Data Descriptor
Gender Distribution of Scientific Prizes Is Associated with Naming of Awards after Men, Women or Neutral

Katja Gehmlich 1,2,* and Stefan Krause 3,4,5,*

1 Institute of Cardiovascular Science, University of Birmingham, Birmingham B15 2TT, UK
2 Division of Cardiovascular Medicine, Radcliffe Department of Medicine and British Heart Foundation Centre of Research Excellence Oxford, University of Oxford, Oxford OX3 9DU, UK
3 School of Geography, Earth and Environmental Sciences, University of Birmingham, Birmingham B15 2TT, UK
4 Institute of Global Innovation, Birmingham B15 2TT, UK
5 Ecologie des Hydrosystèmes Naturels et Anthropisés (LEHNA), Université Claude Bernard Lyon 1, 69622 Villeurbanne, France
* Correspondence: k.gehmlich@bham.ac.uk (K.G.); s.krause@bham.ac.uk (S.K.)

Abstract: Woman scientists have for long been under-represented as recipients of academic prizes. The reasons for this lack of recognition are manifold, including potential gender bias amongst award panels and nomination practices. This dataset of the gender distribution of 8747 recipients of 345 scientific medals and prizes awarded by 11 General Scientific Societies as well as subject-specific societies in the Earth and Environmental Sciences and in Cardiology between 1731 and 2021 explores the magnitude, temporal trends and potential drivers of observed gender imbalances. Our analysis revealed women were particularly underrepresented in awards named after men with awards not named after a person or named after a woman being more frequently awarded to woman scientists. Time-series analysis confirmed persisting trends that are only starting to change since the early 2000s, indicating that a lot remains to be accomplished to achieve true equity. We encourage the scientific community to extend our data and analysis, as they represent important evidence of the recognition of academic achievements towards other under-represented groups and including also nomination information.

Dataset: All primary data underlying this publication are available at https://osf.io/ynbzm/.

Dataset License: License under which the dataset is made available: CC-BY.

Keywords: academic prizes; academic awards; academic medals; gender equality

1. Summary
Not indifferent to the rest of society, academic communities are affected by an under-representation of woman scientists in senior positions and gender pay gaps [1]. Gender inequalities are pervasive across all career stages [2,3], including also the under-representation of woman scientists as recipients of academic prizes and medals. Scientific awards are not only of great importance for the personal career development [4], including for recruitment, promotion and tenure procedures, but also contribute to the self-valuation and personal well-being of academics [5]. The wide-ranging reasons for the pervasive lack of recognition of woman scientists as prize and medal winners has been debated widely, including the roles of selection biases of award panels as well as gender differences in (self-)nomination cultures [6]. For developing strategies to overcome persisting gender inequalities amongst scientific prize and award winners, it is important to understand the underlying factors contributing to such disparities. In this respect, it has been argued that the naming of scientific prizes and medals may affect (self-)attribution and thus who is nominated for them [6].
Here, we present the first comprehensive analysis of gender distributions amongst 8747 recipients of 345 scientific medals and prizes awarded by 11 scientific societies between 1731 and 2021. The established dataset indicates the gender distribution of recipients of academic awards based on whether the respective prizes and medals were named after a man or a woman or carry gender unspecific titles. In addition, the dataset comprises comparative analyses of the gender distributions specifically for early career and service awards as well as time series of the gender of awardees for some of the oldest (longest awarded) and most prestigious awards in order to indicate temporal changes and highlight potential trends in gender distribution and awarding practice.

2. Data Description

2.1. Gender of Awardees

Our analysis of the 8747 awardees of 345 scientific prizes and medals (Figure 1) revealed that we are still far from gender parity amongst the recipients of these awards. On average, only 15.4% of the recipients of the considered scientific awards and prizes were women.

![Figure 1. Gender distribution of 8747 awardees of 345 scientific awards, medals and prizes between 1731 and 2020. On the left, the absolute number of awardees per award is shown, male awardees in blue, female awardees in red, sorted by awarding bodies. On the right, percentage of male (blue) and female (red) awardees is shown for each award. For details, e.g., names of awarding bodies, see Table 1.](image-url)
Table 1. Names of medal and prize awarding societies, with numbers of society specific prizes, dates since when they are awarded, and total number of awardees for specific society.

