The need for the development of discipline-specific approaches to address academic bullying

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Summary

Background It is now well-documented that academic bullying, mainly driven by power differences, affects all disciplines and academic people with various positions (from students to senior faculty) of all levels of experience. Our aim is to probe whether academic bullying, in its specific forms, manifests differently across disciplines.

Methods We analyzed discipline-specific data from our global survey on academic bullying, which was collected since November 2019. The survey was a cross-sectional global study that was administered via Qualtrics. It reflects responses from 2122 individuals whose participation was solicited through various means including advertisements in *Science* and *Nature* magazines and the American Chemical Society.

Findings The main finding is that academic bullying does not affect all scientific fields equally. Our cross-sectional global survey of targets of academic bullying indicates that bullying behavior depended strongly on the scientific discipline. Specifically, our comparison of the three major scientific categories, including Applied Sciences, Natural Sciences, and Social Sciences revealed significant differences ($p < 0.05$) in four (out of ten) of the contextual behaviors. Further comparison of the bullying behavior among specific disciplines (e.g., Chemistry, Engineering, Life Sciences, Neuroscience, and Social Sciences) revealed significant differences ($p < 0.05$) in five of the contextual behaviors. We also noticed that, among the top five disciplines analyzed, respondents in Engineering experienced the highest rate of bullying behaviors.

Interpretation The variation in contextual bullying behavior across disciplines suggests the need for specific and nuanced training, monitoring, and actions by stakeholders in addressing academic bullying in a context-specific manner.

Funding None.

Keywords: Bullying; Harassment; Desipline specific

Introduction

Academic bullying adversely affects scientists in multiple disciplines.[1–4] Various stakeholders, including institutions and funding agencies, are developing cooperative/interdependent guidelines to address this long-neglected issue.[5] However, the crucial role of the culture and environment of specific scientific disciplines in the development of such guidelines/strategies is unlikely being considered. Experts have concluded that policies addressing bullying in academia have had no discernible effect over the course of 30 years.[6] The failure to consider discipline-specific bullying might have contributed to this sobering finding.

To gain some insight into the type and frequency of bullying behavior in various disciplines, we analyzed discipline-specific data from our global survey on academic bullying, which was conducted between November 2019 and July 2021. It reflects responses from 2122 individuals whose participation was solicited through various means including advertisements in *Science* and *Nature* magazines and the American Chemical Society. The actual analyzed dataset is smaller than 2122

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Research in context

Evidence before this study

Scientific manuscripts in various fields of science demonstrated the existence of academic bullying behavior in our scientific backyard and the inability of the current actions to effectively address this old-aged issue. We and others conducted global surveys on academic bullying to better understand the root caused and contextual behaviors of academic bullying.

Added value of this study

Our study is intended to probe whether the contextual behavior of academic bullying is discipline specific. We examine the responses from 2122 participants from various disciplines and our analysis revealed that some of contextual behaviors of academic bullying is discipline specific. We also revealed that some of the contextual behaviors are common in all fields.

Implications of all the available evidence

This study suggests that our science backyard has a significant problem with academic bullying and the type and contextual bullying behaviors are discipline-specific. Our outcomes argues for targeted and nuanced approaches to addressing academic bullying in a timely and effective manner. In addition, stakeholders need to design and execute discipline-specific guidelines and actions to address the academic bullying/harassment issue in our science backyard.

respondents since not all participants respond to the entire checklist and a percentage who responded did not consider themselves targets of academic bullying.

Method

We analyzed responses from participants reporting what we called "contextual behaviors" ($N = 959$) according to the participants' disciplines (based on the following *14* branches of science, which are provided in the survey: Biotech/Pharma, Cancer Research, Chemistry, Clinical Science, Earth Science, Engineering, Genetics, Immunology, Life Science, Maths/Computational, Molecular Biology, Neuroscience, Physical Science, and Social Sciences). The contextual behavior checklist was recently developed to enable scientists to better understand specific abuses unique to the lab and educational or scientific institutions.[7] Table 1 shows the Geographical distribution of the survey participants.

