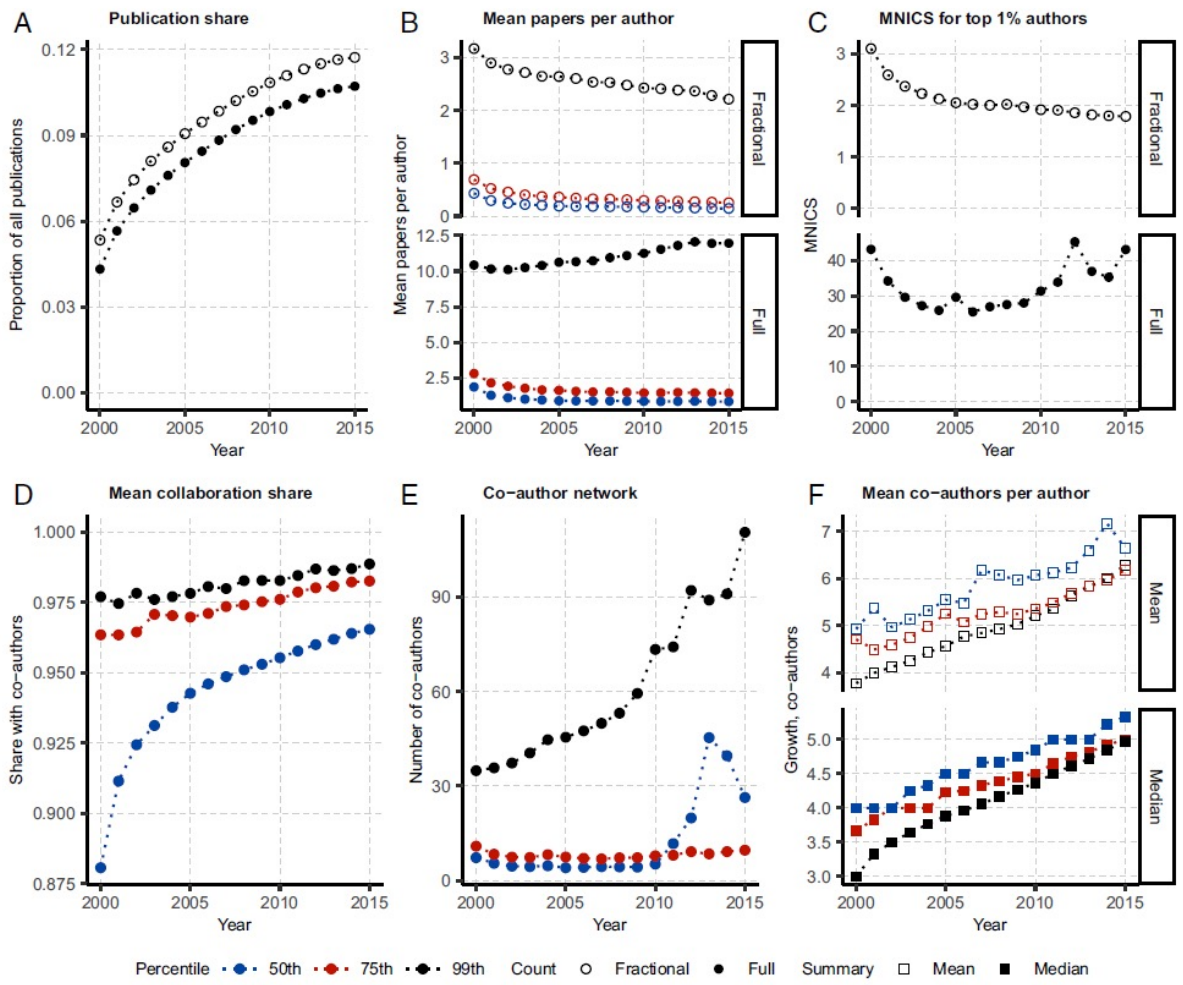
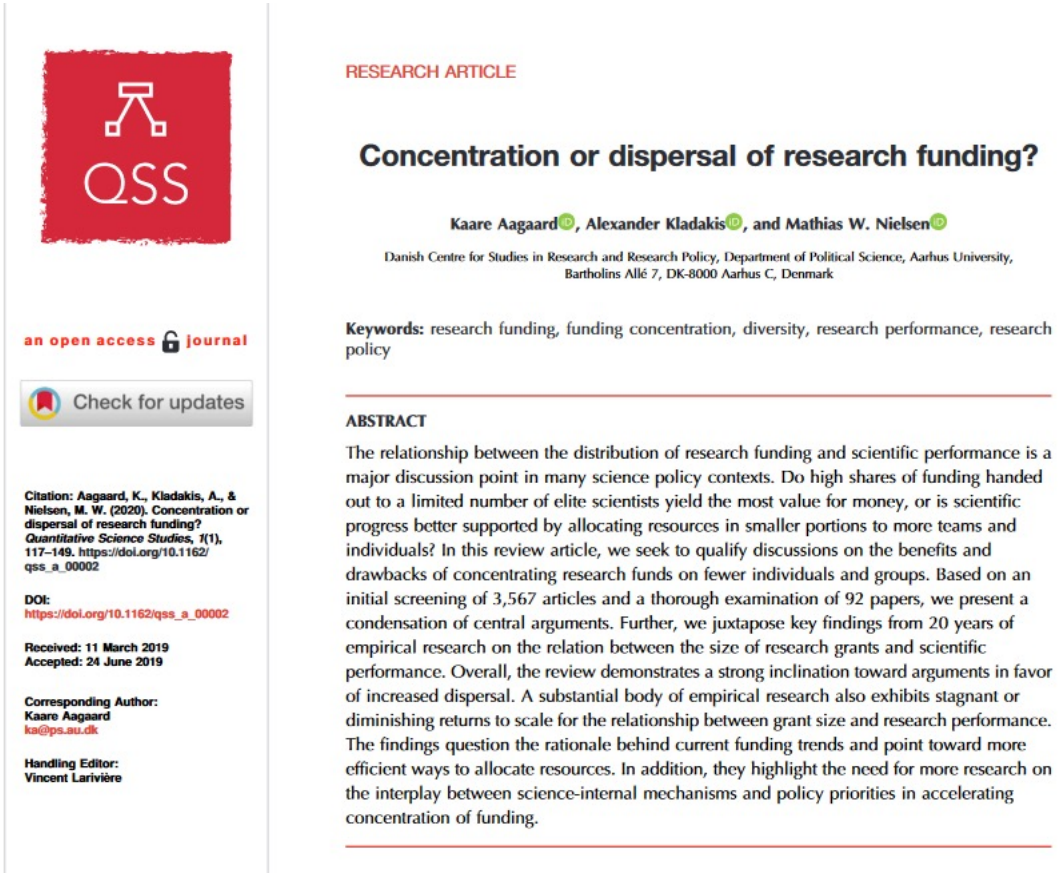


