

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Differences in research funding for women scientists: a systematic comparison of UK investments in global infectious disease research 1997–2010
AUTHORS	Head, Michael; Fitchett, Joseph; Cooke, Mary; Wurie, Fatima; Atun, Rifat

VERSION 1 - REVIEW

REVIEWER	Erin L. Thomas, PhD Gender Diversity Specialist Argonne National Laboratory USA I declare no conflict of interest.
REVIEW RETURNED	05-Jul-2013

THE STUDY	<p>Although I applaud this research endeavor, I'm concerned by the lack of clear hypotheses. In general, this article felt like very exploratory and was void of explication of theoretical explanations for the findings.</p> <p>I understand that there were methodological impossibilities (e.g., controlling for PI rank) but I would've liked to have seen more details about each funding source's funding decisions. Ideally, this process factor what have been coded and controlled for.</p> <p>Moreover, I contend that the lack of data on men's vs. women's number of funding requests limits our ability to draw meaningful conclusions from these data.</p> <p>Finally, the manuscript would benefit from a more intensive proofreading.</p>
RESULTS & CONCLUSIONS	<p>Again, these analyses were not very directive, which resulted in a myriad of data figures and tables.</p> <p>This paper would be more impactful if the researchers honed in on specific hypotheses or explained some of the nuanced data (e.g., the European Commission's higher mean grants to women or the year-to-year funding fluctuations in funding to each gender) and highlighted these in their outputs.</p> <p>I very much hope the authors will consider making these revisions, as these data provide a rigorous examination of gender bias in science funding. I believe such revisions will be essential in mitigating alternative hypotheses and rationalizations for the findings.</p>

REVIEWER	Anne E. Lincoln Southern Methodist University Dallas, Texas USA
REVIEW RETURNED	05-Jul-2013

GENERAL COMMENTS	<p>This paper compares gender differences in the funding received for infectious disease research by PIs at institutions in the UK between 1997 and 2010. The authors note some limitations, but fail to note others, including that there is no knowledge of what amount of funding that researchers applied for. With that knowledge, it would be possible to pinpoint whether women are asking for less funding or whether review panels offer less funding to women than men. Surprisingly, the authors argue that they had no data on the academic ranking of PIs. How difficult would that be to collect? It seems to be a crucial variable and with the internet - or a telephone call - rather easily collected.</p> <p>The authors also have no information on the population of researchers to apply for funding nor the actual pool of applicants. Consequently, all we learn from this study is that men receive more funding than women. We don't know if men are more likely to apply for funding than women, if more men actually applied for more funding than women, or whether men were more likely to receive funding than women.</p> <p>p. 7: A parallel analysis of unfunded studies would be interesting!</p> <p>p. 8: Why were non-infectious studies excluded? Only 1.9% of screened studies were suitable for analysis?! That is vanishingly small. Relatedly, why were some funding sources, like the Gates Foundation and DFID, excluded? Because they are privately-funded? Or was Gates only excluded due to no gender (from the conclusion)? The methodology section is woefully underdeveloped.</p> <p>p. 10: How important is it that women receive more funding than men for research on diphtheria, but not candida? It seems only at issue if there is more funding available for one specialty over another.</p>
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VERSION 1 – AUTHOR RESPONSE

Reviewer one – Erin Thomas

Reviewer comment	Author response
Although I applaud this research endeavor, I'm concerned by the lack of clear hypotheses. In general, this article felt like very exploratory and was void of explication of theoretical explanations for the findings.	We have revised the text to make it clear that we present the differences between gender.
I understand that there were methodological impossibilities (e.g., controlling for PI rank) but I would've liked to have seen more details about	Indeed we do not have this data, and we highlight this as a 'next-step' in the discussion for future papers.

<p>each funding source's funding decisions. Ideally, this process factor what have been coded and controlled for.</p>	
<p>Moreover, I contend that the lack of data on men's vs. women's number of funding requests limits our ability to draw meaningful conclusions from these data.</p>	<p>We agree that this limitation means we cannot infer bias (or not) on the part of the funders. However, we have drawn meaningful conclusions based on what data we do have.</p>
<p>Finally, the manuscript would benefit from a more intensive proofreading.</p>	<p>This has been done and several corrections made.</p>
<p>Again, these analyses were not very directive, which resulted in a myriad of data figures and tables.</p>	<p>We have provided a large amount of data, and it should be noted that much of it is for a web-appendix/supplementary material. We think readers will like to view results of their own research area (both in terms of type of science plus specific pathogen/disease area) and be interested in the depth of data. The results section in the paper summarises this depth.</p> <p>However, we welcome input from BMJ Open editors for content and formatting of the results section.</p>
<p>This paper would be more impactful if the researchers honed in on specific hypotheses or explained some of the nuanced data (e.g., the European Commission's higher mean grants to women or the year-to-year funding fluctuations in funding to each gender) and highlighted these in their outputs.</p>	<p>We have clarified the hypothesis and made changes to ensure the results reflect the tone of the paper.</p>
<p>I very much hope the authors will consider making these revisions, as these data provide a rigorous examination of gender bias in science funding. I believe such revisions will be essential in mitigating alternative hypotheses and rationalizations for the findings.</p>	<p>We do not provide an examination of gender bias and have clarified this in several places in the text.</p>