The inventory of specific behaviors, which was defined based on context-specific anecdotal narratives from qualitative reports of bullying, includes 10 contextual items: my supervisor:

i) gave me a bad/unfair recommendation;
ii) canceled or threatened to cancel my visa;
iii) unnecessarily lengthened my stay in his/her lab;
iv) took away my funding or threatened to take away my funding;
v) encouraged others to mistreat me;
vi) used my data in papers/patents without acknowledging my contribution;
vii) violated authorship contribution guidelines (if existed);
viii) forced me to sign away my rights;
ix) violated my intellectual property rights; and/or
x) canceled or threatened to cancel my current appointment/position.

After conducting an overall ANOVA which suggested there were differences in the level of contextual bullying behavior among the 14 disciplines represented in the study, $F(14, 907) = 2.314$, $p < .004$, we then grouped the disciplines into 4 major science categories: Applied Sciences (including Biotech/Pharma, Clinical Science, Engineering, Cancer Research, and Immunology), Formal Sciences (Maths/Computational), Natural Sciences (including Life Science, Molecular Biology, Chemistry, Physical Science, Genetics, and Earth Science) and Social Sciences (including Neuroscience and Social Sciences) because there were several specific disciplines with very few data points (e.g. Maths/Computational, Biotech/Pharma). Next, we compared differences among the five disciplines with the highest number of respondents (i.e., Chemistry, Engineering, Life Sciences, Neuroscience, and Social Sciences). We removed Formal Sciences from further analysis of the four major science categories because of the low number of participants ($N = 15$).

Statistics

ANOVAs and Chi-Square Tests were used to determine if the observed frequencies of specific bullying behavior in each category were equivalent. Frequencies of bullying behavior across categories were considered significant when the p-value was < 0.05.

Ethics statement

The information regarding the survey, the IRB approvals [i.e., Wake Forest University (IRB00023594) and Michigan State University (STUDY00003215)], consent, and declaration of informed consent to use the data from the participants is fully provided in our original publication.[7] We also reported the full outcomes in line with the Strengthening Reporting of Observational Studies in Epidemiology (STROBE) guidelines.[8]

Role of funding source

There was no funding associated with this study. All authors had full access to all the data in the study and

	AUS	CAN	GER	UK	US	All Others	Total
Range (number of participants)	33–34	48–50	52–55	105–108	458–466	246–250	946–959
Average %	3.5%	5.1%	5.6%	11.2%	48.5%	26.1%	100%

***Table 1*: Geographical distribution of the survey participants.** Percentages calculated by using the midpoint of the range for each country as the numerator and the midpoint of the total as the denominator. The provided range of participants is because not all participants responded to the entire checklist.