Fig. 2. Publication, citation, and collaboration trends. (*A*) Changes over time in the share of total papers accrued by the top 1% (99th percentile), 75th, and 50th percentile from 2000 to 2015. (*B*) Developments in average publication output per year (per author) for the top 99th, 75th, and 50th percentile based on a full and fractional counting of papers. (*C*) Mean citation rate per paper (per year) for the 99th percentile. (*D*) Mean proportion of papers with at least one coauthor for the 99th, 75th, and 50th percentile. (*E*) Average number of coauthors per year for the 99th, 75th, and 50th percentile. (*F*) Annual mean and median number of coauthors per paper for authors in the three percentile bins. In all panels, the black lines and dots show the 99th percentile, red shows the 75th percentile, and blue shows the 50th percentile. Solid dots show the scores by full count and hollow dots show fractional counts. Solid squares show the median and hollow squares show the mean. *B*, *C*, and *F* are split into two facets with common *x* axes and individual *y* axes.

Samarbejdsfordelen!

- Voksende samarbejdsaktivitet og øget output går hånd i hånd for "eliten"
- Dvs. flere samarbejder, men med færre medforfattere gennemsnitligt (end for resten)
- Den gennemsnitlige forsker engagerer sig i flere og større samarbejder over tid
- Fraktionaliserede pub-rater falder over tid for både "eliten" og resten, men mest for resten (relativt set)

1. Større Labs



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RESEARCH ARTICLE

Concentration or dispersal of research funding?

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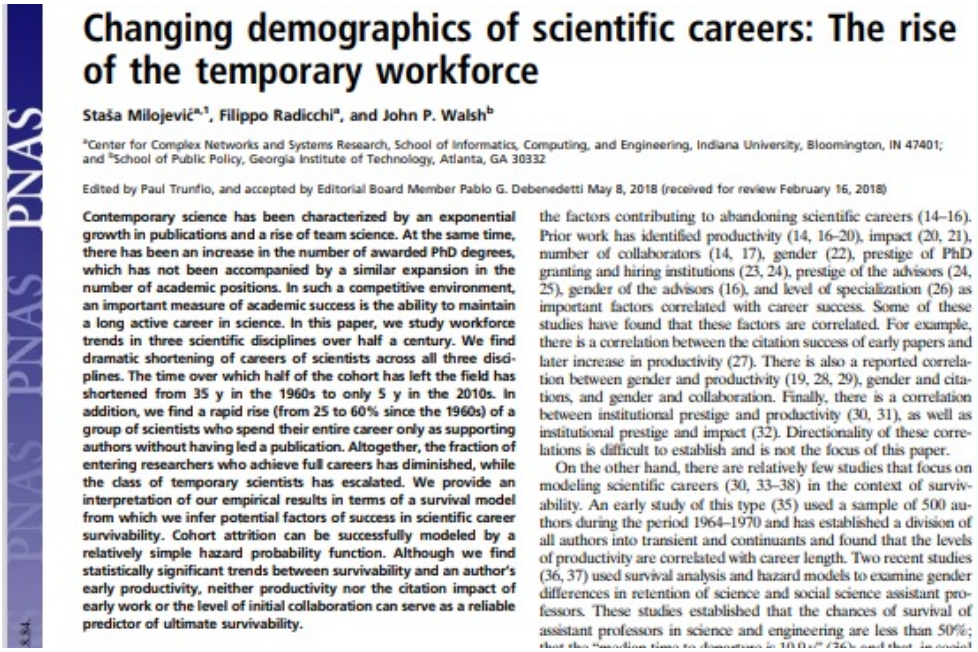
Keywords: research funding, funding concentration, diversity, research performance, research policy

ABSTRACT

The relationship between the distribution of research funding and scientific performance is a major discussion point in many science policy contexts. Do high shares of funding handed out to a limited number of elite scientists yield the most value for money, or is scientific progress better supported by allocating resources in smaller portions to more teams and individuals? In this review article, we seek to qualify discussions on the benefits and drawbacks of concentrating research funds on fewer individuals and groups. Based on an initial screening of 3,567 articles and a thorough examination of 92 papers, we present a condensation of central arguments. Further, we juxtapose key findings from 20 years of empirical research on the relation between the size of research grants and scientific performance. Overall, the review demonstrates a strong inclination toward arguments in favor of increased dispersal. A substantial body of empirical research also exhibits stagnant or diminishing returns to scale for the relationship between grant size and research performance. The findings question the rationale behind current funding trends and point toward more efficient ways to allocate resources. In addition, they highlight the need for more research on the interplay between science-internal mechanisms and policy priorities in accelerating concentration of funding.