Reviewer 2 – Anne Lincoln

Reviewer comment	Author response
The authors note some limitations, but fail to note others, including that there is no knowledge of what amount of funding that researchers applied for. With that knowledge, it would be possible to pinpoint whether women are asking for less funding or whether review panels offer less funding to women than men	This has been added to the limitations section.
Surprisingly, the authors argue that they had no data on the academic ranking of PIs. How difficult would that be to collect? It seems to be a crucial variable and with the internet - or a telephone call - rather easily collected.	The author's agree that academic ranking of PIs could be an interesting and useful addition to the analysis. With no funded staff available it is not feasible to collect these data as they warrant a substantial commitment of both time and resources to individually contact or research the 5000 PI's, who many have moved in the intervening years and been promoted or changed post since the funding was awarded.
The authors also have no information on the population of researchers to apply for funding nor the actual pool of applicants. Consequently, all we learn from this study is that men receive more funding than women.	We quantify the extent of the disparities, across dozens of topic areas within the dataset. We quantify differences in study numbers. We also quantify the difference in median (and mean) awards between gender, which is of particular significance given the noted limitations of our data. We reinforce these findings with statistical rigour. Thus we are content that we present some meaningful and impactful results in this paper.
We don't know if men are more likely to apply for funding than women, if more men actually applied for more funding than women, or whether men were more likely to receive funding than women.	We agree that we do not know this, and this is acknowledged in the limitations. We also highlight this as a 'next-step' in the discussion.
p. 7: A parallel analysis of unfunded studies would be interesting!	Whilst it would indeed be interesting, we are unsure about the existence of any comparable dataset of unfunded infectious disease research studies that were carried out in UK institutions.
p. 8: Why were non-infectious studies excluded? Only 1.9% of screened studies were suitable for	We have made explicit the reasons for only including infectious disease studies (i.e. this data came from an existing analysis we have done

analysis?! That is vanishingly small.	where our focus was on ID research).
Relatedly, why were some funding sources, like the Gates Foundation and DFID, excluded? Because they are privately-funded? Or was Gates only excluded due to no gender (from the conclusion)?	In the same paragraph where this exclusion is mentioned, we also state that Gates and DFID funded studies were excluded as they 'did not specify the PIs name or gender'. The sentence has been revised to make this point clearer.
The methodology section is woefully underdeveloped.	We have re-worked the methodology section.
p. 10: How important is it that women receive more funding than men for research on diphtheria, but not candida? It seems only at issue if there is more funding available for one speciality over another.	As stated in response to reviewer 1, we have provided a large amount of data, and it should be noted that much of it is for a web-appendix/supplementary material. We think readers will like to investigate their own area of research (both in terms of type of science plus specific pathogen/disease area) and be interested in the depth of data. The results section in the paper summarises this depth. However, we welcome input from BMJ Open editors for content and formatting of the results section.

VERSION 2 – REVIEW

REVIEWER	Erin L. Thomas, PhD Gender Diversity Specialist Argonne National Laboratory USA
REVIEW RETURNED	29-Sep-2013

THE STUDY	The limitations described significantly impede the authors' ability to draw meaningful conclusions from the data. Without controlling for PI rank and - more importantly - without data on intergender submission rates, the mechanism at play here is entirely unclear. As such, it is unclear if the phenomenon demonstrated is truly a disparity. A disparity may only be identified if all reasonable contributing factors are controlled for. Moreover, it becomes impossible to recommend interventions to address this phenomenon, given that it is unclear if bias is at play and, if so, how it is being enacted. I would recommend that the authors' follow up with one of their proposed avenues for future research. Packaged together, these two studies could be quite strong.
RESULTS & CONCLUSIONS	It is unclear if the phenomenon demonstrated is truly a disparity. A disparity may only be identified if all reasonable contributing factors are controlled for.
GENERAL COMMENTS	This is a wonderful content analysis but I remain reserved about its

	publication. There are too many limitations to drawing meaningful conclusions from this research and I strongly encourage the researchers to conduct a follow-up study to conclude more convincingly that a disparity still remains after controlling for additional influential factors and/or to identify an underlying mechanism at play.
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VERSION 2 – AUTHOR RESPONSE

Reviewer comments

1. The limitations described significantly impede the authors' ability to draw meaningful conclusions from the data. Without controlling for PI rank and - more importantly - without data on intergender submission rates, the mechanism at play here is entirely unclear.

Response – we have updated discussion, page 17, to include this point. The existing discussion also referred to potential future work including controlling for PI rank.

2. As such, it is unclear if the phenomenon demonstrated is truly a disparity. A disparity may only be identified if all reasonable contributing factors are controlled for. Moreover, it becomes impossible to recommend interventions to address this phenomenon, given that it is unclear if bias is at play and, if so, how it is being enacted.

Response – Again, the alteration of 'disparity' to 'difference' should hopefully address this, along with the revised discussion.

3. I would recommend that the authors' follow up with one of their proposed avenues for future research. Packaged together, these two studies could be quite strong.

Response – conclusions have been revised to reflect this point

4. This is a wonderful content analysis but I remain reserved about its publication. There are too many limitations to drawing meaningful conclusions from this research and I strongly encourage the researchers to conduct a follow-up study to conclude more convincingly that a disparity still remains after controlling for additional influential factors and/or to identify an underlying mechanism at play.

Response – the revised conclusion hopefully addresses the potential for more meaningful conclusions from the suggested follow-up research. However, we remain satisfied that this study, as it stands, provides an excellent quantification of the differences in gender across the large area of infectious disease research in the UK, and thus merits publication.