No Fair Sex in Academia: Is Hiring to Editorial Boards Gender Biased?

Abstract

The editorial boards of academic journals overrepresent men, even above their proportion in university faculties. In this paper we test whether this gender disparity is caused by anti-female bias, supposing that anti-female discrimination means women must have a higher research output than men in order to overcome bias against them. We collect a dataset of the research output and gender of 4384 academics on the editorials boards of 120 journals within four social science subjects: Anthropology, Psychology, Political Science and Economics. Our findings are precisely the opposite of what would be expected from anti-female bias. Using a transformation of the H index as our indicator of research output, we find male research output to be 0.35 standard deviations ($p<0.001$) above female research output. However, the gap falls to 0.13 standard deviations ($p<0.001$) when years publishing is controlled for. Our results are replicated with alternative dependent variables and using robust regression.

We followed up our research with a survey of 231 academics, asking them questions on their attitudes towards discrimination in hiring to editorial boards. Although two-thirds of academics supported no bias, the remainder were far more likely to be biased against men than against women. For every 1 academic who supported discrimination in favour of men, 11 supported discrimination in favour of women. The survey results were consistent with the hypothesis that academics and journal editors are biased in favour of women.

Introduction

Academics have documented many gender disparities in their occupation that could be suggestive of pervasive anti-female bias. Despite women being more than half of undergraduates in many subjects, they are less likely to go into a career in academia (Ceci et al., 2014), they achieve lower pay and lower rank within academia (Aiston, 2014; Dunkin, 1991; Ginther and Hayes, 1999, 2003; Ginther and Khan, 2004; Santos and Dang Van Phu, 2019), their papers are less likely to be cited (Dion et al., 2018) and they are less likely to win academic awards (Chan and Torgler, 2020; Lincoln et al., 2012).

However, evidence exists to suggest male dominance in academia may reflect differences in ability or interest, rather than anti-female bias. For example, Murray (2003) compiled a list of the 4002 most significant figures in the sciences, philosophy, literature, art and music, ranking his figures by the amount of space given to them in encyclopedias. Only 2% of these figures were women, suggesting men are more likely to have a greater ability for academic work. Darwin (1871) thought that the great success of men to achieve eminence in academic research could be reflective of differences in intelligence. Intelligence research may support Darwin’s theory. Three meta-analyses (Lynn, 2017, 1994; Lynn and Irwing, 2004) have been done on the question of gender differences in general intelligence, finding men to have a modest advantage over women. Although there is some evidence women perform better at certain cognitive tasks, such as episodic memory (Asperholm et al, 2019), men perform better in both verbal and spatial aspects of the Wechsler Intelligence tests (Lynn, 2021). Furthermore, men also outperform women in general knowledge tests (Tran et al., 2014) which may be particularly useful for academics who have to memorise and synthesise knowledge from prior academic literature.

Even if there are no differences in mean intelligence, the genders do differ in their variance. In tests of school children around the world on reading and mathematics, boys have a greater variance in their scores (Baye and Monseur, 2016). This 'greater male variability hypothesis' could explain why men are more likely to find greater success within academia. Nyborg (2005) estimates that greater male variance and a modest difference in mean intelligence causes there to be 8 men for every 1 woman with an IQ three standard deviations above the mean. O'Dea et al. (2018) show from simulations that the overrepresentation of men in academia can be partially explained by the fact men exhibit a greater variance in many traits, including academic ability.

This paper seeks to test for bias in hiring to editorial boards in academic journals. Many previous studies on editorial boards show that they overrepresent male academics relative to their proportion in university faculties (eg. Amrien et al., 2011; Cho et al., 2014; Mauleón et al., 2013; Metz and Harzing, 2009, 2012; Morton and Sonnad, 2007; Ioannidou and Effie, 2015; Mazov and Gureev, 2016), suggesting hiring to editorial boards could be gender biased. On the other hand, if men have higher ability for research or interest in research their higher representation could be meritocratic or even mask bias against men.

The editors of journals hire academic experts, usually without pay, to sit on the editorial boards. Academics sitting on editorial boards can perform three main tasks - advising on strategy for the journal, helping in decisions on what to publish and improving the journal's reputation through association (Wiley, 2021). Some longitudinal studies of editorial board membership show that whilst the proportion of women on editorial boards is increasing, this is in parallel if not below the growth in the number of women in academia (Addis and Villa, 2003; Huang et al., 2020; Mauleón et al., 2013; Metz and Harzing, 2012). These studies are focused on certain niches such as journals from Spain or management journals. Nonetheless, if these studies are generalisable, disparities in editorial boards are not changing over time.

A gender bias in hiring to editorial boards, or anywhere else in academia, may be detrimental to the careers of those being discriminated against and for the quality of scientific research as a whole. The Impact factor of journals has been found to correlate with the research productivity of its members, although not with its gender proportion (Hafeez et al., 2019). This means preference for a certain sex above academic merit could undermine the quality of academic journals. Not being allowed on an editorial board bars discriminated individuals from this experience as an academic, but it also might have knock-on effects on the careers of these discriminated individuals. Sitting on an editorial board places an academic within a network of high quality researchers whom you can exchange ideas with or who can help each other in other ways.

A potential consequence of gender bias could be that it distorts scientific output. Addis and Villa (2003) suggest that because the genders differ in their academic interests, a gender skewed editorial board could have different preferences in what articles to publish. An example of gender differences in academic interest include men preferring ‘thing oriented topics’ over ‘people oriented topics’ (Luoto, 2020),

Due to concerns that women may be discriminated against, multiple publishers have asked their journal editors to increase the proportion of women on their editorial boards. For example, *Nature* has been reviewing the gender balance in its journals and asking that editors improve this balance since 2012 (Nature, 2017). More recently both the *Lancet* and *Elsevier* have been urging their editors to improve the gender ratio in their boards (Laudine et al., 2018; Bayazit, 2020; Elsevier, 2021a). To improve transparency, *Elsevier* publishes the gender ratio for each of its journals which may act as an incentive for editors to increase female representation in order to be seen as more progressive or avoid reputation damaging accusations of sexism (Elsevier, 2021b).

Attempts to increase representation of women on journal boards may be helpful if they are being discriminated against. However, if women are not discriminated against, affirmative action policies may reduce meritocracy in academia, creating the very problems of discrimintation affirmative action was meant to counteract.

Although women are less likely to serve on editorial boards, inequality of outcomes does not necessarily mean discrimination has taken place. In the context of editorial boards there are other supply and demand factors. For example, men might be more likely to be high performing academics, as indicated by the fact they receive a higher average number of citations per paper published (Abramo, et al., 2009; D’Amico et al., 2011; Dion et al., 2018; Huang et al., 2020; Maliniak et al., 2013; Schucan Bird, 2011, Strumia 2021). This is also supported by the psychological literature finding greater intelligence in men and greater male variance in intelligence. An alternative explanation is that women might be less interested in joining academic boards perhaps due to family commitments or a preference for conducting research rather than involvement in what may pejoratively be considered ‘bureaucracy’. For example, amongst graduate students women report being less interested in their careers (Ferriman et al., 2009), a gender difference that also increased with age.

Stronger evidence of whether gender bias is at play is essential for judging whether affirmative action policies can be justified or are counterproductive. This is especially important since the greater variation in male intellectual ability, greater average ability or gender differences in interest could explain their greater representation on editorial boards.

In this paper we use a simple test to discern if hiring to editorial boards is biased against women. If women are being discriminated against they would have to be more impressive academically so as to compete with men. A critical trait for being admitted to an editorial board is academic expertise (Lindsey, 1976) which may be measured as research output. All other things being equal, if there is anti-female bias we should expect women on editorials boards to have a higher research output than their male counterparts. Likewise, if men have a higher research output that may suggest there is an anti-male bias in hiring to editorial boards.

The reasoning for our test comes from Gary Becker’s taste discimination model of the labour market (Becker, 1971). If an employer has a distaste for one group of employees, but cannot provide them with a different wage rate, he will only hire members of this group that are sufficiently extra productive so as to outweigh the cost of going against the employer's discriminatory tastes.

This same reasoning has been applied at least once before to editorial boards. Hafeez et al. (2019) found that for Psychiatry journals, despite women publishing half as many papers as men, they served on journals with the same mean impact factor. This result suggests women are not being discriminated against when Psychiatry journal boards hire. The authors also found that when women were in leadership positions the journal was less likely to include women on its editorial and advisory boards. This should not be the case if male academics are more likely to discriminate against women. Hafeez et al. also found that despite women being underrepresented on journal boards relative to the proportion of women in Psychiatry, they were represented fairly relative to their level of seniority in academia.

A similar test for gender bias was used by Guy Madison and Pontus Fahlman (2020). The authors found women had fewer publications and citations upon becoming assistant professors in Sweden, suggesting there was no anti-female bias but probably anti-male bias in hiring. Likewise, Strumia (2021) finds male physicists have a greater research output than women upon being hired by a university.

If men have greater research output than women on academic boards that may suggest discrimination but it is not proof. As discussed it could be that men are generally better at academic research. In addition to studying gender disparities on editorial boards we survey academics regarding their views on gender discrimination. If academics tend to support discrimination in favour or against women that would strongly suggest any gender disparities on editorial boards do in fact reflect discrimination.

In our test of whether editorial boards are gender biased we decide to use journals from the social science and humanities. Firstly, women make up a higher proportion of these scholars so getting a large sample with enough women may be easier when avoiding STEM subjects. Secondly, it has been argued that women prefer these less quantitative subjects (Kahn and Ginther, 2017), and have less aptitude for STEM subjects (Reilly and Neumann, 2013; Lord, 1987). If this were true, the effect of higher male performance would be more likely to obscure the effect of anti-female discrimination making non-STEM subjects more appropriate for our test. Whether or not women have less interest or aptitude for STEM subjects, we chose to study social sciences just in case this would bias our results.

We chose four social science subjects to study: Anthropology, Psychology, Political Science and Economics. We chose these subjects because they vary widely in their political persuasions, with economics being the least left wing and Anthropology being the most left wing (Langbert, 2020). Amongst US faculty, there are 5.5 Democrat economists for every Republican economist. Amongst anthropologists there are 133 Democrats for every Republican.

Table 1

Subject	**Democrat - Republican Ratio in Faculty**
Economics	5.5:1
Political Science	8.2:1
Psychology	16.8:1
Anthropology	133:1
Soure: Langbert (2020)	

Having subjects of ranging political persuasion was important in case politics influences bias in hiring to editorial boards. Some research has suggested that right wingers exhibit an anti-female bias (Austin and Jackson, 2019; Christopher and Mull, 2006; Hodson et al., 2017). Other research finds that left wingers may be prone to bias towards groups with low status including women (Winegard et al., 2020). Overall this body of research indicates that as one moves politically right one becomes less pro-female and more pro-male. More generally a range of subjects was needed in case gender bias was confounded with a particular subject matter.