2. Kortere karrierer



PNAS PNAS PNAS

Changing demographics of scientific careers: The rise of the temporary workforce

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Contemporary science has been characterized by an exponential growth in publications and a rise of team science. At the same time, there has been an increase in the number of awarded PhD degrees, which has not been accompanied by a similar expansion in the number of academic positions. In such a competitive environment, an important measure of academic success is the ability to maintain a long active career in science. In this paper, we study workforce trends in three scientific disciplines over half a century. We find dramatic shortening of careers of scientists across all three disciplines. The time over which half of the cohort has left the field has shortened from 35 y in the 1960s to only 5 y in the 2010s. In addition, we find a rapid rise (from 25 to 60% since the 1960s) of a group of scientists who spend their entire career only as supporting authors without having led a publication. Altogether, the fraction of entering researchers who achieve full careers has diminished, while the class of temporary scientists has escalated. We provide an interpretation of our empirical results in terms of a survival model from which we infer potential factors of success in scientific career survivability. Cohort attrition can be successfully modeled by a relatively simple hazard probability function. Although we find statistically significant trends between survivability and an author's early productivity, neither productivity nor the citation impact of early work or the level of initial collaboration can serve as a reliable predictor of ultimate survivability.

the factors contributing to abandoning scientific careers (14–16). Prior work has identified productivity (14, 16–20), impact (20, 21), number of collaborators (14, 17), gender (22), prestige of PhD granting and hiring institutions (23, 24), prestige of the advisors (24, 25), gender of the advisors (16), and level of specialization (26) as important factors correlated with career success. Some of these studies have found that these factors are correlated. For example, there is a correlation between the citation success of early papers and later increase in productivity (27). There is also a reported correlation between gender and productivity (19, 28, 29), gender and citations, and gender and collaboration. Finally, there is a correlation between institutional prestige and productivity (30, 31), as well as institutional prestige and impact (32). Directionality of these correlations is difficult to establish and is not the focus of this paper.

On the other hand, there are relatively few studies that focus on modeling scientific careers (30, 33–38) in the context of survivability. An early study of this type (35) used a sample of 500 authors during the period 1964–1970 and has established a division of all authors into transient and continuants and found that the levels of productivity are correlated with career length. Two recent studies (36, 37) used survival analysis and hazard models to examine gender differences in retention of science and social science assistant professors. These studies established that the chances of survival of assistant professors in science and engineering are less than 50%;

Et overbefolket system?

The Ortega Hypothesis

Citation analysis suggests that only a few scientists contribute to scientific progress.

Jonathan R. Cole and Stephen Cole

Most scientists are aware that science is a highly stratified institution. Power and resources are concentrated in the hands of a relatively small minority. For the past several years we have been studying the social stratification system of science (*1–3*). Most of our research has concentrated on the social processes through which individual scientists are evaluated, to discover why some scientists rise quickly to positions of eminence and others remain relatively obscure. Two conflicting theories explain social mobility in science. According to one theory the stratification system of science operates on strictly universalistic criteria: the scientists who publish the most significant work receive the ample recognition they deserve; those not publishing significant work are ignored. According to the other theory, a small elite at a handful of universities and government-supported laboratories control the social institutions of science in such a way as to perpetuate their own ideas and assure the social mobility of their intel-

Eller *for* stor magtkoncentration?

Does Science Advance One Funeral at a Time?†

By Pierre Azoulay, Christian Fons-Rosen, and Joshua S. Graff Zivin*

We examine how the premature death of eminent life scientists alters the vitality of their fields. While the flow of articles by collaborators into affected fields decreases after the death of a star scientist, the flow of articles by non-collaborators increases markedly. This surge in contributions from outsiders draws upon a different scientific corpus and is disproportionately likely to be highly cited. While outsiders appear reluctant to challenge leadership within a field when the star is alive, the loss of a luminary provides an opportunity for fields to evolve in new directions that advance the frontier of knowledge. (*JEL* I23, O31, O33)

A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it.

