

CONTRIBUTION

Credit Where Credit is due: Recommendations for Inclusive and Ethical Authorship Practices in Ecology

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Abstract

Although authorship is central to the career advancement of many ecologists, the processes used to assign authorship credit on papers are not always clear, ethical, or equitable. We developed the concept of authorship climate (perceptions of fairness related to procedures, communication practices, and outcomes of authorship decisions) and measured it using a survey of early-career scientists from four fields across U.S. Ph.D.-granting institutions. The results pointed to important differences in authorship climate perceptions across fields, career stages, and demographics. This paper provides an overview of the results, especially for the field of biology that encompasses ecology, and provides recommendations for improving authorship climate for ecologists.

Key words: authorship; climate; credit; power; publication.

Introduction

Authorship is central to the career advancement of many biologists, especially those in research positions (Wager 2009, Smith et al. 2020a). However, the processes used to assign authorship credit on papers can be fraught with difficulties. For example, honorary authorship, ghost authorship, disagreements about author order, and mistaken assumptions about author contributions can all result in inequitable credit, especially for co-authors from marginalized groups and those with low power (e.g., early-career researchers, scholars from less-valued disciplines; West et al. 2013; Elliott et al. 2017; Smith et al. 2020b). Therefore, it is important for scientists to develop a richer understanding of authorship experiences and identify authorship practices that support ethical and equitable decisions.

To meet these goals, our interdisciplinary NSF-funded team (including scholars from ecology, psychology, sociology, history, and philosophy) developed the concept of *authorship climate*, which measures perceptions of fairness related to procedures, communication practices, and outcomes of authorship decisions (Douglas et al. 2024). We then included questions about authorship climate on a survey of early-career scientists from four fields across U.S. Ph.D.-granting institutions. The results pointed to important differences in authorship climate perceptions across fields, career stages, and demographics (e.g., gender, race, first-generation status, birthplace).

Drawing on these findings, we provide recommendations for improving authorship climate for ecologists, focusing on reforming authorship practices for: (1) research labs and teams, (2) publishers and journal editorial boards, and (3) professional societies. Together these practices can promote scientific integrity and positive career outcomes for all ecologists.

Authorship concerns

Numerous concerns have been raised about current authorship practices. The practice of honorary or “gift” authorship, in which people are included as authors even though they do not meet the criteria for authorship, appears to be widespread, with estimates in some fields indicating that it could apply to roughly 20% to 50% of published papers (Kennedy et al. 2014; Kornhaber et al. 2015; Eisenberg et al. 2018). Ghost authorship, in which people contribute significantly to writing papers but are not included as authors, is also a problem (Moffatt and Elliott 2007, Wislar et al. 2011). This appears to be a particular concern in some research areas, such as industry-funded studies of new pharmaceuticals, where it was estimated that thousands of articles were being ghostwritten each year (Sismondo 2018).

Current authorship practices also raise concerns about how author order is decided. In a survey of more than 6,000 authors, Smith et al. (2020b) found that 46.6% reported disagreements about the ordering of authors on scientific papers. Additionally, there is evidence from some fields that women are underrepresented as first and last authors on scientific papers (West et al. 2013, Fishman et al. 2017, Pico et al. 2020) and that women may receive less credit for their contributions to multi-authored publications than men (Sarsons et al. 2021). Those with less power on teams (e.g., early-career researchers) may also struggle to make their voices heard when authorship decisions are being made (Settles et al. 2018), and some teams include everyone as authors (even when they do not meet criteria for authorship) in order to

avoid difficult conversations and decisions (Elliott et al. 2017). All of these challenges can be exacerbated on large, interdisciplinary research teams that have to navigate different norms and expectations across research fields (Hall et al. 2018).

Authorship climate

In organizational psychology, the climate of a team or an organization is defined as employee perception and experience of policies, procedures, and interactions (Ostroff et al. 2012). An inclusive climate is one where all individuals have a voice in decision making, individual differences are valued and appreciated, and where fair treatment is the norm (Nishii 2013). More inclusive climates are associated with a number of positive outcomes including higher job satisfaction, empowerment, and commitment, less team conflict, and lower levels of job turnover intentions (Braun et al., 2013; Settles et al. 2019).