<table>
<thead>
<tr>
<th>Awarding Society</th>
<th>Awarded Since</th>
<th>Number of Awards/Prizes Analysed</th>
<th>Number of Awarded Prizes for These Awards</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Scientific Societies:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Royal Society—RoySoc (UK)</td>
<td>1731</td>
<td>38</td>
<td>1829</td>
</tr>
<tr>
<td>American Association for the Advancement of Sciences—AAAS (US)</td>
<td>1985</td>
<td>7</td>
<td>189</td>
</tr>
<tr>
<td>National Academy of Sciences—NAS (US)</td>
<td>1886</td>
<td>33</td>
<td>914</td>
</tr>
<tr>
<td>Earth and Environmental Sciences:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>European Geoscience Union—EGU (EU)</td>
<td>1983</td>
<td>36</td>
<td>687</td>
</tr>
<tr>
<td>American Geophysical Union—AGU (US)</td>
<td>1939</td>
<td>103</td>
<td>1733</td>
</tr>
<tr>
<td>American Society of Limnology and Oceanography—ASLO (US)</td>
<td>1982</td>
<td>9</td>
<td>170</td>
</tr>
<tr>
<td>Geological Society—GeoSoc (UK)</td>
<td>1831</td>
<td>12</td>
<td>853</td>
</tr>
<tr>
<td>Geoscience Society of America—GSA (US)</td>
<td>1948</td>
<td>9</td>
<td>317</td>
</tr>
<tr>
<td>International Association of Hydrological Sciences—IAHS (International)</td>
<td>1981</td>
<td>2</td>
<td>108</td>
</tr>
<tr>
<td>Cardiology:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>International Society for Heart Research—ISHR (International)</td>
<td>1978</td>
<td>8</td>
<td>133</td>
</tr>
<tr>
<td>American Heart Association—AHA (US)</td>
<td>1937</td>
<td>88</td>
<td>1814</td>
</tr>
</tbody>
</table>

While the percentage of woman awardees ranged from 0 to 100% (Figure 1, right panel), awards with close to or 100% woman awardees represented either prizes and medals specifically designed for woman researchers or newly established awards with only one or a few awardees.

Of note, early career awards and service awards were characterised by generally higher fractions of woman awardees (Figure 2) than “standard” scientific awards. When comparing awards by societies and disciplines, General Scientific Society awards were characterised by an even lower percentage of woman awardees (8.2%), while in the Cardiology discipline, the fraction of woman awardees was, somewhat surprisingly, higher (24.6%) than for General Scientific Society and Earth and Environmental Sciences awards (16.6%). Such disciplinary differences are remarkable despite, undeniably, the fact that some of the General Scientific Society awards were amongst the longest-running scientific awards, including times when woman awardees basically did not exist (until 1903).

2.2. Gender of Award Names

Many of the current scientific awards and medals are named after men scientists or award donors. Almost two thirds (62%) of the investigated 345 scientific awards and prizes were named after men with only 8% named after women and 3% named after a woman and man together (Figure 2), which were usually related to award-donating couples (such as the Randolph W. “Bill” and Cecile T. Bromery Award of the Geological Society of America). Overall, 27% of the scientific awards and prizes were not named after a specific person (Figure 3). This picture was consistent amongst the General Scientific Societies as well as the Earth and Environmental Sciences, where more than two thirds of awards and prizes carry a men’s name and only 16% are not named after a person at all (Figure 3). Interestingly, in the field of Cardiology, whilst not featuring significantly higher proportions of awards and prizes named after women, the overall fraction of awards not named after a person was higher (46%). Closer investigation revealed that many of those awards not named after a person were often service/career or early career awards.
Figure 2. Gender distribution of recipients of scientific medals and prizes by award names and types for all 345 analysed awards, General Scientific Societies, Earth and Environmental Sciences and Cardiology awards. Height of bars indicates percentage of female awardees, while the number on each bar indicates the number of awards in this category. Blue horizontal line marks 50%. Early career and services awards are a sub-set of awards left of the dotted vertical line.
2.3. Impact of Award Names on Gender Balance of Recipients of Prizes and Medals

