RESEARCH

"That's just the way it is": bullying and harassment in STEM academia

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Abstract

Background The under-representation of women and other minority group members in STEM (Science, Technology, Engineering, and Mathematics) academia is a problem internationally and is attributed in part to hostile workplace cultures. We draw on the social identity perspective to examine the dynamic inter and intragroup processes entailed in these experiences. In this paper, we report a reflexive thematic analysis of 219 responses to a free-text question on bullying and harassment embedded in a national survey of 40 STEM departments from across the United Kingdom. Most were women (53%) at an early, pre-lectureship career stage.

Main findings Our analysis shows who is the perpetrator and who is the victim is not arbitrary, and neither is the form that it takes; majority group members draw on discourses that warrant the exclusion of minority group members (e.g., women are not smart; incompatibility with religious identity). In this 'othering', minority group members learn that one is not regarded as a bona fide STEM academic ingroup member and accordingly are constrained in being able to claim and act on that identity. Thus, it is not just the acts themselves that are problematic, but the ways in which being denied a shared STEM academic identity is consequential for a range of putative benefits and leads to a range of strategies that all confer costs.

Conclusions/potential implications The solution must rest with senior STEM academics and with institutions. First, we need to challenge discourses and practices that narrowly define the boundaries and content of STEM academic identity. Second, all members of a community need to perceive an alignment between the purported values of an organisation for diversity, inclusion, and respect and how that organisation responds when those principles are violated. Formal processes of remedy need to recognise the dynamics entailed in status differences and remove the onus of complaint from isolated, low status individuals. In addition, there is a need to recognise the ways in which perpetrators are embedded in networks of support both within and without the university; and the importance, therefore, of widening the scope of evidence gathering and intervention.

Keywords STEM academia, STEM identity, Retention, Gender, Minorities, Workplace harassment, Microaggressions

Introduction

The problem of under-representation of women (and other minority groups) in STEM academia is recognised internationally (Peplow, 2019). In the UK, there are some

STEM subjects where this under-representation starts at the undergraduate level (e.g., engineering, technology and computer science; WISE, 2018). However, even in subjects, such as chemistry, where women now constitute 44% of undergraduates, progress has not translated into strong representation at later stages (39% of doctoral student and 9% of chemistry professor positions; Royal Society of Chemistry, 2018). Similar patterns are evident in STEM academia for ethnic and racial minorities (Joice & Tetlow, 2020); people with a disability (Joice & Tetlow,

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2021); and LGTBTQ+individuals (Cech & Pham, 2017; Reggiani et al., 2024).

A popular metaphor for the apparent exodus of under-represented minorities at various stages of the academic journey is the "leaky pipeline" (Berry et al., 2022; Gregor et al., 2023; Wong et al., 2022). Critics of this metaphor, however, point to it obscuring a reality in which minority groups are 'pushed out' by a climate of bias and hostility (Allen et al., 2022; Amery et al., 2015; Banerjee & Graham, 2023; Berhe et al., 2022). There is considerable support for the notion that hostile or 'chilly' workplace climates are responsible for high attrition rates among under-represented minorities (Callister, 2006; Casad et al., 2021), as well as other forms of 'departure' such as absenteeism, psychological withdrawal, and decreased involvement (Griffin et al., 2011) and that this explanation may be particularly relevant in STEM fields (Britton et al., 2012).

The argument that under-represented groups are being 'pushed' out of STEM academia accords with a national survey we conducted with 732 STEM academics across the UK (Litzellachner et al., 2024). We found that experiencing or witnessing bullying and harassment in the workplace was driving women's greater propensity to leave STEM academia and that this was mediated by perceptions of the workplace climate as less diverse, inclusive, and fair and by reduced job-related commitment and self-efficacy. The current paper builds on this work and on calls for greater attention to the complex dynamics entailed in bullying and harassment (Neall & Tuckey, 2014; Parrish, 2023). We do this through examining STEM academics' sense making of their workplace experiences of bullying and harassment and of its effects.