In previous research, we found that the climate on science teams is associated with a number of team outcomes, including satisfaction with team authorship practices (Settles et al. 2019, Cech et al. 2021). Building on this work, we developed the concept of authorship climate, defined as “perceptions of the fairness of processes, fairness of communication, and fairness of outcomes related to authorship of scientific work” (Douglas et al. 2024). Our team then surveyed 3,512 doctoral students, postdoctoral researchers, and assistant professors in the fields of non-medical biology, economics, psychology, and physics. We elicited these early-career researchers’ perceptions of (1) *authorship procedural justice* (the fairness of processes related to authorship; for example, “Were you able to express your views and feelings about who was an author on the manuscript?”), (2) *authorship informational justice* (the fairness of communication practices related to authorship; for example, “Were people in your co-authorship thorough in their explanations about how authorship was determined?”), and (3) *authorship distributive justice* (the fairness of the outcomes of authorship decisions; for example, “Did your author position reflect the effort you put into the publication?”) on their teams (Douglas et al. 2024). Participants were asked to reflect on these three dimensions of authorship justice and indicate the degree to which they agreed with the statements provided on a Likert Scale from 1 (*Not at all*) to 5 (*Completely*). Each dimension contained multiple survey items that were averaged for each participant, where higher agreement indicated more positive perceptions of authorship climate.

We found that researchers farther along in their careers (e.g., assistant professors), lead authors on papers, and those with fewer marginalized entities (including factors like gender, race, and sexual orientation) tended to have higher perceptions of all three dimensions of authorship climate relative to those earlier in their careers (e.g., doctoral students and postdoctoral researchers), co-authors, and those with more marginalized identities (Douglas et al. 2024). We also found relationships between authorship climate perceptions and norms for assigning authorship order. When authorship order was assigned by contribution, it resulted in higher perceptions of authorship distributive justice but lower perceptions of authorship informational justice relative to when authorship order was assigned alphabetically (Douglas et al. 2024).

In non-medical biology, we observed similar results, especially when considering the experiences of authorship climate for those earlier in their career and those with marginalized identities (Parra

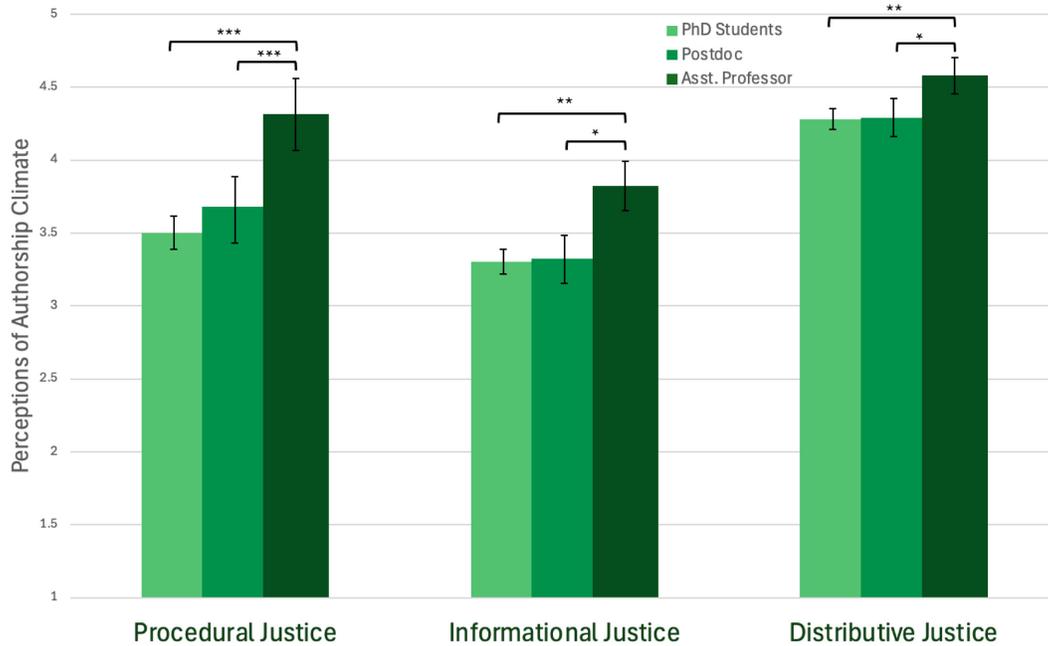


Fig. 1. Authorship Climate by Academic Seniority (Ph.D. Students, Postdocs, Assistant Professors) in Biology. Authorship climate was measured on a Likert scale whereby 1 represents negative climate and 5 represents positive climate. * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$, and error bars represent the 95% Confidence Interval.