There have been many studies on gender representation on editorial boards including in Anthropology (Bruna et al., 2017), Psychology (Evans et al., 2005; Hafeez et al., 2019; Over, 1981; Palser et al., 2021; Robinson et al., 1998), Political Science (Fraga et al., 2011; Palmer et al., 2020) and Economics (Addis and Villa, 2003; Gibbons and Fish, 1991; Mumford, 2016). Anthropology, Psychology and Economic editorial boards tend to slightly under-represent women relative to the number of academic staff in these fields. This could suggest there is anti-female bias in these journals' boards.

However in Political Science (Fraga et al., 2011; Palmer et al., 2020), Economics (Mumford, 2016) and Psychiatry (Hafeez et al., 2019) editorial board gender proportions have been compared to the gender proportion amongst senior academics, not just the totality of junior and senior staff. When this is done editorial boards have a similar gender proportion to that of senior academics, suggesting editorial board's apparent gender disparities could be meritocratic.

Data

To choose which journal's editorial boards to study, we employed the website Scimagojr (SCImago Journal & Country Rank, https://www.scimagojr.com/) which contains a dataset of 34,346 journals on their website based on Scopus, Elsevier's abstract and citations dataset. We ranked journals in each of the subjects we studied according to the number of citations per document they had in a two year period. From this ranking we then took the top 30 journals from each subject[1].

We disagreed with the subject label of some of the journals on Scimagojr. For example, some of the 'Economics' journals such as the 'Journal of management' were deemed closer to Business Studies than Economics. Likewise, 'Politics' journals such as the 'Journal of Political Economy' typically only had economists as authors. Journals not obviously in the correct disciplines were ignored.

From the websites of the journals we recorded members of their editorial boards. The term 'editorial board' had slightly different meanings for different journals. Some used the term to describe everyone working for the journal. Most however used it to label a subsection of the editorial team involved in more advisory work. When there was no subsection of a journal's staff labelled the 'editorial board' we took the relevant subsection that seemed closest in meaning such as 'advisory board'. As such our methodology did not include journal chief editors as part of the editorial board.

To measure the productivity of academics on editorial boards we noted relevant statistics from their Google Scholar page when it was available. These statistics included the publication count, H Index, i10 Index, citation count, H Index since 2016 and the citation count since 2016. Furthermore, to control for years publishing in academia we also recorded the year of the researcher's first publication. When the researcher did not have a page on Google Scholar we left these statistics missing.

Sometimes Google Scholar pages for individuals had errors in . Some papers had the wrong date on them and others were attributed to the wrong author. When a Google Scholar Page included five or more articles with citations which the author had not written, we noted the page as overattributing research to the author. We excluded these 'over-attributed individuals', but reran our main regression analysis with these individuals in the appendix. When the earliest paper on a Google Scholar page appeared to be of the wrong date or by a different author we made use of the next earliest paper that appeared to be correct.

For ease of interpretation our measures of academic output were log10 transformed and then scaled into standard deviation units as 'Z scores', according to the mean and standard deviation values for that metric within each journal. This allows us to compare the relative performance of researchers in different editorial boards. For example a transformed H index of 1 means the researcher's H index is one standard deviation above the mean of the respective editorial board's members. Nonetheless, to prove the robustness of our results we also used raw data in the appendix.

In line with the practice of previous research on gender representation on editorial boards, we coded the gender of academics according to whether their names were obviously male or female (eg. Iaonnidou and Rosiana, 2015). When this was not obvious we used Google

[1] Journals were added to the dataset between March and June 2020. In this time journal rankings by citations changed from a default year of 2019 to 2020. This can be verified with the Internet Archive (Internet Archive, https://web.archive.org/web/*/https://www.scimagojr.com/journalrank.php). During data gathering this change was not noticed meaning journals were ranked by citations in different years depending upon when the data was gathered.

Search to find their gender from pictures or left the gender variable missing when this was insufficient. Of the 5625 editorial board members in our dataset we were unable to find the gender of 7 individuals.

All our data was collected between March and June 2021. Although 5625 editorial board members were recorded, 7 individuals couldn't be identified by gender and a further 1098 individuals did not have Google Scholar pages. Of the board members recorded 40% were women, but 42% of researchers without Google Scholar pages were women meaning women were slightly less likely to have a Google Scholar page. An additional 138 individuals are removed from our main dataset because Google Scholar over-attributes research to them. Women were still 40% of our sample upon removing the over-attributed individuals. Given that our missing observations were not especially more likely to be of one gender or another we do not expect selection effects to cause any substantial biases to affect our analysis. These exclusions left us with 4384 complete cases. The descriptive statistics for this complete dataset are in Table 2.

Table 2

Descriptive Statistics						
Statistic	Mean	Standard Deviation	Minimum	25th Percentile	75th Percentile	Max
Years Publishing	24.4	11.1	2.0	16.0	31.0	70.0
H Index	31.2	23.7	1.0	15.0	40.0	356.0
Transformed H Index	0.0	1.0	-3.7	-0.7	0.7	3.8
H Index since 2016	24.4	39.9	0.0	13.0	30.0	2,455.0
Transformed H Index Since 2016	-0.0	1.0	-5.0	-0.7	0.6	7.8
I10 Index	59.9	73.6	0.0	18.0	72.0	944.0
Transformed I10 Index	-0.0	1.0	-3.6	-0.7	0.7	3.2
Publication Count	142.6	201.1	1.0	45.0	166.0	2,876.0
Transformed Publication Count	0.0	1.0	-3.9	-0.7	0.7	3.6
Citation Count	9,010.5	15,886.4	0.0	1,393.0	9,519.2	195,544.0
Transformed Citation Count	-0.0	1.0	-5.5	-0.6	0.7	2.7
Citation Count since 2016	4,221.2	7,457.5	0.0	865.0	4,724.8	210,648.0
Transformed Citation Count since 2016	-0.0	1.0	-5.7	-0.6	0.7	3.5

In Table 3 We present a correlation matrix of our recorded variables, with the dependent variables in their raw and transformed versions. Notably our measures of research output strongly correlate with each other. This suggests any of the dependent variables will work similarly well as a measure of research output. For simplicity we thus focus on the popular used H index. The H index is the largest value of ‘h’ for which an author has published ‘h’ articles with ‘h’ citations each. However, the differences between the indexes for a researcher’s entire career versus just what they have done since 2016 may be related to gender, especially since women have been increasingly joining academia. Since many of the research output variables correlate so well we opt to focus on the H index and the H index since 2016 for our analysis, using some of the other variables as robustness tests in the appendix.

Table 3

Correlation Matrix

	Years Publishing	H Index	Transformed H Index	H Index since 2016.	Transformed H Index Since 2016	I10 Index	Transformed I10 Index	Publication Count	Transformed Publication Count	Citation Count	Transformed Citation Count	Citation Count since 2016	Transformed Citation Count since 2016
Years Publishing	1	0.60	0.64	0.21	0.52	0.53	0.65	0.46	0.68	0.48	0.62	0.35	0.48
H Index	0.60	1	0.89	0.37	0.85	0.89	0.86	0.64	0.76	0.83	0.81	0.74	0.79
Transformed H Index	0.64	0.89	1	0.35	0.96	0.75	0.97	0.55	0.84	0.65	0.93	0.59	0.90
H Index since 2016	0.21	0.37	0.35	1	0.46	0.33	0.34	0.23	0.29	0.32	0.33	0.30	0.33
Transformed H Index Since 2016	0.52	0.85	0.96	0.46	1	0.71	0.94	0.51	0.78	0.64	0.92	0.60	0.92
I10 Index	0.53	0.89	0.75	0.33	0.71	1	0.79	0.77	0.72	0.78	0.67	0.68	0.65
Transformed I10 Index	0.65	0.86	0.97	0.34	0.94	0.79	1	0.60	0.88	0.62	0.91	0.55	0.87
Publication Count	0.46	0.64	0.55	0.23	0.51	0.77	0.60	1	0.74	0.54	0.48	0.47	0.46
Transformed Publication Count	0.68	0.76	0.84	0.29	0.78	0.72	0.88	0.74	1	0.55	0.75	0.48	0.70
Citation Count	0.48	0.83	0.65	0.32	0.64	0.78	0.62	0.54	0.55	1	0.67	0.87	0.66
Transformed Citation Count	0.62	0.81	0.93	0.33	0.92	0.67	0.91	0.48	0.75	0.67	1	0.61	0.97
Citation Count since 2016	0.35	0.74	0.59	0.30	0.60	0.68	0.55	0.47	0.48	0.87	0.61	1	0.64
Transformed Citation Count since 2016	0.48	0.79	0.90	0.33	0.92	0.65	0.87	0.46	0.70	0.66	0.97	0.64	1

Results

To begin with we follow previous literature in simply comparing the gender proportions on editorial boards to comparison samples. In Table 4 we show the gender proportion in journal boards in each subject. To see whether these proportions are representative of the field they should be compared with the population of academic researchers, be it for example faculty members or published researchers.

For comparison we found a range of datasets representing the gender proportion amongst academics in the subjects we have studied. Our first source of comparison is the gender proportion of academic authors with at least two publications during the years 2014-2018. The figures are provided for the USA and the EU28 (The European Union plus the United Kingdom). These figures are reported by Elesevier (De Kleijn et al., 2020) in their 2020 Gender Report and are derived from the Scopus dataset. Unfortunately this data does not have gender proportions specifically for Anthropology or Political Science so we use the proportions for the closest related subject groups 'Arts and Humanities' and 'Social Sciences'. From the UK we have the gender proportions amongst academic staff from the Higher Education Statistics Agency (2021). We use the proportions from 2016 because newer staff might be too early in their research career to get on a journal board. Finally for economics we also note the proportion of published economists registered with the Research Papers in Economics Author Service as of 2021 (Research Papers in Economics Author Service, 2021).

Table 4

Female Representation					
Subject	Selected Editorial Boards	Active Authors (USA)	Active Authors (EU28)	Academics in UK Universities as of 2016	Registered authors with the Research Papers in Economics Author Service
Anthropology	51%	43% (Arts and Humanities)	43% (Arts and Humanities)	51%	N/A
Psychology	43%	56%	58%	61%	N/A
Political Science	44%	47% (Social Science)	44% (Social Science)	37%	N/A
Economics	26%	24%	34%	30%	26%
Sources: De Kleijn et al., (2020), Higher Education Statistics Agency (2021), Research Papers in Economics Author Service (2021)					

Editorial boards in Anthropology, Political Science and Economics seem to be broadly representative of their fields. Anthropology editorial boards manage to have a majority of women on their boards which is exactly the same as the proportion of UK Anthropologists that are female. Although Anthropology has a greater percentage of women than active authors in the Arts and Humanities these may not be an accurate match for the subjects. Political Science overrepresented women relative to their role in UK Universities but not compared to active authors in social science. Whether this is because other Social Sciences have more women, or because the UK has an unusual lack of women in their Political Science departments is unclear. Compared to every comparison sample Psychology underrepresents women in their fields.