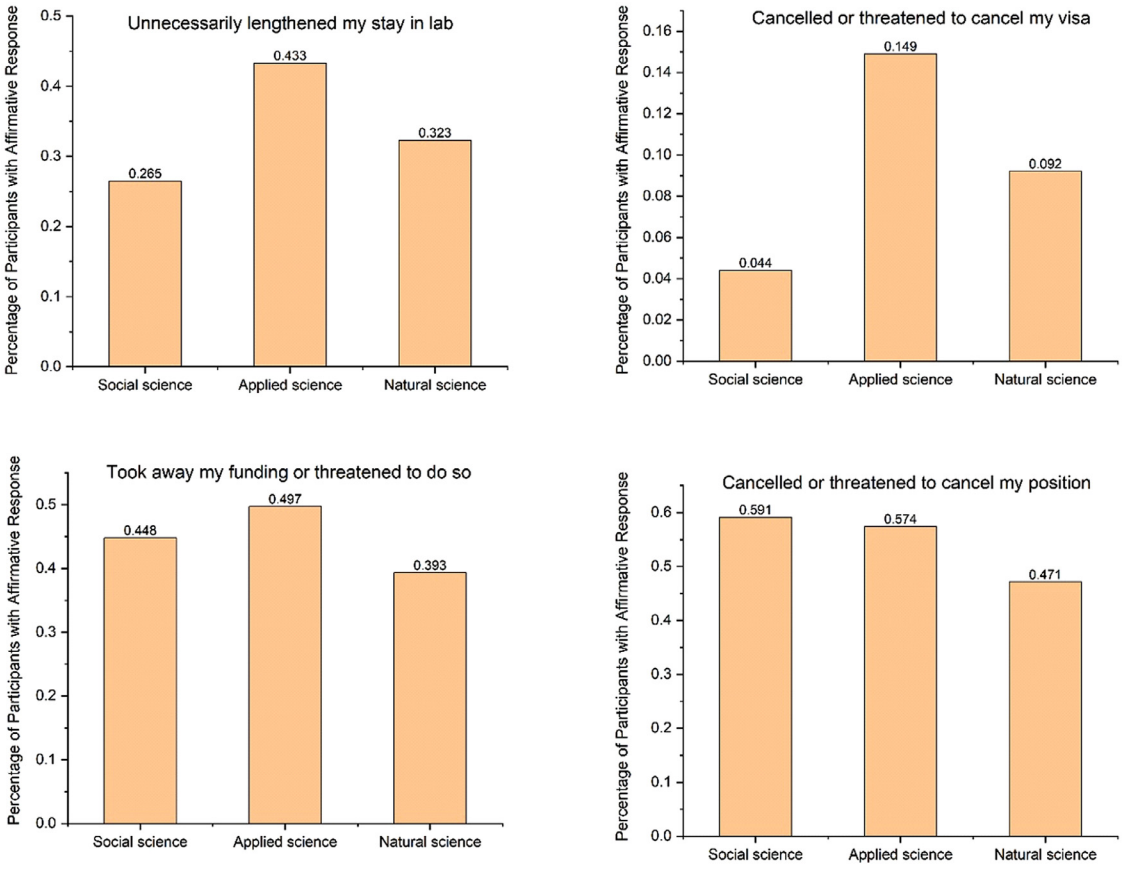

Figure 1. Variation in contextual bullying behaviors, with significant differences ($p < 0.05$), across the three major scientific disciplines.

had final responsibility for the decision to submit for publication.

Results

Contextual behavior variations in the three major science categories

The contextual bullying behavior data demonstrate that scientists working in different disciplines experienced unique patterns of contextual behavior (Figure 1). An initial ANOVA which compared the sum of participants' affirmative responses to 10 specific contextual behaviors (i.e. range: 0 to 10) across the three major categories of *Applied Sciences*, *Natural Sciences*, and *Social Sciences* revealed significant differences $F(2, 809) = 4.295$, $p < 0.014$. Follow-up Chi-Square analyses comparing the percentage of individuals in each category indicating that they had experienced each specific contextual behavior revealed significant differences in the following four of the specific contextual behaviors (see Tables S1 and S2 for details):

- "my supervisor unnecessarily lengthened my stay in his/her lab"
- "my supervisor cancelled or threatened to cancel my visa"
- "my supervisor took away or threatened to take away my funding"
- "my supervisor cancelled or threatened to cancel my current appointment/position"

Follow up analyses of Standardized Residuals indicate that respondents in the field of Applied Sciences experienced higher rates of bullying than those in the Natural and Social Sciences in two of the contextual behaviors: visa threats and lab stays (see Table S3 for standardized residual analysis). Respondents in the Social Sciences, reported a high frequency of threats of appointment cancellation the lowest frequency of visa threats and lab stays (Figure 1).