et al. 2024). For example, across all three dimensions of authorship climate, we observed that assistant professors, relative to Ph.D. students and postdocs, reported significantly greater levels of authorship climate (See Fig. 1; Analysis of Variance Results: Procedural Justice $F(2, 686) = 22.1$, $P < 0.0001$; Informational Justice $F(2, 678) = 4.94$, $P = 0.007$; Distributive Justice $F(2, 682) = 4.11$, $P = 0.017$; see Table S1 for specific post hoc comparison results). Similarly, we found that individuals who had no marginalized identities, relative to those with at least one or two or more, reported the greatest levels of procedural, informational, and distributive justice (See Fig. 2; Analysis of Variance Results: Procedural Justice $F(2, 686) = 13.8$, $P < 0.0001$; Informational Justice $F(2, 678) = 5.04$, $P = 0.007$; Distributive Justice $F(2, 682) = 6.03$, $P = 0.002$; see Table S2 for specific post hoc comparison results). Together, these results indicate that those with less power perceive authorship practices more negatively in non-medical biology than higher-power peers, and they provide insights about how research labs and teams, journals and editorial boards, and professional societies, including the Ecological Society of America (ESA), can improve these practices.

Recommendations

Considered alongside the existing evidence indicating that authorship practices are prone to abuse and confusion that lead to inequities, our findings indicate that steps should be taken to ensure that all authors can influence authorship decisions, receive appropriate credit on publications, and understand why they received the credit they did. Research labs and teams, publishers and editorial boards, and professional societies all have roles to play in improving authorship practices (see Box 1; Douglas et al. 2024; Parra et al. 2024). These improvements can be part of a strategy to improve the overall authorship climate in ecology, which will better-support early career scholars,

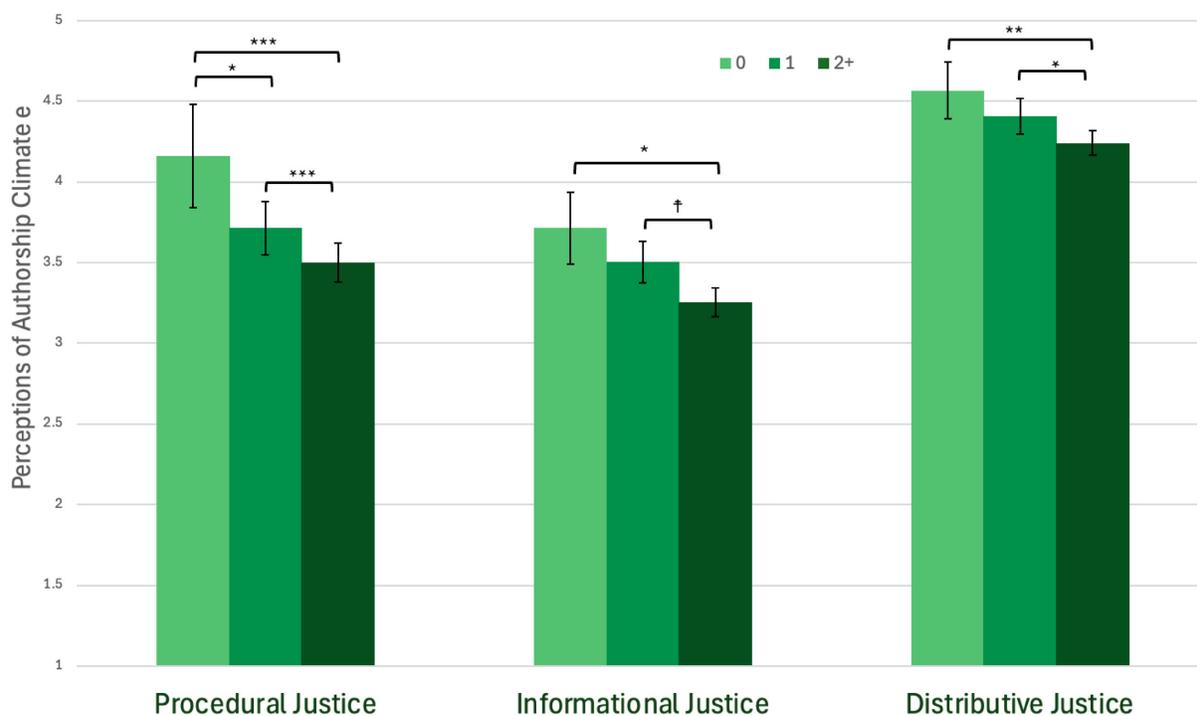


Fig. 2. Authorship Climate by Marginalized Identity in Non-Medical Biology. Marginalized identity was a composite variable composed of self-reported social identity variables (ethnicity-race, gender, sexual orientation, first-generation in college, childhood socioeconomic class, transgender, disability). For each social identity variable, individuals were assigned a 1 if they identified with the minoritized group in the category or a 0 if they identified with the majority group, and then these values were summed to create the composite marginalized identity score. Authorship climate was measured on a Likert scale whereby 1 represents negative climate and 5 represents positive climate. † $P < 0.10$, * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$, and error bars represent the 95% Confidence Interval.