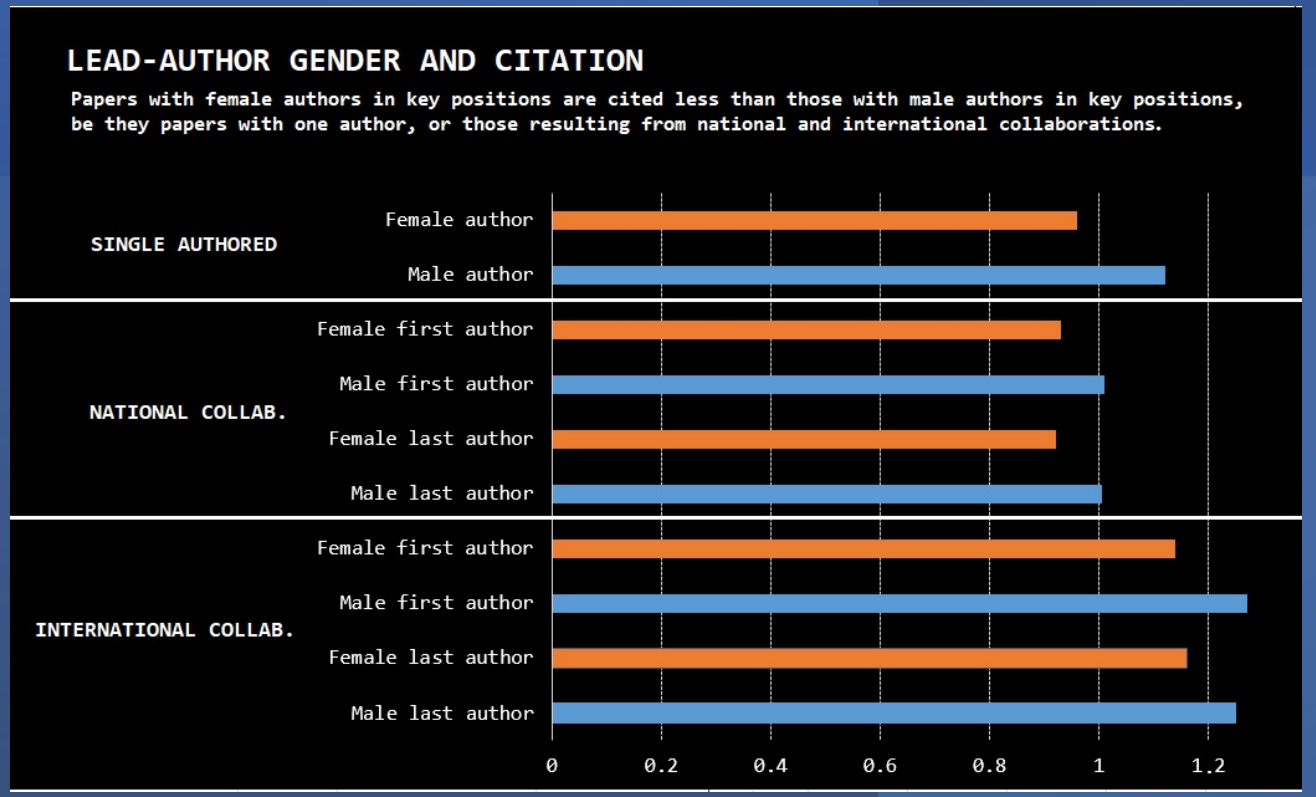
—Max Planck

Bibliometrics: Global gender disparities in science

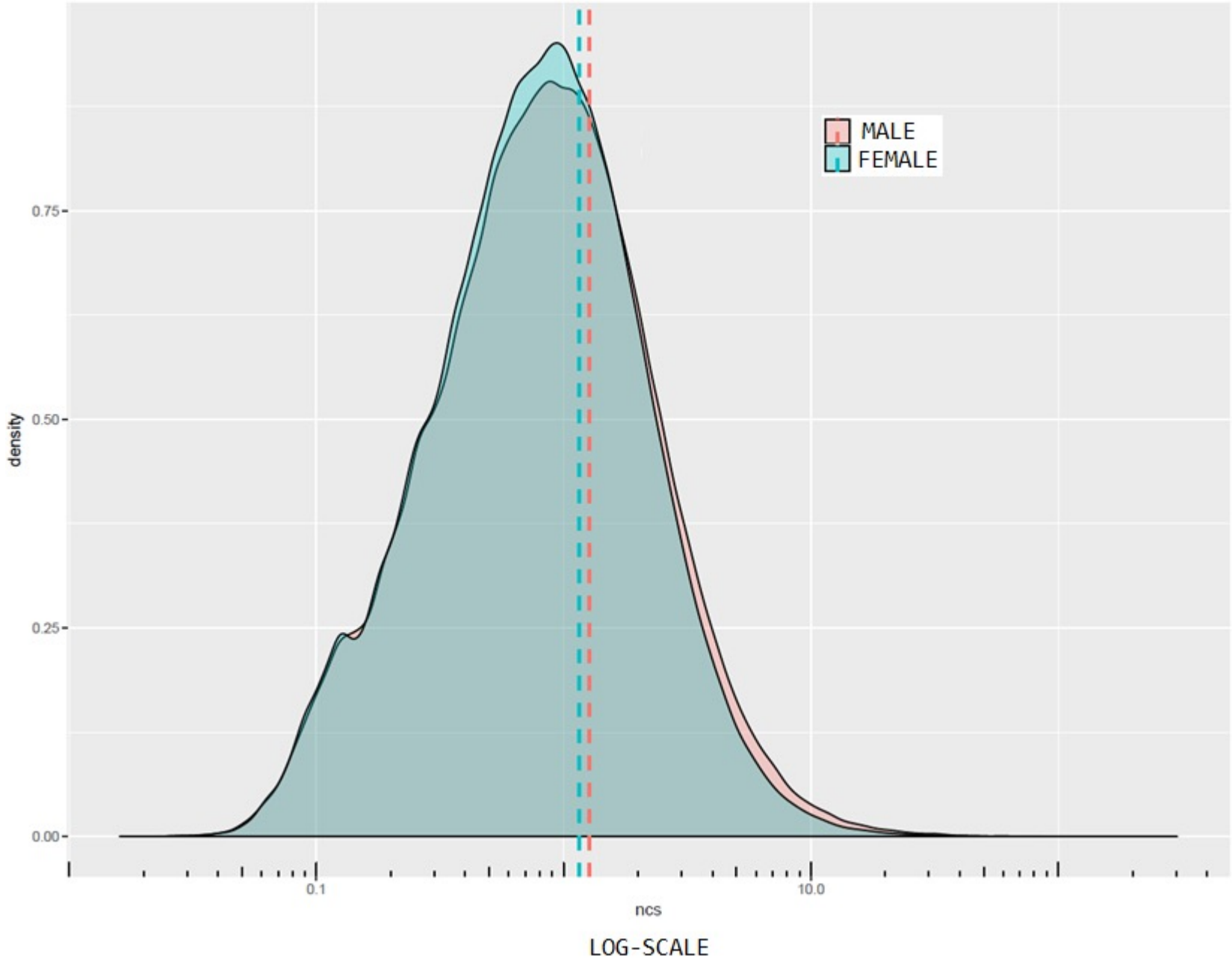
Vincent Larivière, Chaoqun Ni, Yves Gingras, Blaise Cronin & Cassidy R. Sugimoto

Nature **504**, 211–213 (2013) | Cite this article

"And what of impact? We analysed prominent author positions – sole authorship, first-authorship and last-authorship. We discovered that when a woman was in any of these roles, a paper attracted fewer citations than in cases in when a man was in one of these roles (...). The gender disparity holds for national and international collaborations" (Lariviere et al. 2013).



Reconstruction of figure in: Larivière, V., Ni, C., Gingras, Y., Cronin, B., & Sugimoto, C. R. (2013). Bibliometrics: Global gender disparities in science. *Nature News*, *504*(7479), 211.