Our results are somewhat surprising - in prior research Anthropology underrepresented women (Bruna et al., 2017) but we find women proportionally represented in editorial boards. Whilst in previous research Political Science (Fraga et al., 2011; Palmer et al., 2020) and Economics (Mumford, 2016) were only representative of senior academics, here they are broadly representative of all academic staff. Only our results from Psychology (Evans et al., 2005; Hafeez et al., 2019; Over, 1981; Palser et al., 2021; Robinson et al., 1998) were in line with prior research suggesting women are under-represented.

One possibility could be that publishers have been successful in encouraging their journals to increase female representation in recent years. Nonetheless, whether these proportions are meritocratic will depend on the research output of women. Assuming no underlying differences in ability, if the gender disparities found here represent anti-female bias, women would need to substantially outperform men to get on Psychology editorial boards but their research output should be approximately equal to men's in Anthropology, Political Science and Economics.

Test for difference in Means

Our first method for seeing whether women need a higher level of research productivity than men to get on editorial boards is to simply compare research productivity between men and women. As stated in the data section our measures of research productivity are standardised relative to the mean research productivity in the journal board a researcher sits. This ensures that there is no bias from differential gender interest in subdisciplines which may be associated with higher or lower absolute levels of research productivity.

Before using regression to compare gender differences whilst using controls, we present the gender distributions of research productivity by subject in Fig 1. This is to create a clear visualisation of the results of our study. Test results for Welch's t-tests and their p values for the difference between male and female research productivity are reported in table 5.

Figure 1

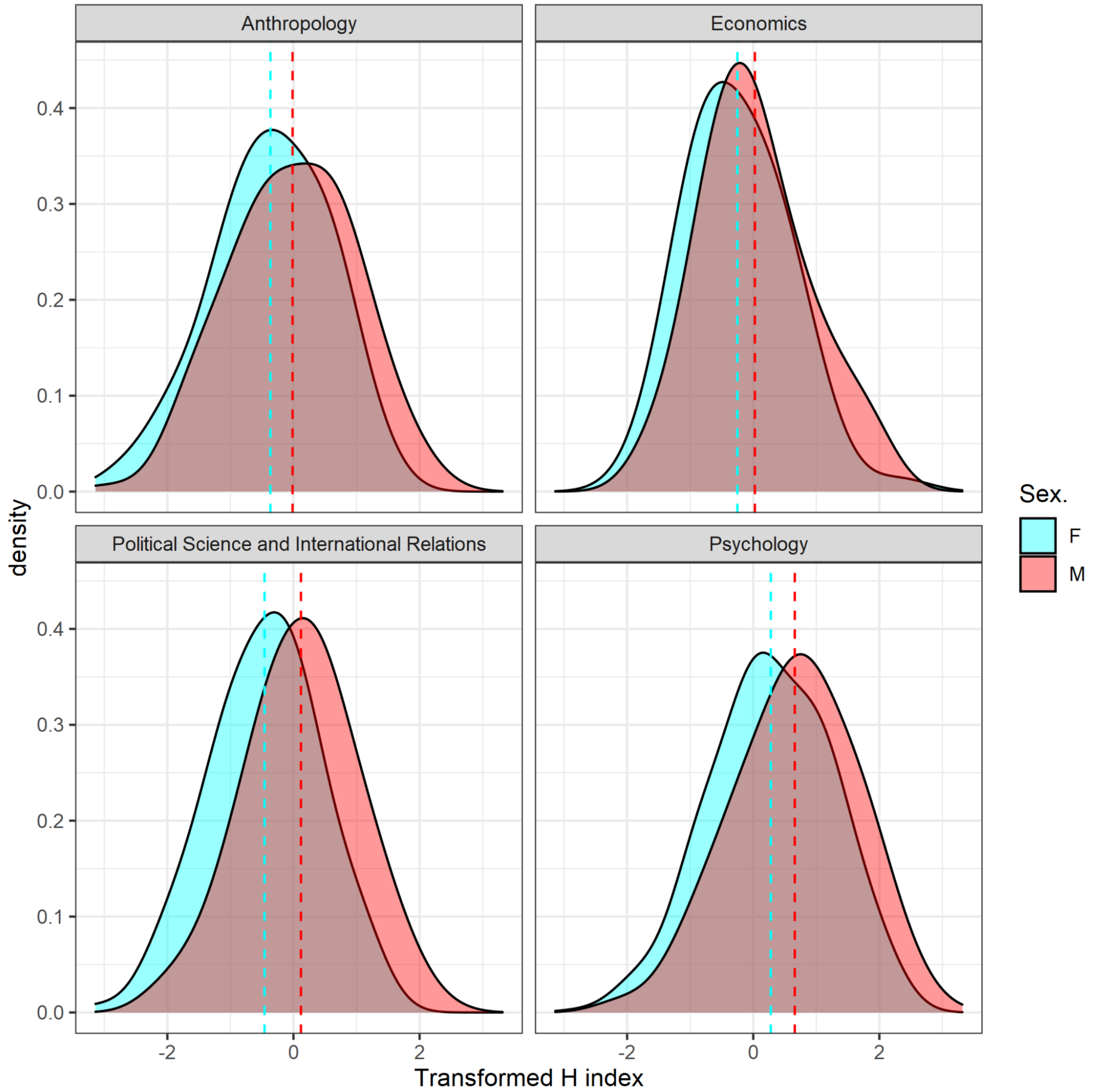

Table 5

	Anthropology	Psychology	Political Science	Economics
Mean Difference	0.34	0.33	0.47	0.28
t value	5.29	6.62	7.89	4.23
p value	P < 0.001	P < 0.001	P < 0.001	P < 0.001
Degrees of Freedom	934.28	1,485.34	934.28	543.18

In every subject men have a higher level of research productivity in terms of our transformed H index. The female disadvantage in research output is between 0.28 standard deviations below men in economics to 0.47 standard deviations below men in political science. Moreover this difference is statistically significant in all subjects ($P < 0.001$). Our results are the opposite of what would be expected if women were being discriminated against, strongly suggesting women are not discriminated against in hiring to editorial boards. It should be noted that despite including just as many journal boards in Economics as we have included in Anthropology and Psychology, it has substantially fewer degrees of freedom because economics journals had fewer editorial board members.

Psychology editorial boards under-represent women and yet still the women who do manage to get on the editorial boards dramatically underperform against men by 0.47 standard deviations. This could suggest that despite women being underrepresented on Psychology editorial boards relative to their presence in universities they are still overrepresented relative to their merit. Likewise women may be overrepresented relative to their merit in Economics, Political Science and Anthropology. Despite women being proportionally represented in these subjects male research output is still higher.

Also of note is that there is no monotonic relationship between gender differences in research output and how right wing a subject's faculty is (subjects are ordered in the table from most left wing to least left wing). To properly test for any gender bias arising from political opinion between subjects we would need to include more subjects.

Regression Modelling

We again analyse the differences between male and female research productivity now using ordinary least squares regression. This has multiple advantages. Firstly, we can combine our samples from different disciplines, using dummies to control for any discipline effect, giving us a larger sample size. Secondly, we can control for the number of years a researcher has been publishing. More years in publishing allows an academic to increase their publication count and receive additional citations for old articles, boosting metrics of research output. This means a brilliant academic may have a lower H index than a mediocre academic who has been publishing for longer. Thus a meritocratic editorial board should take into account the length of an academic's career when judging their research output. Since men tend to have had longer careers in academia (Huang et al., 2020; Martinez et al., 2007) whilst women are joining academia at greater rates we should control for the length of academics' publishing years to see whether higher standards are demanded of women. On the other hand, more time in academia might itself be an indicator of knowledge and experience that could help as a member of an editorial board. Thus controlling for years publishing could be partially controlling for the variable we are trying to model - merit to be on a journal board. Given arguments for and against this control variable we decide to run regressions with and without it.

An alternative approach to avoid experience 'inflating' our measures of researcher productivity is to use an academic's output in recent years. This measure indicates their current research productivity rather than the output from their entire career. To do this we re-run our regressions modelling the researcher's transformed H index since 2016 as our dependent variable. In this regression we can be somewhat more confident that time in academia is not inflating our research productivity measure. As such any moderating effect from years of publishing in academia could indicate whether a preference for younger academics explains why women have a lower research output on editorial boards.

Table 6

Dependent Variable: Transformed H Index

	Anthropology		Psychology		Political Science		Economics		All Subjects			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Gender (Female = 1)	-0.34***	-0.10*	-0.32***	-0.15***	-0.46***	-0.19***	-0.28***	-0.12*	-0.35***	-0.13***	-0.32***	-0.15***
	(0.06)	(0.05)	(0.05)	(0.04)	(0.06)	(0.05)	(0.07)	(0.05)	(0.03)	(0.02)	(0.05)	(0.04)
Years Publishing		0.06***		0.06***		0.05***		0.07***		0.06***		0.06***
		(0.002)		(0.002)		(0.002)		(0.002)		(0.001)		(0.001)
Anthropology									-0.43**	-0.54***	-0.42***	-0.57***
									(0.04)	(0.03)	(0.05)	(0.04)
Economics									-0.55***	-0.35***	-0.56***	-0.36***
									(0.04)	(0.03)	(0.05)	(0.04)
Political Science									-0.44***	-0.58***	-0.39***	-0.59***
									(0.04)	(0.03)	(0.05)	(0.04)
GenderX Anthropology											-0.02	-0.06
											(0.08)	(0.06)
GenderX Economics											0.05	0.01
											(0.098)	(0.06)
GenderX Political Science											0.05	0.01
											(0.08)	(0.06)
Constant	-0.03	-1.57***	0.43***	-1.07***	0.04	-1.39***	-0.14***	-1.63***	0.43***	-1.06***	0.43***	-1.05***
	(0.04)	(0.07)	(0.03)	(0.05)	(0.04)	(0.07)	(0.04)	(0.06)	(0.03)	(0.03)	(0.03)	(0.03)
Observations	941	941	1,650	1,650	843	843	950	950	4,384	4,384	4,384	4,384
R^2	0.03	0.46	0.03	0.46	0.06	0.39	0.02	0.48	0.08	0.48	0.08	0.48
F Statistic	28***	401***	43***	705***	57***	267***	16***	443***	96***	807***	56***	504***

*p<0.05; **p<0.01; ***p<0.001

In our regression models using only gender as an independent variable we find women perform worse in terms of research output in all subjects ($p < 0.001$). When we control for the years publishing we find it has a consistent positive effect ($p < 0.05$) on research output regardless of what subjects are studied. Every 10 years of experience in academic publishing is associated with a research output increase of between 0.5-0.7 standard deviations. This is in accordance with our expectation that academics with less experience tend to have a lower research output. Years publishing moderates the effect size of gender in every subject, more than halving gender's effect size in every regression. Without the control men perform better than women between 0.30 and 0.45 standard deviations, but with the control men only perform better by 0.1-0.15 standard deviations. This moderation effect is to be expected given gender and years in academia are confounded; female academics tend to have less experience because they are becoming more represented in academia over time (Miller and Wai, 2015) and they are more likely to quit their academic career (Huang et al., 2020).