Contextual behavior variations in specific scientific disciplines

Our next comparison evaluated differences in the contextual behavior among specific disciplines (the 5 of the 14 disciplines with the highest numbers of respondents, i.e., Chemistry, Engineering, Life Sciences, Neuroscience, and Social Sciences). An initial ANOVA which compared these five groups against the sum of the ten contextual behaviors revealed an overall effect F (4, 526) = 5.1, $p < .000$). Follow-up Chi-Square analyses revealed significant differences ($p < 0.05$) in five of the contextual behaviors:

- "my supervisor cancelled or threatened to cancel my visa"
- "my supervisor unnecessarily lengthened my stay in his/her lab"
- "my supervisor cancelled or threatened to cancel my current appointment/position"
- "my supervisor used my data in papers/patents without acknowledging my contribution." (See Table S3 for standardized residuals). It is noteworthy that "my supervisor used my data in papers/patents without acknowledging my contribution" was also marginally significant difference ($p = 0.053$) among the three *major* science categories.
- "my supervisor took away or threatened to take away my funding"

Follow up analyses of standardized residuals indicate that participants in Engineering experienced higher than expected rates of four of the five contextual behaviors: visa cancellation threats, lab stays, threats to funding and unacknowledged use of data (Figure 2). Chemistry also had higher than expected rates of visa threats. Social Sciences had lower than expected rates visa threats, extended lab stays, and unacknowledged use of data while Life Sciences had lower than expected rates of funding threats. Standardized residual analysis of treats to appointments yielded no further unexpected frequencies across specific disciplines (Figure 2). Overall, Engineering was the field with the worst record of contextual bullying behaviors while Social Sciences had the lowest frequencies of offenses.

The significant differences in the contextual bullying behavior among different scientific disciplines may be due to the nature of the work in each field; e.g., differences in spending on research, teaching, fundraising/

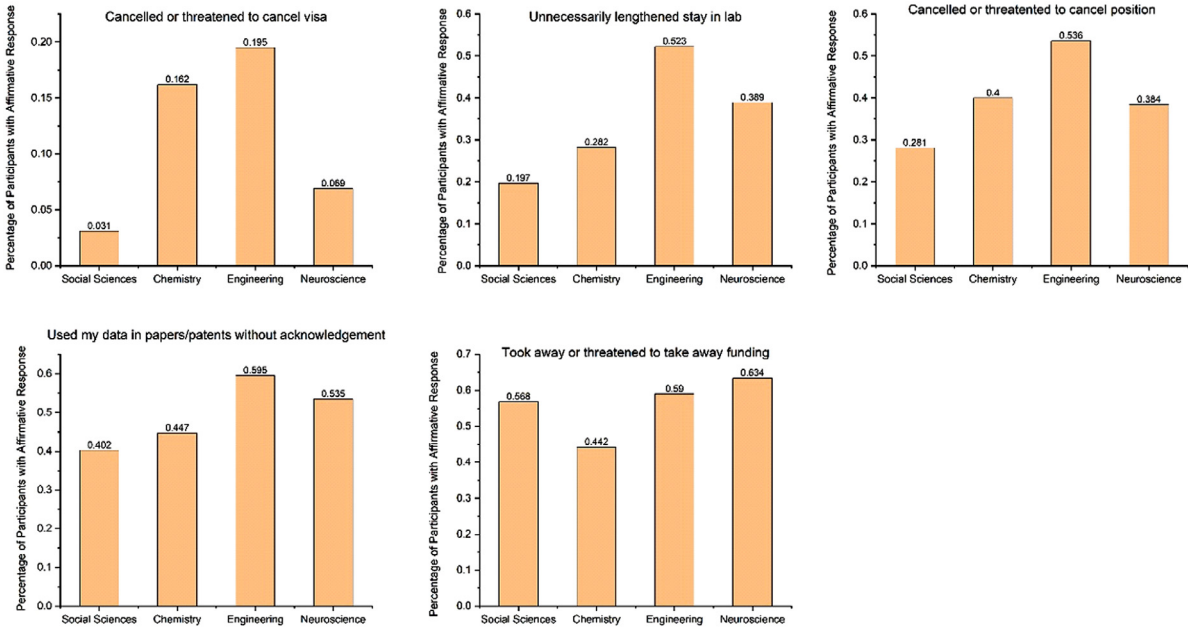

Figure 2. Variation in contextual bullying behaviors, with significant differences ($p < 0.05$), across the five scientific disciplines with the highest numbers of participants.