MALE
FEMALE
density
0.75
0.50
0.25
0.00
0.1
10.0
ncs
LOG-SCALE

Ideen rejser videre…

- "In the Web of Science, women in first- or sole-author positions receive fewer citations than men in the same positions" (*Socius*)
- "On impact, women's publications are cited less per article than men's, according to a study of 5.5 million articles published between 2008 and 2012" (*Perspectives in Psychological Science*)
- "In addition, women are under-represented in prestigious publications and authorship positions and women receive ~10% fewer citations." (*Nature Astronomy*)
- "More subtle practices are also implicated. For example, we know that men's research is more likely to be cited than women's" (*Gender and Society*)
- "Every major criterion on which scientists are evaluated […] has been shown to be biased in favour of (white) men. These include authorship credit, paper citations, funding, recruitment, mentoring and tenure! *(Nature*)
- "This research also found that articles with women in these positions are cited less frequently than those that have males occupying them."
- "Women scientists have fewer citations than men" (*Handbook of Science and Technology Studies)*

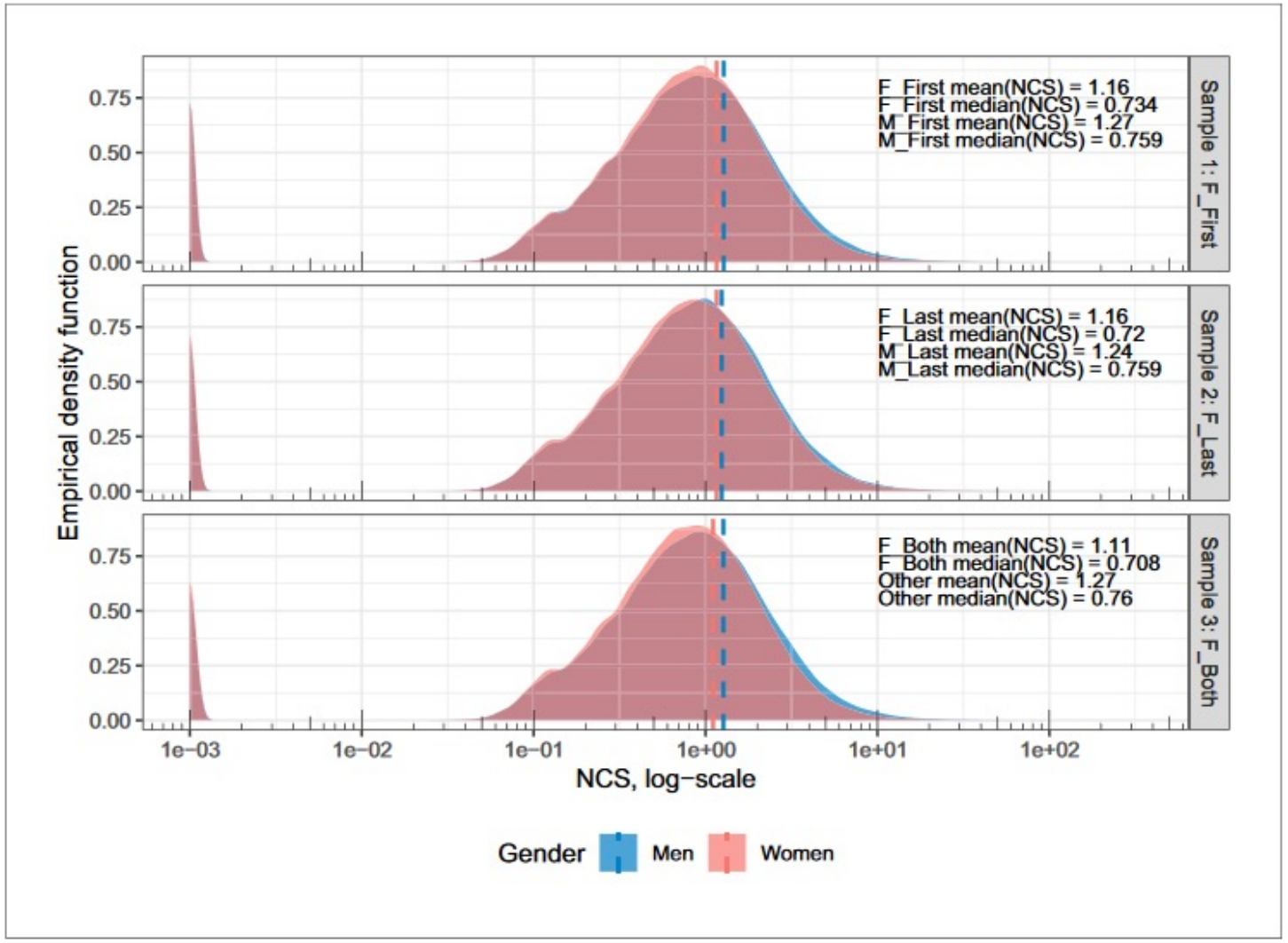
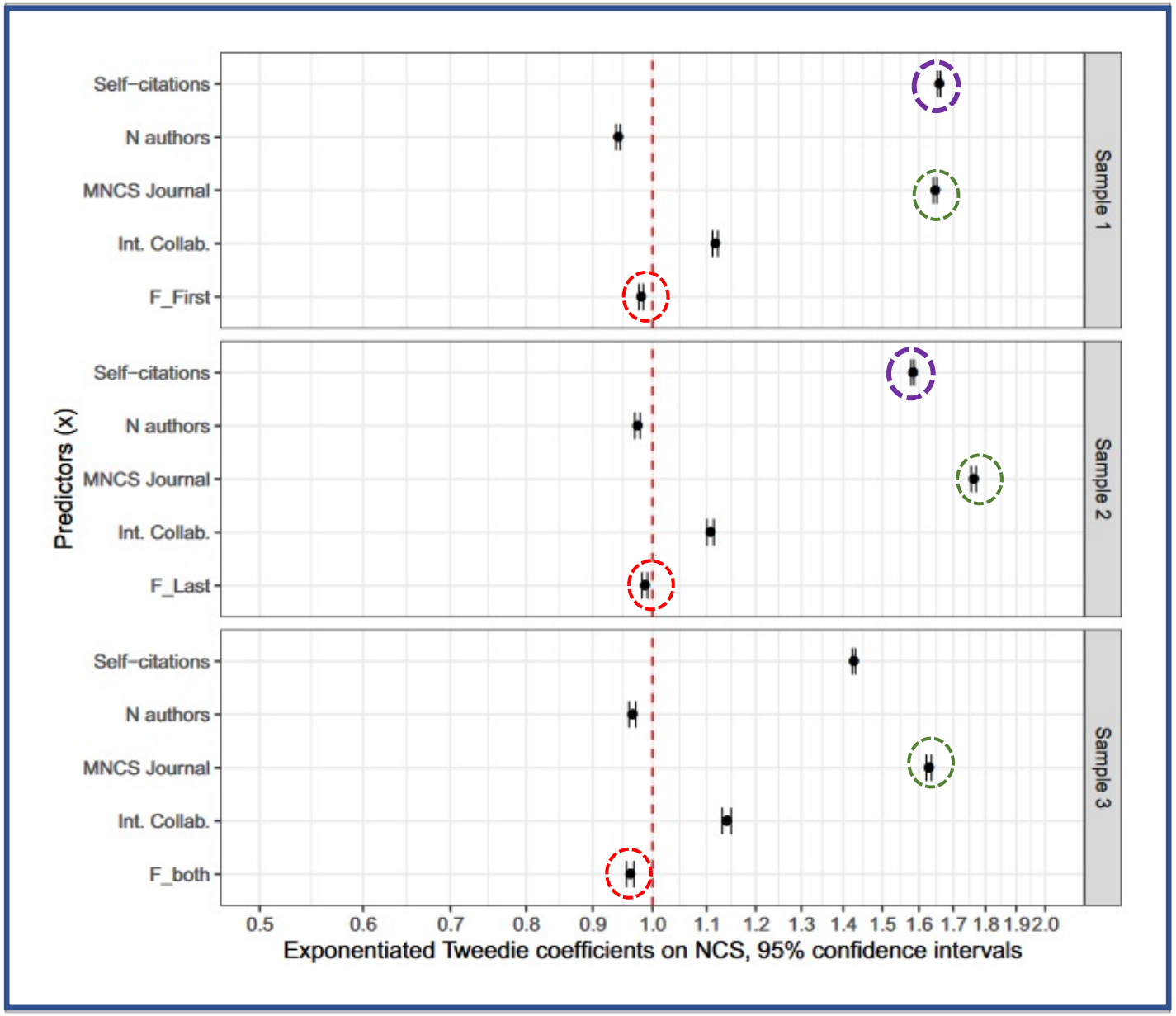