When we combine all the subjects together in regressions 9-12 we find gender still has a statistically significant effect on research output. In regressions 11 and 12 we use the interaction terms between subject and gender, indicating whether some subjects significantly differ in their respective gender effects. In these regressions we find no statistically significant interaction terms. Log likelihood ratio tests were used to judge whether models 11 and 12 are superior to models 9 and 10. The chi square values were insignificant so the subject gender interaction terms do not improve the models. Thus we cannot reject the null hypothesis of gender's effect being homogenous across subjects.

To test whether our results are robust we ran the same set of regressions for the non-transformed raw H index and transformed versions of the publication count, citation count. We also rerun the first set of regressions with academics excluded for having five or more misattributed papers with citations. These results are in the appendix and show a similar effect of gender on research output regardless of what measure we use.

Table 7

Dependent Variable: Transformed H Index sine 2016

	Anthropology		Psychology		Political Science		Economics		All Subjects			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Gender (Female = 1)	-0.30***	-0.11*	-0.27***	-0.13**	-0.36***	-0.15**	-0.29***	-0.15**	-0.30***	-0.13***	-0.27***	-0.13**
	(0.06)	(0.05)	(0.05)	(0.04)	(0.06)	(0.06)	(0.07)	(0.06)	(0.03)	(0.03)	(0.05)	(0.04)
Years Publishing		0.05***		0.05***		0.04***		0.06***		0.05***		0.05***
		(0.002)		(0.002)		(0.003)		(0.003)		(0.001)		(0.001)
Anthropology									-0.55***	-0.64***	-0.54***	-0.65***
									(0.04)	(0.03)	(0.05)	(0.04)
Economics									-0.57***	-0.41***	-0.56***	-0.39***
									(0.04)	(0.03)	(0.05)	(0.04)
Political Science									-0.57***	-0.69***	-0.54***	-0.70***
									(0.04)	(0.03)	(0.05)	(0.04)
GenderX Anthropology											-0.03	0.03
											(0.08)	(0.07)
GenderX Economics											-0.02	-0.04
											(0.08)	(0.07)
GenderX Political Science											-0.09	0.03
											(0.08)	(0.07)
Constant	-0.08	-1.34***	0.46***	-0.78***	-0.08***	-1.21***	-0.10***	-1.35***	0.47***	-0.75***	0.46***	-0.75***
	(0.04)	(0.07)	(0.03)	(0.05)	(0.04)	(0.08)	(0.04)	(0.06)	(0.03)	(0.04)	(0.03)	(0.04)
Observations	941	941	1,650	1,650	843	843	950	950	4,384	4,384	4,384	4,384
R^2	0.02	0.31	0.02	0.33	0.04	0.24	0.02	0.35	0.09	0.36	0.10	0.36
F Statistic	22***	209***	30***	397***	34***	132***	18***	258***	115***	494***	66***	308***

*p<0.05; **p<0.01; ***p<0.001

In table 7 we use the transformed H index since 2016 as the dependent variable. Years publishing has a similar effect size on research output in each of our regressions. This could mean that years publishing's positive effect on research output may not just be due to older academics having more time to receive citations. Moreover the effect of years publishing still reduces the gender gap in research output. This suggests one of the reasons women have a lower research output on editorial boards could be because young scholars are simply more likely to be selected to an editorial board. Thus the possible gender bias in favour of women may in fact be caused by an age bias in favour of younger scholars.

Why would journals prefer younger scholars? One possibility is that academics gain better research output with age, making it rational for journals to take on younger scholars with the expectation that their research output will increase. As women are more likely to be younger scholars, the moderating effect of years publishing on the coefficient of gender may represent journals taking a rational bet on female academics. Rørstad and Aksnes (2015) have found that older academics do publish more, especially for female academics, supporting this theory.

On the other hand, older academics may publish more due to a selection effect - with younger, weaker scholars being more likely to leave academia. This would mean younger scholars on editorial boards tend to have a lower research output because younger scholars are generally worse. That there are significant differences between scholars by years publishing might also mean editors do not demand the same high standards of younger scholars - indicating an age bias. Huang et al. (2020), using a dataset of the publication history of 1.5 million gender identified authors from the Web of Science, find women are more likely to drop out of academia. The authors find that women's research output is 27.4% worse than men's; however, when simulating the effects of men dropping out at the same rate as women and controlling for age, they find women only perform 9% worse than men. This could indicate years publishing partially moderates the effect of gender on research output because academia is a 'leaky pipeline' with poor performing female scholars being more likely to drop out.

A selection effect causing younger scholars to be worse might not occur at the entry to editorial boards but prior to that in academics' careers. Akcigit et al. (2020) have shown there are more academics today than before. The authors show reducing the selectiveness for joining academia has reduced the IQ of the average PhD student. This is corroborated by the fact that in longitudinal data it has been found that scientists are becoming less productive (Huang et al., 2020). Given women tend to be younger scholars, controlling for years publishing could be controlling for the possibility women happen to be worse scholars on average simply because they are younger.

To summarise, the gender disparity in research output is partially moderated by years of publishing. However, it is unclear whether this is because younger cohorts of scholars have had less time to publish or are worse than older scholars or journals have an age bias or journals prefer younger scholars because they are expected to improve their research output. If the latter theory is correct we should expect the gender disparity in research output to fall as female academics age.

Huber Weighted Robust Regression

As a robustness test we use the robust regression with Huber weights. This approach puts lower weights on observations with a high residual. This is useful for seeing whether lessening the effect of outlier values changes our results. For example, this helps us to be confident that human errors in data gathering or random errors by Google Scholar have not distorted the results. Our robust regressions are created using the *rlm()* function in the R package **MASS**. For details on robust regression see Venables and Ripley (2010). The Robust regression results are shown in Table 8.

The use of robust regression does not seem to change our results substantially. The predicted gender disparity appears approximately the same. Likewise the coefficients for years publishing are the same rounded to two decimal places. There are still no significant gender subject interaction terms. Overall this suggests that outlier observations are not distorting our regression results.

Table 8

Dependent Variable: Transformed H Index sine 2016

	Anthropology		Psychology		Political Science		Economics		All Subjects			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Gender (Female = 1)	-0.34***	-0.11*	-0.34***	-0.15***	-0.46***	-0.22***	-0.25***	-0.12*	-0.35***	-0.14***	-0.34***	-0.15***
	(0.07)	(0.05)	(0.05)	(0.04)	(0.06)	(0.05)	(0.07)	(0.05)	(0.03)	(0.02)	(0.05)	(0.03)
Years Publishing		0.06***		0.06***		0.05***		0.07***		0.06***		0.06***
		(0.002)		(0.002)		(0.002)		(0.002)		(0.001)		(0.001)
Anthropology									-0.41***	-0.54***	-0.41***	-0.56***
									(0.04)	(0.03)	(0.05)	(0.04)
Economics									-0.56***	-0.36***	-0.59***	-0.36***
									(0.04)	(0.03)	(0.05)	(0.03)
Political Science									-0.43***	-0.57***	-0.38***	-0.56***
									(0.04)	(0.03)	(0.05)	(0.04)
GenderX Anthropology											0.002	0.05
											(0.08)	(0.06)
GenderX Economics											0.08	0.01
											(0.08)	(0.06)
GenderX Political Science											-0.12	-0.02
											(0.08)	(0.06)
Constant	0.03	-1.57***	0.45***	-1.09***	0.08*	-1.35***	-0.14***	-1.62***	0.45***	-1.06***	0.45***	-1.06***
	(0.05)	(0.07)	(0.03)	(0.05)	(0.04)	(0.07)	(0.04)	(0.05)	(0.03)	(0.03)	(0.03)	(0.03)
Observations	941	941	1,650	1,650	843	843	950	950	4,384	4,384	4,384	4,384
Residual Standard Error	1.00#2	0.66	1.04	1.05	0.84	0.64	0.91	0.59	0.96	0.66	0.96	0.66

*p<0.05; **p<0.01; ***p<0.001

Survey

In our dataset of editorial board members we have shown that male research output is higher than female research output. There are two competing explanations - that men are in general higher performing academics than women and that journals are biased in favour of women, requiring a lower academic standard to let women onto editorial boards. Furthermore, we found academics with more years publishing performed better even when we only judged their research output since 2016. Likewise this can be explained by the idea that older scholars are better or that there is a bias against them. The moderating effect of years publishing on the gender gap suggests that if age bias is at play it may indirectly cause a gender bias in favour of women.

To see if there was further evidence that gender disparities in research output reflect bias we decided to run a survey of academics. If academics said they supported discrimination in favour of women that would support the theory that academics running journals are biased in favour of women. If this was not the case the survey results would indicate that gender disparities on editorial boards are best explained by differences in aptitude alone.

We designed our survey using Alchemer (https://www.alchemer.com/). We created four questions on attitudes towards gender bias in hiring to journals and four questions on attitudes towards age bias in hiring to journals. We asked a further two questions on general attitudes to meritocracy in hiring. All questions were on a 0-10 scale. When questions offered a choice between two extremes (eg. pro-male bias to pro-female bias), the question stated that option 5 was a neutral answer. For questions on gender bias and age bias, higher numbers indicated a pro-female bias or a pro-young bias[2].

We gathered a sample of survey respondents using Prolific (https://www.prolific.co/). Individuals are paid to answer surveys through this website. Our inclusion criteria was for all individuals to have a PhD giving us 425 respondents. We employed a question asking respondents whether or not they worked in academia or were publishing academic papers. After excluding individuals not in academic publishing we had a sample size of 231. All respondents were from Western countries such as The United States, The United Kingdom and Israel.

[2] For questions 5 and 7 our survey responders were told higher numbers indicate a pro-old preferences instead of a pro-young preference. For ease of interpretation across different questions, answers for questions 5 and 7 were mirrored around point 5. Thus a raw answer of 3 became an answer of 7 and vice versa.