grant-writing, and administrative/clinical duties that vary significantly among various disciplines. For example, targets in the engineering disciplines, whose efforts rely on physical laboratories and time-sensitive experiments, reported the largest percentage of bullying in four of the identified contextual bullying behaviors in which there were significant differences across the disciplines. Conversely, fields that are less equipment-intensive—such as Social Science—reported the lowest percentage of bullying in three of the identified contextual bullying behaviors with significant differences across the disciplines (Figure 2).

Our findings also demonstrate that five of the contextual bullying behaviors have no significant association with particular scientific disciplines and are reported by researchers in all disciplines in varying frequency (see Tables S1 and S2 for details). These behaviors are: gave me a bad/unfair recommendation; encouraged others to mistreat me; violated my intellectual property rights; violated authorship contribution guidelines (if existed), forced me to sign away my rights; and violated my intellectual property rights.

Discussion

Perpetrators disrupting the career paths of subordinates (e.g., through bad recommendations and/or violation of authorship/intellectual property rights) and mobbing (i.e., ganging up against an individual) are the most common types of academic bullying across disciplines and represent a widespread threat to scientific integrity and organizational health in general.

We acknowledge that our survey was limited in scale and scope. While our findings demonstrate proof-of-concept regarding the strong alignment of academic bullying behavior with specific scientific disciplines, they should not be used to draw general conclusions. We acknowledge that the list of bullying behavior used in our research might reflect bullying targets' experiences better in some disciplines than in others. In the social sciences, for instance, tangible resources like lab equipment or applications for patents are typically irrelevant. Bullying might better be covered by more symbolic actions in such disciplines. For instance, based on qualitative research, a report about harassment in Dutch academia[9] revealed scientific sabotage as a bullying behavior commonly experienced by women academics. Scientific sabotage refers to behavior that obstructs a person's work as a scientist, and involves i) making a person's work, ideas, or expertise invisible, ii) refusal of promotion despite the person being suitable and a position being available, iii) blocking an academic's access to documents, spaces, or information needed to do their job, iv) referring to people as incompetent in the presence of others, and v) the physical or financial destruction of a person's research project. This list reflects a spectrum from subtle (i-iv) to tangible (v) manifestations of bullying.

Most of our participants were from the United States (48.5%). While we received responses from 60 countries, the number of responses from other countries was not sufficient to draw a robust analysis from them. As the guidelines, actions, regulations, and interdependencies among various stakeholders (e.g., funding agencies and institutions) are highly dependent on the country, our data most likely reflects bullying behavior in the US. As such, more geographically targeted surveys need to be conducted to better understand the relationships between bullying behavior and disciplines in each country. Such information would be crucial in designing discipline-specific guidelines, monitoring systems, and effective actions to create safe and healthy organizational environments across disciplines and cultures.

Therefore, we call for a coordinated worldwide research effort into manifestations of academic bullying. Such an endeavor would take into account differences in legislation against bullying in different countries. For instance, the labor laws in place to protect employees from bullying in Europe are rarely enforced,[10] and retaliation against reporters of bullying and discrimination is commonplace.[11] A global study would identify the most effective legislation regarding bullying, and support subsequent advocacy for its implementation in other countries. An additional advantage of a coordinated global survey would be that universities or National Academies of Science could be involved in recruiting respondents, reducing the self-selection bias that may have been an issue with our smaller survey. In sum, a coordinated global study would deliver valuable insights into more effective policy-making and enforcement for the global scientific community and its stakeholders.