Figure 1. Density distributions of the log-transformed, per-paper NCS for the matched set of male and female first authors (Sample 1), female and male last authors (Sample 2), and female first and last authors vs. other author combinations (Sample 3). Dashed lines indicate the mean NCS for each sample. The y-axis indicates the



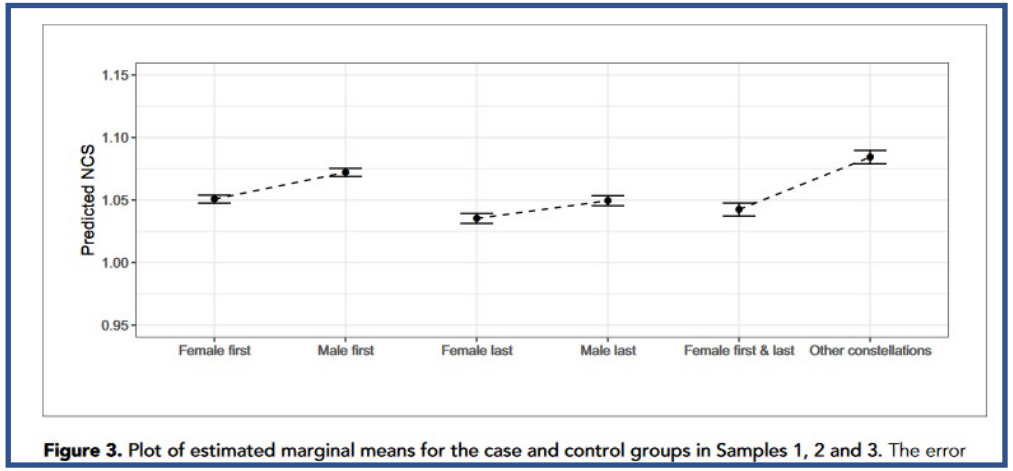


Figure 3. Plot of estimated marginal means for the case and control groups in Samples 1, 2 and 3. The error

Variationer i alder og output

PLOS ONE

RESEARCH ARTICLE

Self-citation is the hallmark of productive authors, of any gender

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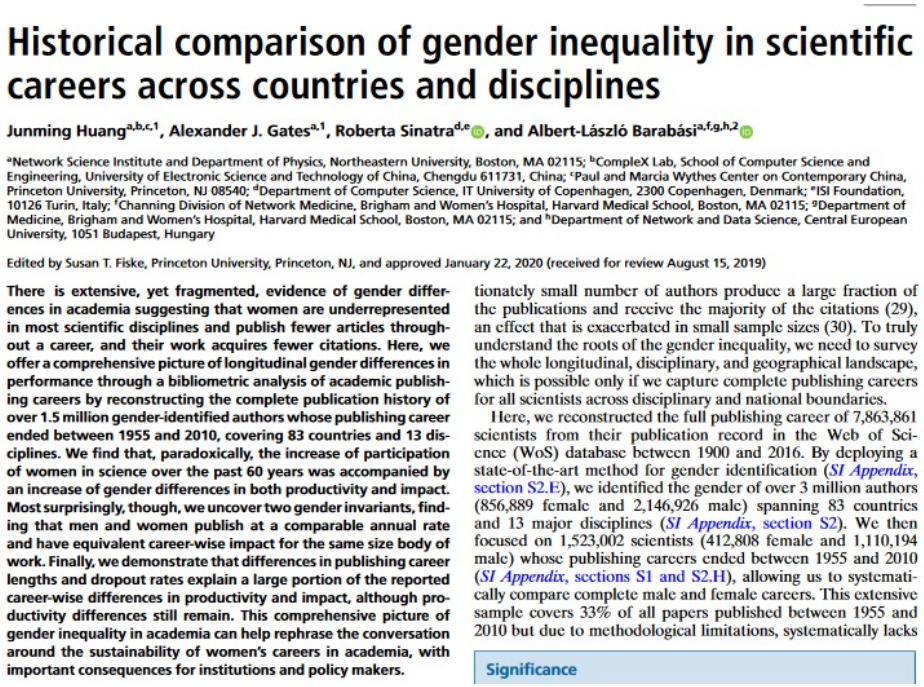
Abstract