Table 9

Survey Results

Question	Mean Response	t value (5 is the null hypothesis)	Percent of responses below 5	Percent of responses at 5	Percent of responses above 5	number of responses
Q1. Is age diversity in editorial boards important?	6.8***	11.9	13%	8%	79%	231
Q2. Is gender diversity in editorial boards important?	7.5***	15.3	13%	5%	82%	231
Q3. Should journal editors have an age preference in hiring to editorial boards? (Pick 5 for no age preference)	5.3***	3.8	8%	71%	21%	231
Q4. Should journal editors have a gender preference in hiring to editorial boards? (Pick 5 for no gender preference)	5.6***	6.6	3%	64%	33%	231
Q5. Do older academics have a greater aptitude for academic research than younger academics (Pick 5 for no age difference)	5.1	1.1	21%	55%	24%	231
Q6. Do female academics have a greater aptitude for academic research than men? (Pick 5 for no gender difference)	5.1	1.7	4%	87%	9%	231
Q7. Do you think journal editors have an age preference in hiring to editorial boards? (Pick 5 for no age preference)	3.8***	-9.9	62%	24%	13%	231
Q8. Do you think journal editors have a gender preference in hiring to editorial boards? (Pick 5 for no gender preference)	3.9***	-10.0	55%	35%	10%	231
Q9. How important do you think academic merit *should be* for hiring to editorial boards?	8.1***	26.2	3%	4%	93%	231
Q. 10 How important do you think academic merit currently is for hiring to editorial boards?	6.8***	14.2	13%	10%	77%	231

Critical values $p<0.05$, $|t| > 1.97$; $p < 0.01$, $|t| > 2.60$; $p < 0.001$, $|t| > 3.33$

Results from our survey are shown in Table 9. We used a t-test on the mean response to each question to see whether it differed significantly from 5. On question 4, academics were asked “Should journal editors have a gender preference in hiring to editorial boards?”. To ensure all respondents correctly interpreted the question as implying that a gender preference would be discriminatory and anti-meritocratic, we labelled the right end of responses “They should favor females above their academic accomplishments” and the left the same but for males.

The mean response to this question was 5.6 which significantly different from 5 ($p < 0.001$). Moreover, one third of academics said journals should have a pro-female bias and nearly two thirds (64%) said journals should have no age preference. This meant for everyone 1 academic preferring men, there were 11 who preferred women. Although the average academic was against a gender bias, academics were overwhelmingly more likely to support journals preferring women than the reverse.

Only 3% of our respondents thought journal editors should be biased in favour of men. Such a low response for this option could indicate academics only chose this option by mistake in answering the question or were lying for the sake of humour. For comparison, an opinion poll found 4% of Americans indicated that they believed reptilians ran the world (Public Policy Polling, 2013). This 4% figure has been dubbed by blogger Scott Alexander (2013) as the 'Lizardman's Constant' to be used as a rule of thumb indicating the maximum survey response that may be explained by mistakes or malice on the respondents' behalves. Since support for anti-female discrimination is lower than the Liardman's Constant we should be sceptical whether any respondents actually support bias against women at all. As such, self reported support for bias against women amongst academics is negligible.

In our model of research output on editorial boards we found older scholars performed better, even when we only studied academic output since 2016. We suggested that this might not just be due to older scholars having more experience but a result of biased lower requirements for younger scholars. In question 3 academics were asked "Should journal editors have an age preference in hiring to editorial boards?". The mean answer was 5.3 indicating an average pro-young bias. It was significantly different from the no bias response of 5 ($p < 0.001$). 21% supported a pro-young bias, 71% supported no bias and 8% supported a pro-old bias. These results, whilst not as extreme as the gender responses, indicate a pro-young bias; nearly 3 academics preferred young academics for every 1 that supported older academics.

These results indicate that academics are far more likely to be biased in favour of women and younger scholars. This evidence supports the idea that disparities in research output on editorial boards reflects pro-female bias.

In addition to asking academics whether they had an age or gender preference, we asked them whether they thought journal editors were biased. For the gender question the mean answer was 3.9 and for age 3.8. These differed significantly from 5 ($p < 0.001$), suggesting academic thought journals were biased in favour of men and older scholars. As argued in this paper these beliefs appear to be false since men and older scholars achieve higher research output to get onto editorial boards. So whilst academics are biased in favour of women and young people they believe other academics have the opposite bias. It could be that academics have such strong anti-male bias they are deluded into thinking academia has the opposite bias than it has in reality.

What motivates the academics to prefer young and female academics? We asked respondents whether they valued gender and age diversity in questions 2 and 1 respectively. A response of 0 meant diversity was "not important", whilst a response of 10 indicated that diversity was "very important". Mean responses were 7.5 for gender and 6.8 for age. 82%

and 79% gave responses above 5 for gender and age diversity respectively. With responses overwhelmingly closer to 10 than 0, it seems academics place much value on diversity.

We also asked academics whether they believed men and older scholars have greater aptitude than female and young scholars. The mean response to both questions was 5.1 which was not significantly different from 5. This indicates academics thought neither gender had greater aptitude for research, despite the fact men tend to receive more citations (Abramo, et al., 2009; D’Amico et al., 2011; Dion et al., 2018; Huang et al., 2020; Maliniak et al., 2013; Schucan Bird, 2011), academic academic awards (Chan and Torgler, 2020; Lincoln et al., 2012) and are more likely to be considered eminent in their field (Murray, 2003). It also suggests academics believe young scholars are just as good as older scholars.

In table 10 we present a correlation matrix of all our survey questions to better examine what makes scholars prefer women. Concern for gender diversity (Question 2) correlates at 0.34 ($p < 0.001$) with belief that journal editors should prefer women (Question 4). Curiously however, concern for age diversity (Question 1) does not appear to correlate with belief that journal editors should prefer younger scholars (Question 3). This could suggest that whilst academics prefer women for the sake of diversity, preference for younger scholars is not to do with a general concern for age diversity. This could be because some scholars that believe in age diversity think this requires more older scholars to be represented on journal boards.

In our survey we found no statistically significant belief that younger or female scholars had a greater aptitude than older or male scholars. This could indicate that bias against men is so strong amongst academics that they refuse to believe in greater male academic ability. We find belief in higher female aptitude (Question 6) correlates at 0.22 ($p < 0.001$) with preference for hiring women (Question 4). This would suppot the idea that bias in favour of women is motivating both bias regarding their ability and also discrimination in favour of women. Belief that journals are biased against women (Question 8) had a small negative correlation (-0.12) with preference to discriminate in women (Question 4). This could suggest that discrimination in favour of women is motivated by countering perceived injustices against women. However this correlation was statistically insignificant.

Table 10

Survey Correlation Matrix										
	Q1.	Q2.	Q3.	Q4.	Q5.	Q6.	Q7.	Q8.	Q9	Q10.
Q1. Is age diversity in editorial boards important?	1	0.54***	0.05	0.14*	0.02	0.14*	-0.04	-0.11	-0.04	-0.15*
Q2. Is gender diversity in editorial boards important?	0.54***	1	0.005	0.23***	0.07	0.17*	-0.03	-0.18**	-0.05	0.01
Q3. Should journal editors have an age preference in hiring to editorial boards? (Pick 5 for no age preference)	0.05	0.005	1	0.34***	0.04	0.06	-0.06	0.04	-0.10	0.07
Q4. Should journal editors have a gender preference in hiring to editorial boards? (Pick 5 for no gender preference)	0.14*	0.23***	0.34***	1	0.03	0.22***	-0.11	-0.12	0.02	-0.04
Q5. Do older academics have a greater aptitude for academic research than younger academics (Pick 5 for no age difference)	0.02	0.07	0.04	0.03	1	-0.004	0.03	-0.15*	0.03	-0.17**
Q6. Do female academics have a greater aptitude for academic research than men? (Pick 5 for no gender difference)	0.14*	0.17*	0.06	0.22***	-0.004	1	-0.20**	0.004	0.06	-0.07
Q7. Do you think journal editors have an age preference in hiring to editorial boards? (Pick 5 for no age preference)	-0.04	-0.03	-0.06	-0.11	0.03	-0.20**	1	0.18**	-0.13	-0.11
Q8. Do you think journal editors have a gender preference in hiring to editorial boards? (Pick 5 for no gender preference)	-0.11	-0.18**	0.04	-0.12	-0.15*	0.004	0.18**	1	0.07	0.17*
Q9. How important do you think academic merit *should be* for hiring to editorial boards?	-0.04	-0.05	-0.10	0.02	0.03	0.06	-0.13	0.07	1	0.16*
Q10. How important do you think academic merit currently is for hiring to editorial boards?	-0.15*	0.01	0.07	-0.04	-0.17**	-0.07	-0.11	0.17*	0.16*	1
										*p<0.05; **p<0.01; ***p<0.001

Discussion and Limitations

Our results have shown that men substantially outperform women on editorial boards in Political Science, Psychology and Anthropology between 0.10-0.45 standard deviations in research output depending on model specification. These results are robust, remaining stable when different measures of research output are used, when either the unit of observation is academics and when robust regression was used in addition to OLS. In regression results we found controlling for years publishing reduces the male advantage in research output. We were uncertain of the best reason for this but suggested a few hypotheses: older scholars have had more time to publish papers, younger cohorts of scholars are worse than older ones or journals have an age bias.

Overall we can be confident that male research output is higher than women's on editorial boards. This is inconsistent with the hypothesis of anti-female bias which predicts that women have a higher research output. As such our results undermine the theory of anti-female bias. In fact, the results are consistent with anti-male bias. To further explore this hypothesis we surveyed academics on their attitudes to gender bias. We found that whilst most academics were opposed to discrimination, they were 11 times more likely to support discrimination in favour of women than against with regards to hiring to editorial boards. This further supported the idea that there is anti-male bias in hiring to editorial boards. Academics also supported discrimination in favor of younger scholars. This means the moderating effect of years publishing on the gender disparity in research output may be because age bias indirectly creates a gender bias.

There are some important limitations to our research methods. Potential errors in our data gathering increase the chance that we have outlier values distorting our results. For example, simple human errors in our data collection errors could create outlier observations that reduce the reliability of our models. Nonetheless the use of robust regression should minimise the risk of human errors distorting our results. When we performed robust regression our results were almost identical suggesting mistaken outlier observations were not distorting our results.

Another cause of errors comes from Google Scholar occasionally making errors. The site occasionally assigns authorship to the wrong individuals because two academics share the same name. When falsely attributed publications were seen we excluded these when calculating the author's first year of publication. Moreover we excluded any individuals with five or more cited false attributed papers. Since our measures of research productivity were calculated by Google Scholar we were not able to change these scores when Google Scholar had made an error. It is possible that since men are more likely to be academic authors, Google Scholar is more likely to falsely attribute papers to male authors. However, our results remained the same whether or not we excluded individuals who had been misattributed papers by Google Scholar. However, it is not impossible that some falsely attributed papers were missed in our data gathering process. This could bias our results in favour of men having a higher research output on editorial boards if Google Scholar's mistakes were gender biased. However, when citations on Google Scholar have been compared with citations on the Web of Science database no gender bias was found (Andersen and Nielsen, 2018). This suggests any errors from Google Scholar are unlikely to cause bias in our results.