Only 11.8% of prizes and awards were awarded to woman scientists if the respective prizes or medals were named after a man (Figure 2). This trend is consistent across all disciplines and societies. In contrast, if awards did not bear the name of a specific individual or were named after a woman, the proportion of woman recipients was considerably higher (31.8% and 46.9%, respectively). Comparing two example research disciplines, Cardiology and Earth and Environmental Sciences, the overall higher percentage of woman awardees in Cardiology (24.6%) versus 15.1% in Earth and Environmental Sciences (Figure 2) was linked to awards not named after men (58% in versus 30%; see Figure 3), while awards with a man’s name had similar percentages of woman awardees (16.9% in Cardiology versus 15.1% in the Earth and Environmental Sciences). Whilst we can only speculate about the exact reasons for these observed patterns as nomination data are either not collected or kept confidential, the clear association between types of award names and gender balance of recipients of those awards suggests a causal relationship.

2.4. Types of Awards

Scientific prizes and medals are awarded for multiple reasons, ranging from the recognition of particular scientific achievements and research excellence (at different career stages including early and mid-career awards) to lifetime achievement as well as service awards to honour specific contributions to the discipline or wider scientific community. In addition, awards are given for the communication and wider dissemination of sciences and career support and mentorship awards. Our analyses of the types of prizes and awards received by woman researchers reveal that recent changes and improvements in the recognition of women’s scientific talent were often limited to the receipt of early career awards as well as service and mentoring awards, where the proportion of woman awardees was higher (Figure 2). Overall, woman recipients made 28.1% of the early career award

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**Figure 3.** Types and gender of scientific award names of 345 medals and prizes also with breakdown in General Scientific Societies and the fields of Earth and Environmental Sciences and Cardiology. Color indicates the type of award (names after man: blue, named neutral: yellow, named after woman: orange, named after man and woman: grey). Each dot represents 1% of the awards.
winners and even 37.9% of the service award winners, which was significantly higher than the 15.4% of the overall fraction of woman awardees. The proportion of woman early career and service award winners was even higher amongst Cardiology prizes and medals (33.2% and 67.1%) and slightly lower in the Earth and Environmental Sciences (27.7% and 27.3%) as well as in General Scientific Societies (23.6% and 40.7%) (Figure 2).

2.5. Temporal Trends—Times Are Changing, Very Slowly

The drive towards fostering and celebrating wider diversity and gender equality across society has yielded changes in how scientific communities are recognising scientific excellence and talent, too [7]. Our analysis of temporal trends and changes in the gender distribution of recipients of scientific prizes and awards has revealed that substantial improvements are still sparse and vary between different societies awarding medals, and prizes and have generally only started this century (Figure 4). This is later than one would have perhaps imagined, given that scientific communities often see themselves at the forefront of the equality, diversity, and inclusivity debate and drivers and early adopters of innovation.

Figure 4. Time series of gender of awardees of selected scientific awards, medals and prizes. Male recipients indicated in blue, female in yellow. (a) From 1731 to 2021. (b) Zoom into data from 2000 to 2021.

In fact, the first scientific prize awarded to a woman in this survey was the Davy Medal, which was awarded by the Royal Society to Pierre and Marie Curie “for their research on radium” in 1903. Hertha Ayrton was the first woman awardee of the Hughes Medal by the Royal Society “for her experimental investigations on the electric arc, and also on sand ripples” in 1906 (Figure 4). While exceptions like these became slightly more frequent from the 1920s onwards, they remained at a very low level until the end of the
century. Significant increases in the fraction of woman awardees in some of the longest lasting scientific awards shown in Figure 4 only occurred after 2010. The late onset of any substantial change here is astonishing and may indicate still persisting resistances to and obstacles for change.