Incidences of academic bullying have been discussed extensively over the past couple of years in the scientific literature, social media, and the popular press.[12–18] However, recent systematic reviews of harassment in academia reveal that anti-harassment and non-discrimination policies over the past 30 years have had no discernible effect.[6] Our findings suggest that this could partly be due to policies being too generic and not paying sufficient attention to discipline-specific bullying behaviors. Our study provides quantitative evidence of disparities in contextual academic bullying behavior across scientific disciplines, valuable input for more effective policies and interventions to combat and discourage bullying. For instance, most universities feature general anti-harassment policies. Our findings suggest that faculties might benefit from additional discipline-specific policies that account for increased vulnerability to forms of bullying particular to that discipline.

A number of stakeholders (e.g., funding agencies) have announced strict policy responses to academic bullying.[19–21] These policies are uniform across disciplines. However, the heterogeneous effects of academic bullying on various scientific disciplines require design

and execution of discipline-specific policies. It is therefore important that all involved stakeholders (e.g., institutions and funding bodies) evaluate the consequences of their uniform policies designed to respond to academic bullying, as they may disproportionately disadvantage specific disciplines and worsen existing disparities in contextual bullying behaviors.

We acknowledge the following limitations of this study. The results of this analyses may be biased due to the selection effect as people who were abused were more motivated to participate in our survey. Our data has been collected globally from different countries with different rules and regulations as well as cultural differences. Specially, demographic data such as age, race, ethnicity, gender, marital status, income, education, and employment play a significant role both for perpetrators and targets. Our results demonstrated the proof-of-concept of the critical role of scientific disciplines in contextual behavior of academic bullying; however, further studies need to be conducted to systematically investigate the role of demographics of participants on the profiles and contextual behavior of academic bullying. We have 2122 participants in this study, but not all of them answered all questions. Lower response rates for some disciplines cannot be actually due to low occurrence of bullying but to our recruiting methodology and moreover due to the lower number of candidates in these disciplines compared to more populated disciplines. Additional measures are needed to ensure that data collected from participants in future studies are representative of the eligible population of participants in each geography.

Lastly, because our respondents were mostly based in the US, we cannot capture the substantial adverse effects of academic bullying on scientific integrity, research, and organizational health worldwide. We note, however, that our findings align with the conclusions of systematic reviews on harassment in academia that had no particular focus on the U.S.[6] Our valuable findings extend earlier research, by pointing towards the necessity for considering both discipline-specific and more generic forms of academic bullying. Future work expanding our understanding of the role of scientific disciplines on contextual academic bullying behavior across different countries will be needed to determine if there are country by discipline interaction effects (though we saw no evidence of this in our data). This type of data is important to be able to effectively promote psychologically safe workplaces for scientists across disciplines and geographies. The variation in contextual bullying behavior across disciplines suggests the need for targeted and nuanced approaches to address academic bullying in an effective manner.

Contributors

Sherry Moss: Conceptualization, Supervision, Methodology, Analysis and investigation, Writing - Review and editing
Susanne Täuber: Analysis and investigation, Data curation
Shahriar Sharifi: Analysis and investigation, Data curation
Morteza Mahmoudi: Conceptualization, Supervision, Methodology, Analysis and investigation, Writing - Review and editing
All authors have read the final version of the manuscript.

Data sharing statement

Extracted data is from our earlier published study and is available in the paper[7]; the dataset is not subject to embargo or restrictions.

Declaration of interests

Morteza Mahmoudi discloses that he is a co-founder and director of the Academic Parity Movement (www.paritymovement.org), a non-profit organization dedicated to addressing academic discrimination, violence, and incivility. Sherry Moss discloses that she is a director of the Academic Parity Movement. Susanne Täuber discloses that she is an advisory board member at the i) Academic Parity Movement and ii) the Network against Abuse of Power in Science.

Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.eclinm.2022.101598.

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