A limitation of our survey work of academics is that the respondents may not be a representative sample. Respondents were people who supplemented their income by answering online surveys, suggesting our respondents were disproportionately poor and possibly poorly performing academics. It could be that academics near the bottom of the career ladder have different attitutdes to discrimination than those higher up, such as journal editors. As such it is not impossible that whilst our respondents wanted to discriminate against women, journal editors may have different preferences. Nonetheless, this hypothesis seems very unlikely. The fact that top publishers and journals are supporting affirmative action in favour of women (Bayazit, 2020; Elsevier, 2021a, 2021b; Laudine et al., 2018; Nature, 2017) would suggest that high performing academics share the same attitudes to gender bias as our surveyed academics who are likely poor performing. Moreover academics at elite institutions are overwhelmingly left wing which is associated with having pro-female preferences (Winegard et al., 2020), suggesting editors of top journals are likely to share the same preferences. For example, 39% of elite American liberal arts colleges have no registered Republican professors (Langbert, 2020).

The fact that many academics and publishers are concerned that academia has an anti-female bias would seem to make the theory of anti-male bias unlikely if these academics were rational in their claims. However this also poses a paradox, if so many academics are publicly against anti-female discrimination how can academia still be so biased against women? For example, in our survey results whilst academics on net supported discrimination in favour of women and younger scholars they believed other academics who ran journals had the opposite biases.

Clark and Winegard (2020) explain this paradox by arguing that the pervasive narrative of misogyny could itself be caused by academia and society at large having an anti-male bias. This could be an example of preference falsification (Kuran, 1997) whereby individuals lie about their true preferences, or self-deception (Trivers, 2011) whereby individuals lie to themselves about what is true or desirable in order to avoid the reputational costs of breaking social taboos. After all, there are large incentives to believing in the value of diversity and affirmative action. Academics that do not support affirmative action for women or diversity might be shunned or even ‘cancelled’ by their colleagues who are overwhelmingly left wing. For example, Cern physicist Alessandro Strumia lost his job for publicly arguing that higher male performance in academia was not a result of discrimination. This theory would also explain our survey results that academics do not believe in gender differences in academic aptitude despite greater male average intelligence (Lynn, 1994, 2017, 2021; Lynn and Irwing, 2004; Nyborg, 2005), greater variance in male intelligence (Baye and Monseur, 2016) and the overwhelming representation of men as eminent figures in science (Darwin, 1871; Murray, 2003). If anti-male bias is so common and accepted that could explain why our results are consistent with anti-male bias despite anti-female bias being a more popular theory with academics.

A limitation for our test for anti-female bias in editorial boards is that gender difference in research output on editorial boards might not only reflect bias but could also reflect gender differences in research output amongst the entire population of academics. Many studies have shown female academics to perform worse in terms of research output (Abramo, et al., 2009; D’Amico et al., 2011; Dion et al., 2018; Huang et al., 2020; Maliniak et al., 2013; Schucan Bird, 2011). This means that even if boards hire meritocratically we should expect male academics to have some advantage in their research output. So whilst a male advantage in research output is consistent with anti-male bias it could also be consistent with meritocratic hiring. Likewise it is not impossible for men to perform better than women in editorial boards even if a minimum higher standard is demanded of women. Nonetheless the fact academics in our survey support discrimination in favor of women suggests gender disparities on editorial boards do partially reflect gender bias.

In a study of 3,293 Danish researchers, Nielsen (2015) provides nuance to the claim that women have a lower research output than men. The authors find that upon normalising research output relative to the subdiscipline an academic publishes in, no gender difference in research output can be found. This suggests the gender gap in research output is caused by gender differences in field of study. In this paper we normalise research output of editorial board members relative to the research output of other members of the same editorial board, thus controlling for any gender differences in preferences for subdisciplines. If Nielsen’s results replicate then it would suggest meritocratic hiring to editorial boards should result in no gender differences in research output. This would meant the disparity in research output we have found would only reflect bias.

Since our data is not longitudinal we cannot say that editorial boards have not previously exhibited a bias against women, but we can be reasonably confident that there is no systematic bias today. Our results should make publishers such as Elsevier, the Lancet and Nature think twice before trying to further increase the diversity on the journal boards. If there is no bias, affirmative action policies would be liable to create net anti-male bias instead of counteracting anti-female bias.

If there is already an anti-male bias in hiring to editorial boards, as our research on editorial boards and our survey works suggests, then affirmative action polices could have already caused discrimination against men. In Gary Becker's taste discrimination model of the labour market (1971), profit seeking firms should employ discriminated groups because they are accepting of lower wages. Likewise journals looking for top talent could do well in recruiting the men other editorial boards have ignored.

Bibliography

Abramo, G., D'Angelo, C. A. and Caprasecca, A. (2009) 'Gender differences in research productivity: A bibliometric analysis of the Italian academic system', *Scientometrics*, 79(3), pp. 517–539. doi: 10.1007/s11192-007-2046-8.

Addis, E. and Villa, P. (2003) 'The Editorial Boards of Italian Economics Journals: Women, Gender, and Social Networking', *Feminist Economics*, 9(1), pp. 75–91. doi: 10.1080/1354570032000057062.

Aiston, S. J. (2014) 'Leading the academy or being led? Hong Kong women academics', *Higher Education Research & Development*, 33(1), pp. 59–72. doi: 10.1080/07294360.2013.864618.

Akcigit, U., Pearce, J. and Prato, M. (2020) *Tapping into Talent: Coupling Education and Innovation Policies for Economic Growth*. w27862. Cambridge, MA: National Bureau of Economic Research, p. w27862. doi: 10.3386/w27862.

Alexander, S. (2013) 'LIZARDMAN'S CONSTANT IS 4%'. Available at: https://slatestarcodex.com/2013/04/12/noisy-poll-results-and-reptilian-muslim-climatologists-from-mars/.

Amrein, K. *et al.* (2011) 'Women Underrepresented on Editorial Boards of 60 Major Medical Journals', *Gender Medicine*, 8(6), pp. 378–387. doi: 10.1016/j.genm.2011.10.007.

Andersen, J. P. and Nielsen, M. W. (2018) ‘Google Scholar and Web of Science: Examining gender differences in citation coverage across five scientific disciplines’, *Journal of Informetrics*, 12(3), pp. 950–959. doi: 10.1016/j.joi.2018.07.010.

Asperholm, M. et al. (2019) ‘What did you do yesterday? A meta-analysis of sex differences in episodic memory.’, Psychological Bulletin, 145(8), pp. 785–821. doi: 10.1037/bul0000197.

Austin, D. E. J. and Jackson, M. (2019) ‘Benevolent and hostile sexism differentially predicted by facets of right-wing authoritarianism and social dominance orientation’, *Personality and Individual Differences*, 139, pp. 34–38. doi: 10.1016/j.paid.2018.11.002.

Balasubramanian, S. *et al.* (2020) ‘Women Representation Among Cardiology Journal Editorial Boards’, *Circulation*, 141(7), pp. 603–605. doi: 10.1161/CIRCULATIONAHA.119.042909.

Bayazit, K. (2020) ‘Kumsal Bayazit at EU Gender in Science Symposium: “ We must make progress across all dimensions of diversity.”’ Elsevier. Available at: https://www.elsevier.com/connect/kumsal-bayazit-at-eu-gender-in-science-symposium.

Baye, A. and Monseur, C. (2016) ‘Gender differences in variability and extreme scores in an international context’, *Large-scale Assessments in Education*, 4(1), p. 1. doi: 10.1186/s40536-015-0015-x.

Becker, G. S. (1971) *The economics of discrimination*. 2d ed. Chicago: University of Chicago Press (Economics research studies of the Economics Research Center of the University of Chicago).

Bruna, S. *et al.* (2017) ‘The Gatekeeper Project: Crowdsourced Examination of the Gender Composition of Anthropology Journals’, in. *116th Annual Meeting*, Washington DC: American Anthropological Association. Available at: https://www.seanbruna.com/wp-content/uploads/2017/12/AAA-Poster-2017-Final_WATERMK.pptx.pdf.

Campanario, J. M., González, L. and Rodríguez, C. (2006) ‘Structure of the impact factor of academic journals in the field of Education and Educational Psychology: Citations from editorial board members’, *Scientometrics*, 69(1), pp. 37–56. doi: 10.1007/s11192-006-0137-6.

Ceci, S. J. *et al.* (2014) ‘Women in Academic Science: A Changing Landscape’, *Psychological Science in the Public Interest*, 15(3), pp. 75–141. doi: 10.1177/1529100614541236.

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

Cho, A. H. *et al.* (2014) 'Women are underrepresented on the editorial boards of journals in environmental biology and natural resource management', *PeerJ*, 2, p. e542. doi: 10.7717/peerj.542.

Christopher, A. N. and Mull, M. S. (2006) 'Conservative Ideology and Ambivalent Sexism', *Psychology of Women Quarterly*, 30(2), pp. 223–230. doi: 10.1111/j.1471-6402.2006.00284.x.

Clark, C. and Winegard, B. (2020) 'The Myth of Pervasive Misogny'. Available at: https://quillette.com/2020/07/27/the-myth-of-pervasive-misogyny/ (Accessed: 10 May 2021).

D'Amico, R., Vermigli, P. and Canetto, S. S. (2011) 'Publication productivity and career advancement by female and male psychology faculty: The case of Italy.', *Journal of Diversity in Higher Education*, 4(3), pp. 175–184. doi: 10.1037/a0022570.

Darwin, C. (1871) *The Descent of Man, and Selection in Sex*.

De Kleijn, M. *et al.* (2020) 'The Researcher Journey Through a Gender Lens: An Examination of Research Participation, Career Progression and Perceptions Across the Globe'. Elsevier. Available at: www.elsevier.com/gender-report.

Dion, M. L., Sumner, J. L. and Mitchell, S. M. (2018) 'Gendered Citation Patterns across Political Science and Social Science Methodology Fields', *Political Analysis*, 26(3), pp. 312–327. doi: 10.1017/pan.2018.12.

Dunkin, M. J. (1991) 'Determinants of Academic Career Advancement at an Australian University', *Higher Education Research & Development*, 10(2), pp. 115–131. doi: 10.1080/0729436910100201.

Elsevier (2021a) 'Elsevier's journals' now displaying editors' gender in support of diversity'. Elsevier. Available at: https://www.elsevier.com/about/press-releases/corporate/elseviers-journals-now-displaying-editors-gender-in-support-of-diversity.

Elsevier (2021b) 'Inclusion & Diversity Advisory Board'. Elsevier. Available at: https://www.elsevier.com/about/inclusion-diversity-board.

Evans, J., Hsieh, P. P.-H. and Robinson, D. H. (2005) 'Women's Involvement in Educational Psychology Journals from 1976 to 2004', *Educational Psychology Review*, 17(3), pp. 263–271. doi: 10.1007/s10648-005-5619-1.

Fraga, F. *et al.* (2011) 'Political Science in the 21st Century: Report of the Task Force on Political Science in the 21st Century'. American Political Science Association.