General conceptual framework
Our research is informed by the social identity perspective—comprising social identity theory (Tajfel et al., 1979) and self-categorization theory (Turner et al., 1987)—which provides a social psychological understanding of the dynamic inter- and intragroup processes involved in social life. According to this perspective, we derive a significant part of our self-concept from our group memberships (or social identities, e.g., academic, social scientist, female, atheist). When a personally valued group membership is contextually salient, we (a) self-categorise and assimilate to what we perceive to be the normative values and behaviours of the group and (b) differentiate ourselves from other groups in ways that enhance self-esteem. These processes are associated with ingroup favouritism which may be benign, but at best reserve benefits to ingroup members (e.g., influence, trust, respect, giving the 'benefit of the doubt', Brewer, 2001). Moreover,

whilst outgroup harm-doing is not always an outcome, these processes provide the conditions for this, particularly in contexts, where there is competition or threat (Brewer, 2001).

Research from the social identity perspective attests to the importance of organisational identity and belonging for a range of outcomes, such as self-worth and agency, cooperation and trust, and organisational commitment; these are all important to people's ability to thrive in the workplace (Ellemers, 2001; Haslam et al., 2014). The experience of belonging (and being able to self-categorise with a group), however, is no easy thing; it requires intragroup recognition of us as a bona fide member of the ingroup (Blackwood et al., 2013a, 2013b, 2015; Hopkins & Blackwood, 2011). Moreover, it is those who are prototypical of the group—who represent the ideal—who are in a particularly powerful position to define both the boundaries of identity (i.e., who is recognised as ingroup and who as outgroup) and the content of the identity (i.e., the normative values and behaviours of the group including what is acceptable; Barreto & Ellemers, 2003; Blackwood et al., 2015).

The communication of who does and does not belong to a workplace-related group can take many forms, including everyday microaggressions (Kim & Meister, 2023; Lee et al., 2020; Salmon, 2024); active and overt forms of ostracism and incivility (Miner et al., 2019); and bullying and harassment (Gunter & Stambach, 2005; Parrish, 2023). These negative behaviours tend to be conceptualised in interpersonal terms—happening between two individuals within an organisation (Lewis et al., 2020). In contrast, the social identity approach conceptualises these dynamics as an intergroup process—between members of groups who occupy different status positions, not just in terms of formal power structures (place in the organisational hierarchy) but in terms of informal power structures, including alliances within the workplace and wider societal structures (e.g., gender, ethnicity, class; Ramsay et al., 2010). From this perspective, what matters about negative workplace interactions is not just that they make a person feel intimidated and excluded as an individual (Naezer et al., 2019); more crucially, they signal that one is not seen as a member of the ingroup, and sometimes do so in ways that make salient other group memberships that might be important to personal identity (e.g., gender, ethnicity) but that in this context mark one as 'other' or outgroup (Osbourne et al., 2023). Moreover, this group-based approach changes how we understand the phenomenon of peer to peer and subordinate to supervisor bullying (Rospenda et al., 1998); these are no less structured by power (e.g., based on gender or class) than the typical representation of supervisor to subordinate bullying. Thus, it matters that harassment

in academia is a gendered, racialized, heteronormative, and classed phenomenon (Keashly, 2019).

Mattheis et al (2022), argue that science positions itself as a race and gender–neutral space. This is nicely captured in recent research by Dancy and Hodari (2023) examining liberal white male physicists' explanations for inaction; one participant commented "*That's probably one of the advantages of physics is you get to work for smart people, so normally {race and gender is] not an issue*". Thus, what may not be recognised by members of the majority group is the ways in which science is very much defined by an ideological framework based on white, male, middle-class occupation (Mattheis et al., 2022). Fundamentally, for minority group members, negative interactions can subtly convey that particular groups of people do not fit within this framework (or definition of the STEM prototype) and that their exclusion is legitimate. When one is misrecognised—for instance when one is denied a valued STEM academic identity and viewed instead in terms of another category (e.g., class, gender or ethnicity)—there are a number of affective, cognitive and behavioural consequences. For instance, one study found that on days when conversations cued rejection and incompetence, women engineers (not men) experienced more social identity threat when the interlocutor was a man (not woman), and this in turn predicted mental exhaustion and psychological burnout (Hall et al., 2015).