It was recently reported that men self-cite >50% more often than women across a wide variety of disciplines in the bibliographic database JSTOR. Here, we replicate this finding in a sample of 1.6 million papers from Author-ity, a version of PubMed with computationally disambiguated author names. More importantly, we show that the gender effect largely disappears when accounting for prior publication count in a multidimensional statistical model. Gender has the weakest effect on the probability of self-citation among an extensive set of features tested, including byline position, affiliation, ethnicity, collaboration size, time lag, subject-matter novelty, reference/citation counts, publication type, language, and venue. We find that self-citation is the hallmark of productive authors, of any gender, who cite their novel journal publications early and in similar venues, and more often cross citation-barriers such as language and indexing. As a result, papers by authors with short, disrupted, or diverse careers miss out on the initial boost in visibility gained from self-citations. Our data further suggest that this disproportionately affects women because of attrition and not because of disciplinary under-specialization.



Historical comparison of gender inequality in scientific careers across countries and disciplines

Junming Huang[a,b,c,1], Alexander J. Gates[a,1], Roberta Sinatra[d,e], and Albert-László Barabási[a,f,g,h,2]

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There is extensive, yet fragmented, evidence of gender differences in academia suggesting that women are underrepresented in most scientific disciplines and publish fewer articles throughout a career, and their work acquires fewer citations. Here, we offer a comprehensive picture of longitudinal gender differences in performance through a bibliometric analysis of academic publishing careers by reconstructing the complete publication history of over 1.5 million gender-identified authors whose publishing career ended between 1955 and 2010, covering 83 countries and 13 disciplines. We find that, paradoxically, the increase of participation of women in science over the past 60 years was accompanied by an increase of gender differences in both productivity and impact. Most surprisingly, though, we uncover two gender invariants, finding that men and women publish at a comparable annual rate and have equivalent career-wise impact for the same size body of work. Finally, we demonstrate that differences in publishing career lengths and dropout rates explain a large portion of the reported career-wise differences in productivity and impact, although productivity differences still remain. This comprehensive picture of gender inequality in academia can help rephrase the conversation around the sustainability of women's careers in academia, with important consequences for institutions and policy makers.

tionately small number of authors produce a large fraction of the publications and receive the majority of the citations (29), an effect that is exacerbated in small sample sizes (30). To truly understand the roots of the gender inequality, we need to survey the whole longitudinal, disciplinary, and geographical landscape, which is possible only if we capture complete publishing careers for all scientists across disciplinary and national boundaries.

Here, we reconstructed the full publishing career of 7,863,861 scientists from their publication record in the Web of Science (WoS) database between 1900 and 2016. By deploying a state-of-the-art method for gender identification (*SI Appendix*, section S2.E), we identified the gender of over 3 million authors (856,889 female and 2,146,926 male) spanning 83 countries and 13 major disciplines (*SI Appendix*, section S2). We then focused on 1,523,002 scientists (412,808 female and 1,110,194 male) whose publishing careers ended between 1955 and 2010 (*SI Appendix*, sections S1 and S2.H), allowing us to systematically compare complete male and female careers. This extensive sample covers 33% of all papers published between 1955 and 2010 but due to methodological limitations, systematically lacks

Significance

Toptidsskrifter som en central del af problemet?

Gender differences in submission behavior exacerbate publication disparities in elite journals

Isabel Basson[1], Chaoqun Ni[2], Giovanna Badia[3], Nathalie Tufenkji[4], Cassidy R. Sugimoto[5,6], Vincent Larivière*[1,6,7]

Abstract

Women are particularly underrepresented in journals of the highest scientific impact, with substantial consequences for their careers. While a large body of research has focused on the outcome and the process of peer review, fewer articles have explicitly focused on gendered submission behavior and the explanations for these differences. In our study of nearly five thousand active authors, we find that women are less likely to report having submitted papers and, when they have, to submit fewer manuscripts, on average, than men. Women were more likely to indicate that they did not submit their papers (in general and their subsequently most cited papers) to *Science*, *Nature*, or *PNAS* because they were advised not to. In the aggregate, no statistically significant difference was observed between men and women in how they rated the quality of their work. Nevertheless, regardless of discipline, women were more likely than men to indicate that their "*work was not ground-breaking or sufficiently novel*" as a rationale for not submitting to one of the listed prestigious journals. Men were more likely than women to indicate that the "*work would fit better in a more specialized journal.*" We discuss the implications of these findings and interventions that can serve to mitigate the disparities caused by gendered differences in submission behavior.