Ferriman, K., Lubinski, D. and Benbow, C. P. (2009) 'Work preferences, life values, and personal views of top math/science graduate students and the profoundly gifted: Developmental changes and gender differences during emerging adulthood and parenthood.', *Journal of Personality and Social Psychology*, 97(3), pp. 517–532. doi: 10.1037/a0016030.

Gersick, C. J. G., Dutton, J. E. and Bartunek, J. M. (2000) 'Learning From Academia: The Importance Of Relationships In Professional Life', *Academy of Management Journal*, 43(6), pp. 1026–1044. doi: 10.5465/1556333.

Gibbons, J. D. and Fish, M. (1991) 'Rankings of Economics Faculties and Representation on Editorial Boards of Top Journals', *The Journal of Economic Education*, 22(4), p. 361. doi: 10.2307/1183356.

Ginther, D. K. and Hayes, K. J. (1999) 'Gender Differences in Salary and Promotion in the Humanities', *American Economic Review*, 89(2), pp. 397–402. doi: 10.1257/aer.89.2.397.

Ginther, D. K. and Hayes, K. J. (2003) 'Gender Differences in Salary and Promotion for Faculty in the Humanities 1977-95', *The Journal of Human Resources*, 38(1), p. 34. doi: 10.2307/1558755.

Ginther, D. K. and Kahn, S. (2004) 'Women in Economics: Moving Up or Falling Off the Academic Career Ladder?', *Journal of Economic Perspectives*, 18(3), pp. 193–214. doi: 10.1257/0895330042162386.

Hafeez, D. M. *et al.* (2019) 'Gender distribution in psychiatry journals' editorial boards worldwide', *Comprehensive Psychiatry*, 94, p. 152119. doi: 10.1016/j.comppsych.2019.152119.

Higher Education Statistics Agency (2021) 'Academic staff by academic cost centre, sex and academic year'. Available at: https://www.hesa.ac.uk/data-and-analysis/staff/chart-6 (Accessed: 30 April 2021).

Hlavac, Marek (2018). stargazer: Well-Formatted Regression and Summary Statistics Tables. R package version 5.2.2. https://CRAN.R-project.org/package=stargazer

Hodson, G., MacInnis, C. C. and Busseri, M. A. (2017) 'Bowing and kicking: Rediscovering the fundamental link between generalized authoritarianism and generalized prejudice', *Personality and Individual Differences*, 104, pp. 243–251. doi: 10.1016/j.paid.2016.08.018.

Huang, J. *et al.* (2020) 'Historical comparison of gender inequality in scientific careers across countries and disciplines', *Proceedings of the National Academy of Sciences*, 117(9), pp. 4609–4616. doi: 10.1073/pnas.1914221117.

Ioannidou, E. and Rosiana, A. (2015) 'Under-Representation of Women on Dental Journal Editorial Boards', *PLOS ONE*, 10(1). doi: https://doi.org/10.1371/journal.pone.0116630.

Kahn, S. and Ginther, D. (2017) *Women and STEM*. w23525. Cambridge, MA: National Bureau of Economic Research, p. w23525. doi: 10.3386/w23525.

Kuran, T. (1997) *Private truths, public lies: the social consequences of preference falsification*. 1st Harvard University Press pbk. ed. Cambridge, Mass: Harvard University Press.

Langbert, M. (2018) 'Homogenous: The Political Affiliations of Elite Liberal Arts College Faculty', *Academic Questions*, 31, pp. 186–197. doi: https://doi.org/10.1007/s12129-018-9700-x.

Lincoln, A. E. *et al.* (2012) 'The Matilda Effect in science: Awards and prizes in the US, 1990s and 2000s', *Social Studies of Science*, 42(2), pp. 307–320. doi: 10.1177/0306312711435830.

Lindsey, D. (1976) 'Distinction, achievement, and editorial board membership.', *American Psychologist*, 31(11), pp. 799–804. doi: 10.1037/0003-066X.31.11.799.

Lord, T. R. (1987) 'A look at spatial abilities in undergraduate women science majors', *Journal of Research in Science Teaching*, 24(8), pp. 757–767. doi: 10.1002/tea.3660240808.

Lundine, J. *et al.* (2018) 'The gendered system of academic publishing', *The Lancet*, 391(10132), pp. 1754–1756. doi: 10.1016/S0140-6736(18)30950-4.

Luoto, S. (2020) 'Sex differences in people and things orientation are reflected in sex differences in academic publishing', *Journal of Informetrics*, 14(2), p. 101021. doi: 10.1016/j.joi.2020.101021.

Lynn, R. (1994) 'Sex differences in intelligence and brain size: A paradox resolved', *Personality and Individual Differences*, 17(2), pp. 257–271. doi: 10.1016/0191-8869(94)90030-2.

Lynn, R. (2021) 'Sex Differences in Verbal Abilities in the Wechsler Tests: A Review', *Mankind Quarterly*, 61(3), pp. 688–706. doi: 10.46469/mq.2021.61.3.18.

Lynn, R. (2017) 'Sex Differences in Intelligence: The Developmental Theory', *Mankind Quarterly*, 58(1), pp. 9–42. doi: 10.46469/mq.2017.58.1.2.

Lynn, R. and Irwing, P. (2004) ‘Sex differences on the progressive matrices: A meta-analysis’, *Intelligence*, 32(5), pp. 481–498. doi: 10.1016/j.intell.2004.06.008.

Madison, G. and Fahlman, P. (2020) ‘Sex differences in the number of scientific publications and citations when attaining the rank of professor in Sweden’, *Studies in Higher Education*, pp. 1–22. doi: 10.1080/03075079.2020.1723533.

Maliniak, D., Powers, R. and Walter, B. F. (2013) ‘The Gender Citation Gap in International Relations’, *International Organization*, 67(4), pp. 889–922. doi: 10.1017/S0020818313000209.

Martinez, E. D. *et al.* (2007) ‘Falling off the academic bandwagon: Women are more likely to quit at the postdoc to principal investigator transition’, *EMBO reports*, 8(11), pp. 977–981. doi: 10.1038/sj.embor.7401110.

Mauleón, E. *et al.* (2013) ‘Assessing gender balance among journal authors and editorial board members’, *Scientometrics*, 95(1), pp. 87–114. doi: 10.1007/s11192-012-0824-4.

Mazov, N. A. and Gureev, V. N. (2016) ‘The editorial boards of scientific journals as a subject of scientometric research: A literature Review’, *Scientific and Technical Information Processing*, 43(3), pp. 144–153. doi: 10.3103/S0147688216030035.

Metz, I. and Harzing, A. (2012) ‘An update of gender diversity in editorial boards: a longitudinal study of management journals’, *Personnel Review*, 41(3), pp. 283–300. doi: 10.1108/00483481211212940.

Metz, I. and Harzing, A.-W. (2009) ‘Gender Diversity in Editorial Boards of Management Journals’, *Academy of Management Learning & Education*, 8(4), pp. 540–557. doi: 10.5465/amle.8.4.zqr540.

Miller, D. I. and Wai, J. (2015) ‘The bachelors to Ph.D. STEM pipeline no longer leaks more women than men: a 30-year analysis’, *Frontiers in Psychology*, 6. doi: 10.3389/fpsyg.2015.00037.

Morton, M. J. and Sonnad, S. S. (2007) ‘Women on professional society and journal editorial boards’, *Journal of the National Medical Association*, 99(7), pp. 764–771.

Mumford, K. A. (2016) ‘On Gender, Research Discipline and being an Economics Journal Editor in the UK.’, *Royal Economics Society Newsletter*, pp. 15–19.

Murray, C. A. (2003) *Human accomplishment: the pursuit of excellence in the arts and sciences, 800 BC to 1950*. 1. ed. New York, NY: HarperCollins.

Nature (2017) ‘Gender imbalance in science journals is still pervasive’, *Nature*, 541(7638), pp. 435–436. doi: 10.1038/541435b.

Nielsen, M. W. (2016) ‘Gender inequality and research performance: moving beyond individual-meritocratic explanations of academic advancement’, *Studies in Higher Education*, 41(11), pp. 2044–2060. doi: 10.1080/03075079.2015.1007945.

Nyborg, H. (2005) ‘Sex-related differences in general intelligence g, brain size, and social status’, *Personality and Individual Differences*, 39(3), pp. 497–509. doi: 10.1016/j.paid.2004.12.011.

O’Dea, R. E. *et al.* (2018) ‘Gender differences in individual variation in academic grades fail to fit expected patterns for STEM’, *Nature Communications*, 9(1), p. 3777. doi: 10.1038/s41467-018-06292-0.

Over, R. (1981) ‘Representation of women on the editorial boards of psychology journals.’, *American Psychologist*, 36(8), pp. 885–891. doi: 10.1037/0003-066X.36.8.885.

Palmer, B., van Assendelft, L. and Stegmaier, M. (2020) ‘Revisiting the Presence of Women in Political Science Journal Editorial Positions’, *PS: Political Science & Politics*, 53(3), pp. 499–504. doi: 10.1017/S1049096520000190.

Palser, E. R., Lazerwitz, M. and Fotopoulou, A. (2021) *Gender and geographical disparity in editorial boards of journals in psychology and neuroscience*. preprint. Scientific Communication and Education. doi: 10.1101/2021.02.15.431321.

Public Policy Polling (2013) ‘Democrats and Republicans differ on conspiracy theory beliefs’. Public Policy Polling. Available at: https://www.publicpolicypolling.com/wp-content/uploads/2017/09/PPP_Release_National_ConspiracyTheories_040213.pdf.

Reilly, D. and Neumann, D. L. (2013) ‘Gender-Role Differences in Spatial Ability: A Meta-Analytic Review’, *Sex Roles*, 68(9–10), pp. 521–535. doi: 10.1007/s11199-013-0269-0.

Research Papers in Economics Author Service (2021) ‘Female representation in Economics, as of March 2021’. Federal Reserve Bank of St. Louis. Available at: https://ideas.repec.org/top/female.html.

Robinson, D. H. *et al.* (1998) ‘Are Women Underrepresented as Authors and Editors of Educational Psychology Journals?’, *Contemporary Educational Psychology*, 23(3), pp. 331–343. doi: 10.1006/ceps.1997.0967.

Rørstad, K. and Aksnes, D. W. (2015) ‘Publication rate expressed by age, gender and academic position – A large-scale analysis of Norwegian academic staff’, *Journal of Informetrics*, 9(2), pp. 317–333. doi: 10.1016/j.joi.2015.02.003.

Santos, G. and Dang Van Phu, S. (2019) ‘Gender and Academic Rank in the UK’, *Sustainability*, 11(11), p. 3171. doi: 10.3390/su11113171.

Schucan Bird, K. (2011) ‘Do women publish fewer journal articles than men? Sex differences in publication productivity in the social sciences’, *British Journal of Sociology of Education*, 32(6), pp. 921–937. doi: 10.1080/01425692.2011.596387.

Strumia, A. (2021) ‘Gender issues in fundamental physics: A bibliometric analysis’, *Quantitative Science Studies*, 2(1), pp. 225–253. doi: 10.1162/qss_a_00114.