More generally, research points to a range of consequences of identity misrecognition and categorization threat including diminished self-worth, depression, hypervigilance, and loss of agency (Smith et al., 2007); as well as social-identity management strategies (e.g., reduced commitment to the group and withdrawal of effort; Tyler & Blader, 2003); and concealment of minority identities and changing one's behaviour in order to 'pass' or 'fit-in', Kim & Meister, 2022; Moore & Nash, 2021; Reggiani et al., 2024). For instance, Black academics in STEM report navigating racial stereotypes through choices about appearance, speech, and behaviour to mimic the majority norm, a type of social performance to be situated as academically acceptable (Griffin et al., 2011; McGee, 2016). In addition, less visible minorities report making choices about whether to disclose their identity. Bilimoria and Stewart (2009) found that LGBTQ + STEM faculty' perceptions of heteronormativity in their work environment led to decreased self-expression of sexual orientation. Similar mechanisms occur for academic staff with disabilities in choosing to disclose their disability or feeling the need to conceal it due to ableism (Lindsay & Fuentes, 2022), as well as professors' strategic choices about whether to reveal their socioeconomic backgrounds or choose to 'pass' as middle-class (Lee, 2017).

Understanding academic bullying and harassment as intergroup phenomena that invoke processes of identity misrecognition and othering is important to recruiting, retaining, and supporting under-represented groups in STEM academia.

Methods
This qualitative study was designed to explore how STEM academia faculty understands experiences of bullying and harassment and how and why their understanding are consequential for how they act.

Data collection
Our sample comprised 219 respondents (117 cis-women, 85 cis-men, 10 non-cis people, 7 prefer not to say; $M_{age} = 36.78$, $Sd_{age} = 11.71$) who answered a free-text question about insulting or offensive remarks or behaviours they had experienced or witnessed at work, based on religion, gender, sexuality, socio-economic background, disability, and/or ethnicity. This open question was embedded in a larger online survey examining factors influencing retention and career progression in STEM academia, with a national sample of 715 STEM academics from 40 universities across the United Kingdom.[1] Whilst interviews enable deeper exploration, surveys work well for sensitive topics and enable larger, more diverse samples. We recruited via STEM colleagues and Royal Societies who distributed the survey to STEM departments and their professional networks with a request to further disseminate to eligible participants (all academics working in a UK university, in an STEM field). Encouragement was given to early career researchers who were the primary focus of the wider project (see Litzellachner et al., 2024, for more information on the full survey).

Our sub-sample of 219 were drawn from a range of STEM disciplines, including biological science (39; 17.8%), computer science (7; 3.2%), engineering (46; 21%) mathematical science (25; 11.4%), physics (29; 13.2%), chemistry (17; 7.8%), and earth sciences (7; 3.2%). Reflecting the focus of our research and our recruitment strategy, most (65%) were early career (69 PhD-Students, 44 Post-Docs, 29 Research or Teaching Fellows). Seventy-one respondents (32%) were Lecturer through to Professor, and a further six indicated 'other'. Most respondents

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[1] 374 indicated they had either experienced or witnessed harassment at least once in their career, and 219 of those completed a single free-text question which asked them to elaborate on their experience(s). Women (χ^2 (1, $N = 672$) = 18.62, $p < 0.001$)), people with a disability (χ^2 (2, $N = 695$) = 14.97, $p < 0.001$)), and tenured academics (χ^2 (1, $N = 708$) = 5.11, $p = 0.024$)) were more likely to be among the 374 who had experienced or witnessed harassment, compared with men, those who did not have a disability, and those who were untenured respectively.

were employed on fixed-term contracts (129; 59%), with only 79 (36%) on more secure, open-ended contracts; 11 respondents indicated not knowing/not applicable. Most respondents were white (181; 83%), straight (163; 74%), without a disability (168; 77%), and had parents with a higher education degree (134; 61%).

The data corpus comprised a total of 16,202 words (equivalent to 26 pages or 93,124 characters). Responses varied in length, with the shortest containing just one word and the longest 607 words. On average, each response contained 74 words (SD = 89.24), and the median response length was 51 words.