especially those from marginalized groups. Research labs and teams can develop authorship policies that specify the expectations for being included as an author, the reasoning behind authorship order on team publications, and the procedures for developing papers and assigning authorship (Oliver et al. 2018, Soranno and Cheruvilil 2019). By revisiting these policies regularly, labs and teams can generate fruitful discussions and build buy-in for all team members (Elliott et al. 2017). They can also use case studies (e.g., Cheruvilil et al. 2019) to foster reflection about authorship issues and group discussions about problematic authorship practices and best practices for authorship. Finally, they can train all members on effective conflict resolution and develop and implement guidelines for communication around authorship decision-making.

Publishers and journal editorial boards can develop policies designed to promote transparency around authorship roles. Some journals in ecology, including those published by Springer and Elsevier (e.g., *Oecologia*, *Ecosystems*, *Trends in Ecology & Evolution*) already use the Contributor Role Taxonomy (CRediT) system to designate authorship roles. Also requiring and publishing a detailed authorship contribution paragraph could provide additional clarity about author contributions. This paragraph could be included in all papers submitted for peer review, and reviewers and associate editors could be trained on how to assess those paragraphs and engage in conversations about potentially unethical or inequitable authorship as part of the review process. Further, these author contribution paragraphs could

BOX 1. Recommendations to Foster Inclusive Authorship Climates in Ecology.

Research labs and teams

- Develop, implement, and revisit authorship policies.
- Foster reflection and group discussions about authorship practices.
- Develop, implement, and revisit guidelines and policies for communication and conflict resolution around authorship decision-making.
- Train and practice teamwork skills (e.g., discussion facilitation, reflection, communication, conflict resolution).

Publishers and journal editorial boards

- Develop, implement, and revise policies and practices for transparency around authorship roles.
- Require and publish authorship contribution paragraphs for all submissions.
- Train reviewers and editors on best practices for authorship.
- Hold authors accountable for ethical and equitable authorship.

Professional societies

- Help society journals develop, implement, and assess best practices related to authorship and hold them accountable.
- Host workshops on ethical and equitable authorship at society meetings.
- Create a society role to support equitable and ethical authorship practices.
- Highlight information about responsible authorship on society websites.

then be included by authors in their CVs to document their contribution on papers (McNutt et al. 2018). Finally, journals could implement an independent assessment of authorship practices. For example, all authors listed on a submission could receive a survey asking them to report on their authorship climate experiences for that paper, with the results provided to editors for consideration in the peer review process as a way to ensure equitable and ethical authorship practices.

Professional societies like ESA can also promote responsible authorship practices. Societies that publish journals can work with those journals to develop policies that increase the use of best practices for assigning authorship and then hold the journals accountable for ensuring equitable and fair authorship assignments. Societies with journals could create a leadership position that provides an impartial ombudsperson who can be sought out when authors find themselves in a complex situation. Professional societies can also host workshops about authorship policies and practices at annual meetings and include sample authorship policies and author contribution paragraphs, and information about responsible authorship practices on their websites.

By taking these steps and exploring other avenues for promoting responsible authorship practices, ecologists can help promote scientific integrity and ethics, advance the careers of early-career and marginalized scientists, and make sure that everyone receives appropriate credit for their contributions to ecology.

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Author contributions

KCE wrote the first draft of the manuscript, and all authors critically revised it. JR and DP analyzed the authorship climate data for the field of non-medical biology, and JR created the figures and table and led the manuscript revisions. KSC, KCE, and GMM obtained the funding for the project. DP, GMM, and KCE led the creation of the biology dissemination report from which the recommendations in this piece were drawn. KSC, KCE, and DP created and ran a workshop at the 2025 Ecological Society of America conference that helped inform this article.

Open research statement

The de-identified data associated with this manuscript are available on openICPSR (<https://doi.org/10.3886/E172961V1>). To protect participant confidentiality, the data file does not include demographic information.

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Supporting Information

Additional supporting information may be found in the online version of this article at <http://onlinelibrary.wiley.com/doi/10.1002/bes2.70069/supinfo>

Appendix S1.

Table S1. Post hoc Comparisons for Career Stage. Grad = doctoral student.

Table S2. Post hoc Comparisons for Marginalized Identity (ID). See [Fig. 2](#) caption for.