Tran, U. S., Hofer, A. A. and Voracek, M. (2014) ‘Sex Differences in General Knowledge: Meta-Analysis and New Data on the Contribution of School-Related Moderators among High-School Students’, *PLoS ONE*. Edited by K. Laws, 9(10), p. e110391. doi: 10.1371/journal.pone.0110391.

Trivers, R. (2011) *Deceit and self-deception: fooling yourself the better to fool others*. London: Allen Lane.

Venables, W. N. and Ripley, B. D. (2010) *Modern Applied Statistics with S*. 4. ed., [Nachdr.]. New York: Springer (Statistics and computing).

Wiley (2021) ‘Editorial Office Guidelines’. Available at: https://authorservices.wiley.com/editors/editorial-office-guidelines/editorial-board.html.

Winegard, B., Clark, C. and Hasty, C. R. (2018) ‘Equalitarianism: A Source of Liberal Bias’, *SSRN Electronic Journal*. doi: 10.2139/ssrn.3175680.

Appendix

Table 11

Dependent Variable: Transformed H Index

	Anthropology		Psychology		Political Science		Economics		All Subjects			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Gender (Female = 1)	-0.36***	-0.10*	-0.34***	-0.15***	-0.49***	-0.20**	-0.30***	-0.11*	-0.37***	-0.14***	-0.34***	-0.15***
	(0.06)	(0.05)	(0.05)	(0.04)	(0.06)	(0.05)	(0.07)	(0.07)	(0.03)	(0.02)	(0.05)	(0.04)
Years Publishing		0.06***		0.06***		0.05***		0.07***		0.06***		0.06***
		(0.002)		(0.002)		(0.002)		(0.002)		(0.001)		(0.001)
Anthropology									-0.42***	-0.53***	-0.41***	-0.55***
									(0.04)	(0.03)	(0.05)	(0.04)
Economics									-0.55***	-0.33***	-0.55***	-0.34**
									(0.04)	(0.03)	(0.05)	(0.04)
Political Science									-0.42***	-0.56***	-0.36***	-0.56***
									(0.04)	(0.03)	(0.05)	(0.04)
GenderX Anthropology											-0.03	0.06
											(0.08)	(0.06)
GenderX Economics											0.04	0.06
											(0.08)	(0.06)
GenderX Political Science											-0.16	0.001
											(0.08)	(0.06)
Constant	0.01	-1.57***	0.42***	-1.07***	0.06	-1.39***	-0.13***	-1.64***	0.43***	-1.07***	0.42***	-1.07***
	(0.04)	(0.06)	(0.03)	(0.05)	(0.04)	(0.07)	(0.04)	(0.06)	(0.03)	(0.03)	(0.03)	(0.03)
Observations	961	961	1,707	1,707	884	884	970	970	4,522	4,522	4,522	4,522
R^2	0.03	0.47	0.03	0.47	0.07	0.40	0.02	0.50	0.08	0.49	0.08	0.49
F Statistic	33***	426***	48***	754.85***	68.5***	296***	19***	476***	100***	858***	58***	536***

*p<0.05; **p<0.01; ***p<0.001

In table 11 we rerun our regression analyses but with the inclusion of individuals that Google Scholar has misattributed 5 or more papers to. We do this to see whether our exclusion of these individuals may have biased our results. The results are almost indistinguishable from the regression results in table 6. Some of the coefficients on gender are slightly different - within 0.03 of the coefficients in table 6. This means our exclusion of ‘overattributed individuals’ has only changed our estimates of the gender gap in research productivity by a maximum of 0.03 standard deviations. This suggests that our exclusion of overattributed individuals has not biased our results.

In tables 12-14 we use alternative dependent variables for research output instead of our transformed H index. The variables employed are the raw H index and transformed citation and publication counts. When we use the raw H index we still find statistically significant gender differences in research output. In regression 12 we find significant ($p < 0.05$) interaction terms between Anthropology and Political Science with gender. This indicates that the gender differences in raw H indexes may differ across subjects. Nonetheless this does not imply a real difference in gender bias or ability across subjects. Raw H indexes may not be comparable across subjects if it is easier to attain publications and citations in some subjects than in others. Such differences would mean that for journal editors having the same relative bias towards women across subjects, the gender gap in raw H indexes should be different across subjects.

Table 12

Dependent Variable: Raw H Index

	Anthropology		Psychology		Political Science		Economics		All Subjects			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Gender (Female = 1)	-7.52***	-3.18***	-9.03***	-4.43***	-8.83***	-3.94**	-6.26***	-3.06*	-8.13***	-3.50***	-9.03***	-5.28***
	(1.22)	(0.95)	(1.38)	(1.06)	(1.12)	(0.94)	(1.58)	(1.28)	(0.71)	(0.57)	(1.14)	(0.90)
Years Publishing		1.03***		1.57***		0.90***		1.34***		1.28***		1.28***
		(0.04)		(0.05)		(0.04)		(0.06)		(0.02)		(0.03)
Anthropology									-10.12***	-12.52***	-10.79***	-13.93***
									(0.93)	(0.74)	(1.27)	(1.00)
Economics									-12.79***	-8.35***	-13.69***	-9.15***
									(0.93)	(0.74)	(1.13)	(0.90)
Political Science									-11.81***	-14.92***	-11.89***	-16.31***
									(0.96)	(0.76)	(1.25)	(0.99)
GenderX Anthropology											1.51	3.16*
											(1.87)	(1.47)
GenderX Economics											2.77	2.08
											(1.99)	(1.57)
GenderX Political Science											0.20	3.40*
											(1.96)	(1.55)
Constant	31.27***	2.56*	42.06***	2.08	30.17***	4.14**	28.37***	-0.96	41.69***	8.79***	42.06***	9.45***
	(0.86)	(1.30)	(0.88)	(1.35)	(0.71)	(1.40)	(0.84)	(1.47)	(0.63)	(0.81)	(0.72)	(0.85)
Observations	941	941	1,650	1,650	843	843	950	950	4,384	4,384	4,384	4,384
R^2	0.04	0.43	0.03	0.43	0.07	0.38	0.02	0.36	0.08	0.43	0.08	0.43
F Statistic	38***	361***	43***	621***	62***	257***	16***	266***	99***	654***	57***	410***

*p<0.05; **p<0.01; ***p<0.001

In tables 13 and 14 we use the transformed publication count and citation count. There are no significant subject gender interactions and the coefficient sizes are similar to our original regression results in table 6. It should be noted that in regression 8 of the publication models gender is not statistically significant. This model is only for economics board members and controls for years publishing. We have no a priori reason to suppose that gender would not be significant in this particular model specification but should be when other variables or subjects are used. Given this is the only statistically insignificant gender coefficient in any of our models we suggest it is likely to be a false negative.

Table 13

Dependent Variable: Transformed Publication Count

	Anthropology		Psychology		Political Science		Economics		All Subjects			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Gender (Female = 1)	-0.35***	-0.12**	-0.32***	-0.15***	-0.45***	-0.15**	-0.26***	-0.07	-0.34***	-0.12***	-0.32***	-0.14***
	(0.06)	(0.04)	(0.05)	(0.04)	(0.06)	(0.05)	(0.08)	(0.05)	(0.03)	(0.02)	(0.05)	(0.04)
Years Publishing		0.06***		0.06***		0.06***		0.08***		0.06***		0.06***
		(0.002)		(0.002)		(0.002)		(0.002)		(0.001)		(0.001)
Anthropology									-0.14***	-0.26***	-0.13*	-0.28***
									(0.04)	(0.03)	(0.05)	(0.04)
Economics									-0.41***	-0.20***	-0.43***	-0.22***
									(0.04)	(0.03)	(0.05)	(0.04)
Political Science									-0.04	-0.18***	0.02	-0.19***
									(0.04)	(0.03)	(0.05)	(0.04)
GenderX Anthropology											-0.03	0.04
											(0.08)	(0.06)
GenderX Economics											0.06	0.03
											(0.09)	(0.06)
GenderX Political Science											-0.13	0.02
											(0.08)	(0.06)
Constant	0.13***	-1.43***	0.25***	-1.22***	0.27***	-1.35***	-0.17***	-1.86***	0.26***	-1.29***	0.25***	-1.28***
	(0.04)	(0.06)	(0.03)	(0.05)	(0.04)	(0.07)	(0.04)	(0.06)	(0.03)	(0.03)	(0.03)	(0.03)
Observations	941	941	1,650	1,650	843	843	950	950	4,384	4,384	4,384	4,384
R^2	0.03	0.50	0.02	0.44	0.06	0.47	0.01	0.51	0.05	0.48	0.05	0.48
F Statistic	33***	471***	41***	648***	55***	367***	12***	502***	56***	805***	33***	503***

*p<0.05; **p<0.01; ***p<0.001

Table 14

Dependent Variable: Transformed Citation Count

	Anthropology		Psychology		Political Science		Economics		All Subjects			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Gender (Female = 1)	-0.37***	-0.13*	-0.26***	-0.10**	-0.41***	-0.13*	-0.26***	-0.11*	-0.31***	-0.11***	-0.26***	-0.10*
	(0.07)	(0.05)	(0.05)	(0.04)	(0.06)	(0.06)	(0.07)	(0.05)	(0.03)	(0.02)	(0.05)	(0.04)
Years Publishing		0.06***		0.06***		0.05***		0.06***		0.06***		0.06***
		(0.002)		(0.002)		(0.003)		(0.003)		(0.001)		(0.001)
Anthropology									-0.46***	-0.57***	-0.41***	-0.55***
									(0.04)	(0.03)	(0.05)	(0.04)
Economics									-0.41***	-0.22***	-0.41***	-0.21***
									(0.04)	(0.03)	(0.05)	(0.04)
Political Science									-0.42***	-0.56***	-0.36***	-0.55***
									(0.04)	(0.03)	(0.05)	(0.04)
GenderX Anthropology											-0.10	-0.03
											(0.08)	(0.06)
GenderX Economics											0.0004	-0.03
											(0.08)	(0.06)
GenderX Political Science											-0.14	-0.004
											(0.08)	(0.06)
Constant	-0.04	-1.61***	0.37***	-1.04***	0.01	-1.47***	-0.04	-1.45***	0.39***	-1.06***	0.37***	-1.07***
	(0.05)	(0.07)	(0.03)	(0.05)	(0.04)	(0.08)	(0.04)	(0.06)	(0.03)	(0.03)	(0.03)	(0.04)
Observations	941	941	1,650	1,650	843	843	950	950	4,384	4,384	4,384	4,384
R^2	0.03	0.43	0.02	0.45	0.04	0.35	0.01	0.42	0.07	0.45	0.07	0.45
F Statistic	30***	351***	31***	682***	39***	229***	14***	342***	79***	702***	46***	439***

*p<0.05; **p<0.01; ***p<0.001