Analytic procedure

Prior to our analysis, the open question data were coded on three dimensions important to understanding the context in which the analysis is situated: (a) the target of harassment (e.g., gender, socio-economic status); (b) the status of the perpetrator in relation to the victim (i.e., higher, lower, or equal); and (c) the nature of the harassment (e.g., bullying/verbal harassment, sexual in nature, microaggressions). Our coding of the latter was informed by literature on forms of bullying and harassment including microaggressions (Sue & Spanierman, 2020) and respondents' own definitions.

We conducted a reflexive thematic analysis (Braun & Clarke, 2022) to answer the research question. According to this approach, the subjectivity of the researchers is recognised and valued; codes and themes do not emerge from the data, but rather they are actively identified by the researchers (Braun & Clarke, 2022). Consistent with this, we adopted a critical realist epistemology and ontology, believing events and objects are real and can be empirically investigated, but that they are filtered through the experience and interpretation of participants and researchers (Fletcher, 2017). Accordingly, it is important to be clear about the positionality of the researchers. The research team were all White women from the UK, France, and Australia, who brought the perspectives of early career graduate (EC), and postdoctoral (LY) researchers, and senior faculty (LB and JB). All have witnessed or experienced some form of bullying and harassment in academia and have an interest in improving diversity in higher education; and two have worked directly in this area. LB is a social psychologist who conducts research on social identity and processes of alienation and social change, and occupies an equality, diversity, and inclusion lead role. LY is a sociologist who has worked in widening participation roles within higher education, whose PhD examined class and young people's experiences of STEM. These knowledges and experiences necessarily shaped the analysis. Care was taken in discussions to surface assumptions and rather than work towards consensus, and the emphasis was on enriching the analysis through multiple perspectives and developing nuance.

Following Braun and Clarke's (2022) recommendations, the analysis was conducted systematically, but also in a manner that is fluid and recursive where the researchers moved back and forth between stages of analysis. We used a combination inductive and deductive approach (Byrne, 2022). In the initial stages of the analysis, the lead author (EC) conducted inductive coding at a semantic level to prioritise respondents' meaning making. In collaboration with her co-author (LB), the codes were then further developed and collated based on patterns of shared meaning. At this stage, a degree of deductive and latent analysis was used to ensure themes were meaningful to the research question (Byrne, 2022). Both authors shared and discussed their interpretations and returned to the data and the coding in an iterative fashion. Finally, at the write-up stage, the analysis was shared in draft form with all co-authors including JB and LY who were invited to sense-check ideas and add their own interpretations.

This research has approval from a formally constituted University ethics committee (PREC 19-273). Respondents gave informed consent before answering the survey. To anonymise the data as well as facilitate the narrative, we have given our respondents pseudonyms. We have also provided career status (early career researcher; tenured—lecturer and above) to contextualise responses in terms of place in the organisational hierarchy.

Findings

Overview

Table 1 provides an overview of the data and the context for our analysis. It shows that where indicated within our data, most bullying and harassment was based on gender; the perpetrator was typically of higher status, and most accounts were of subtle, everyday microaggressions such as talking over someone, backhanded compliments, and jokes with an underlying prejudicial theme (Sue & Spanierman, 2020). Some respondents explicitly referred to these as 'microaggressions' and were clear about their presence. Although less frequent, more overt forms of bullying and harassment (e.g., physical and sexual coercion and violence) were also described.

Below, we present the findings from our reflexive thematic analysis. This identified three themes: (1) the questioning of competence in an academic setting and the forms this takes; (2) the wider social context in which harassment occurs and the influence of power dynamics; and (3) the ensuing responses, reactions, and impacts harassment has on targets and witnesses.