3. Methods

We here analysed the gender of 8747 awardees of 345 scientific prizes and medals awarded between 1731 and 2021 by 11 scientific societies (Table 1), including three of the world’s oldest and largest General Scientific Societies, namely, Royal Society (UK), American Association for the Advancement of Sciences (US) and National Academy of Sciences (US) as well as eight discipline-specific societies in the Earth and Environmental Sciences, including the European Geoscience Union (EU), American Geophysical Union (US), American Society of Limnology and Oceanography (US), Geological Society (UK), Geoscience Society of America (US), International Association of Hydrological Sciences (International) as well as the field of Cardiology, with the International Society for Heart Research (International) and the American Heart Association (US) representing the respective disciplines of the authors.

The gender distributions of recipients of awards and medals that carry the names of men or women as personalities were compared to recipients of awards and medals that are not named after an individual to establish to what degree the naming of scientific prizes and medals may relate to a bias in the awarding of these recognitions. In the absence of data that would evidence how recipients do gender identify, gender was inferred based in names, photos of recipients and pronouns used to refer to them in the award solicitations (he/him = man, she/her = woman). Sources of information were the award recognitions available from the archives of the respective scientific society, self-conducted database searches on the awardees in publicly available resources, or simply attribution by the awardees’ names. In very few cases, where gender was ambiguous, the award was not counted.

We subsequently analysed whether gender differences in the recipient of academic awards differed by the specific natures of the awarded medals and prizes as well as whether, for instance, biases for early career and service awards differed from other recognitions.

Limitations

The authors would like to express their full support to other under-represented groups. We are acutely aware that the under-representation of women as recipients of academic medals and prizes is just one example of persisting inequality and a lack of diversity challenges across the scientific community and wider society with other groups (e.g., diverse ethnical or societal backgrounds, first-generation university degree holders) often being similarly or even more marginalised.

We are furthermore aware that the binary representation of gender used in this study does not reflect the full breadth of gender diversity in today’s society nor in our academic communities. This limitation is purely the result of the availability of data and points towards the need to collect wider diversity data amongst prize-awarding societies. The authors recognise that their methods to attribute gender to awardees are prone to error. Hence, we encourage the scientific societies involved to crosscheck and correct the enclosed database where required. The immense value of systematically obtained data of award nominations (including background information of the nominators’ gender and career stages) cannot be emphasised enough as a resource for the robust analysis of the wide-ranging reasons for gender imbalances identified here. We therefore welcome that some of the prize medal-awarding scientific societies are starting to systematically collect, archive and analyse such data required to identify reasons for nomination and award biases.

Author Contributions: Conceptualisation, S.K.; methodology, S.K.; formal analysis, S.K. and K.G.; investigation, S.K. and K.G.; data curation, S.K. and K.G.; writing—original draft preparation, S.K.; writing—review and editing, S.K. and K.G.; visualisation, S.K.; funding acquisition, S.K. and K.G. All authors have read and agreed to the published version of the manuscript.
**Funding:** This research was funded by British Heart Foundation, grant number PG/19/45/34419 to K.G., by The Medical Research Council, grant number MR/V009540/1 to K.G., by The National Centre for the 3Rs, grant number NC/T001747/1 to K.G., by The Royal Society, grant number INF\'R2\'212060 to S.K., by The Leverhulme Trust, grant numbers RPG-2021-030, RPG-2017-377 to S.K., by The Natural Environment Research Council, grant number NE/X018830/1 to S.K., by Engineering and Physical Sciences Research Council, grant numbers EP/X03626X/1, EP/X036472/1, EP/Y004027/1 to S.K., by EU Horizon Europe, grant number HORIZON-MSCA-2021-DN-01-01 PlasticUnderground to S.K. The Institute of Cardiovascular Sciences, University of Birmingham, has received an Accelerator Award by the British Heart Foundation (AA/18/2/34218). S.K. is supported by the Birmingham Institute for Global Innovation.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** All primary data underlying this publication are available at https://osf.io/ynbzm/ (accessed on 21 April 2024).

**Conflicts of Interest:** The authors declare no conflicts of interest.

**References**


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