Publishing while female

Are women held to higher standards? Evidence from peer review.*

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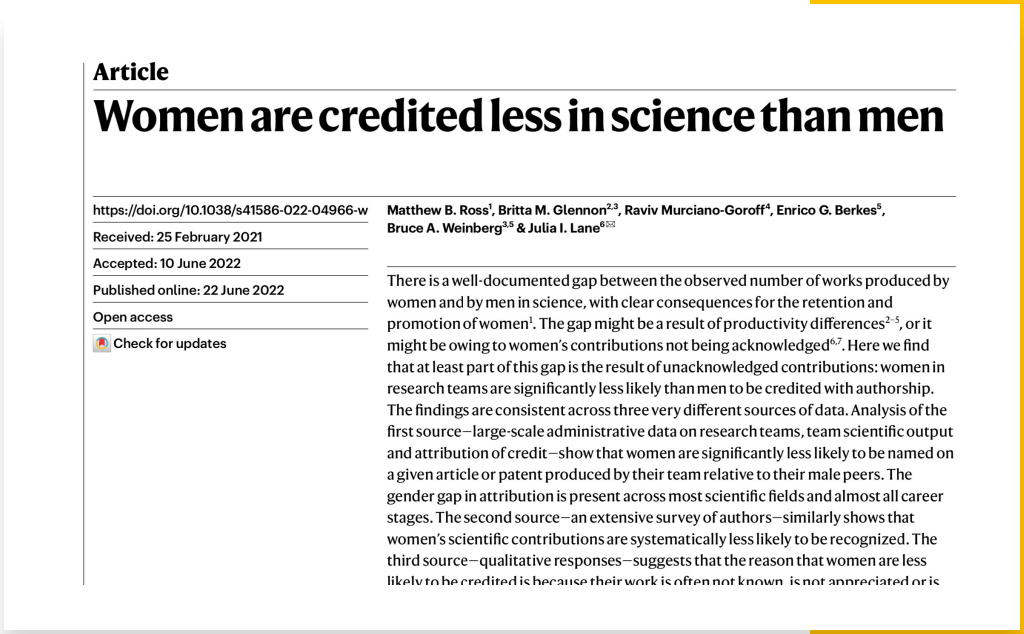
Conditional on the quality of a paper, are women held to higher writing standards in academic peer review? Using readability scores to investigate, I find: (i) female-authored papers are 1–6 percent better written than equivalent papers by men; (ii) the gap widens *during* peer review; (iii) women improve their writing as they publish more papers (but men do not); (iv) men do not appear to compensate by raising quality along another dimension. Using a subjective expected utility framework, I show that tougher editorial standards are most obviously consistent with authors' observed choices. A conservative estimate derived from the model suggests higher writing standards may cause senior female economists to write at least 5–7 percent more clearly than they otherwise would.

Hvis bidrag krediteres?



Article

Women are credited less in science than men

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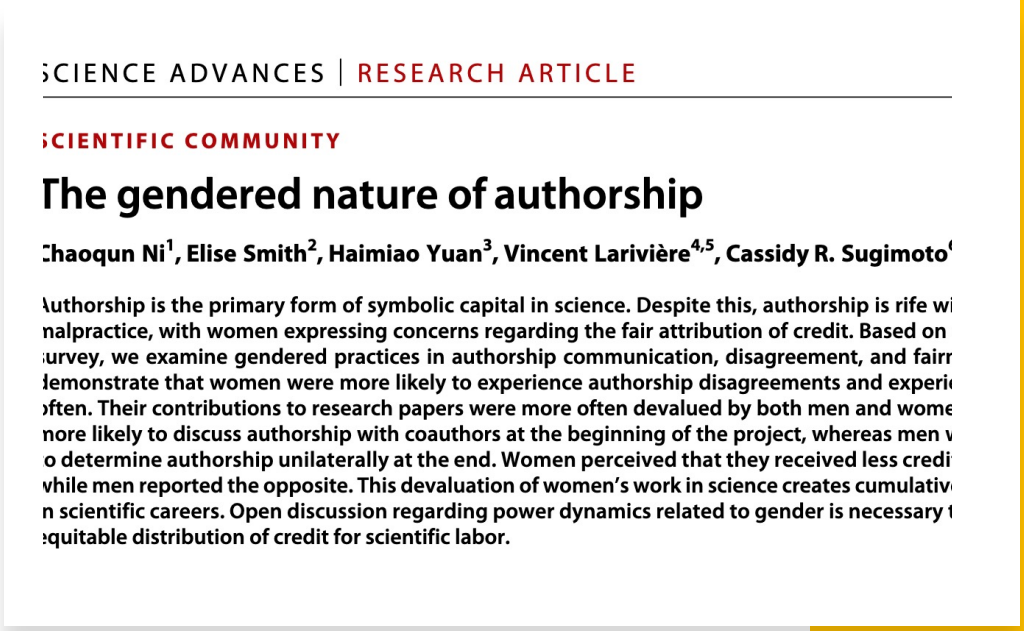
There is a well-documented gap between the observed number of works produced by women and by men in science, with clear consequences for the retention and promotion of women[1]. The gap might be a result of productivity differences[2–5], or it might be owing to women's contributions not being acknowledged[6,7]. Here we find that at least part of this gap is the result of unacknowledged contributions: women in research teams are significantly less likely than men to be credited with authorship. The findings are consistent across three very different sources of data. Analysis of the first source—large-scale administrative data on research teams, team scientific output and attribution of credit—show that women are significantly less likely to be named on a given article or patent produced by their team relative to their male peers. The gender gap in attribution is present across most scientific fields and almost all career stages. The second source—an extensive survey of authors—similarly shows that women's scientific contributions are systematically less likely to be recognized. The third source—qualitative responses—suggests that the reason that women are less likely to be credited is because their work is often not known, is not appreciated or is



SCIENCE ADVANCES | RESEARCH ARTICLE

SCIENTIFIC COMMUNITY

The gendered nature of authorship

Chaoqun Ni[1], Elise Smith[2], Haimiao Yuan[3], Vincent Larivière[4,5], Cassidy R. Sugimoto[6]

Authorship is the primary form of symbolic capital in science. Despite this, authorship is rife wi malpractice, with women expressing concerns regarding the fair attribution of credit. Based on survey, we examine gendered practices in authorship communication, disagreement, and fairr demonstrate that women were more likely to experience authorship disagreements and experi often. Their contributions to research papers were more often devalued by both men and wome more likely to discuss authorship with coauthors at the beginning of the project, whereas men v to determine authorship unilaterally at the end. Women perceived that they received less credi while men reported the opposite. This devaluation of women's work in science creates cumulativ in scientific careers. Open discussion regarding power dynamics related to gender is necessary t equitable distribution of credit for scientific labor.