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Table 1 Number and percentage of cases for target, perpetrator status, and nature of harassment

Category	*n*; percentage from category
Target of harassment (*N* = 170)	
Gender	106; 62%
Ethnicity	59; 34.7%
Socio-economic status	20; 11.8%
Sexual orientation	20; 11.8%
Religion	16; 9.4%
Disability	16; 9.4%
Status of the perpetrator in relation the victim (*N* = 94)	
Higher status to the target	67; 71.3%
Equal status	33; 35.1%
Lower status	12; 12.8%
Nature of the harassment (*N* = 194)	
Subtle, everyday microaggressions	152; 78.4%
Bullying/verbal harassment	77; 39.7%
Sexual in nature	40; 20.6%

Theme 1: questioning competence in an academic setting

Our respondents described a myriad of ways in which they experienced being 'othered', which are common to other contexts. In the reified academic environment, possessing characteristics that set one apart from the majority white group, did not pass unnoticed. For instance, one woman early career researcher experienced questioning about where she was originally from—this was despite her excellent English (Mila, early career researcher). Another reported "*the usual casual racism from older colleagues when I first started (now all retired). Things like not learning to pronounce my name and just making up an Anglo-Saxon one* (Margaret, tenured). Such interactions were encountered both inside and outside formal office settings and work hours, including meetings, after-work drinks, during conferences, and on social media.

Particularly pernicious, were experiences that spoke to how one was regarded on dimensions that are important to academic identity. Whilst competence is a dimension typically used by majority groups to (de)value outgroups (Fiske et al., 2002), it is particularly meaningful as a basis for exclusion in academia, where intelligence is a group defining normative value (Naezer et al., 2019). Here, we have a young early career researcher woman recounting one of her experiences with a supervisor:

> "*One supervisor stated that I was not smart enough, was a girl and was not strong enough to get the research done and that it was basically a failure*" (Emma, early career researcher)

On one hand, there is something unremarkable about this experience; the terms on which this woman is being diminished are so familiar. However, it is precisely this familiarity—the way in which her supervisor draws on stereotypes of women as unintelligent, weak, and child-like that we recognise the operation of prejudice (Block et al., 2019; Fiske et al., 2002). At least from this respondent's perspective, the basis for her supervisor's negative evaluations of her competence and suitability for academia are clear; it is because she is a woman.

We observed similar dynamics in relation to class-based prejudices:

> "*I've had remarks aimed at my accent and the fact that I'm northern more generally; I've been called a pleb or plebian or even referred to as a peasant based on the area of the country I come from and the fact that I went to a state comprehensive school. People routinely interrupt me in the middle of sentences to repeat a word I've said in a thicker accent, mimicking me. My accent is becoming less and less broad as time goes on which I feel removes part of my identity.*" (Fiona, early career researcher).

In the UK, growing up in the north of the country, having a northern accent, and attending a state comprehensive school are all treated as signifiers of being working-class and, therefore, less intelligent (Crozier et al., 2019). The mobilisation of these stereotypes and the use of terms such as 'pleb' and 'peasant' suggests conscious and active processes of othering and exclusion. What is clearly communicated is that academia is a middle-class space. Moreover, the experience of being interrupted and having one's accent mimicked communicates a lack of respect and valuing of what one has to say. A widely documented social identity management strategy in this context is changing one's accent (Baratta, 2016). Whether consciously done or not, as with all forms of 'social mobility' strategies this might secure some level of personal acceptance but does not change things for the group (Van Knippenberg, 2020). Moreover, as this respondent reflects, what may be sacrificed is a valued part of one's identity; Crozier et al's (2019) study of working-class students shows this tension between exclusion on the one hand and betrayal of one's roots on the other.

Some categories (e.g., sex, ethnicity, and class) are typically ascribed at birth, and are reasonably stable; other categories might entail more choice (Tajfel, 1996). Religion is one such category and can be an important and valued identity; one that for this respondent drew derision and hostility:

> "*I am a Christian and have received remarks about how someone can possibly believe in something like*

that. I often hear my worldview described by STEM academics as being a coping mechanism or something for simple minded people who can't think for themselves [...] Usually it is just someone shutting down these beliefs on the basis that they're too intelligent to believe such nonsense." (Donald, early career researcher).

Once again, what is questioned is the person's intelligence. This respondent experiences being labelled simple-minded and as believing in 'nonsense'. What is at stake here, is not simply being othered and marked as outgroup; there is an open hostility to a set of values and beliefs that this respondent holds dear. The belief that religion is *"incompatible with STEM research"* (Bill, early career researcher) has deep historical roots (Draper, 1875) and a resonance today (for instance, in debates about creationism; Blancke et al., 2014). This respondent's account speaks to the absence of space for someone with religious views and the explicit derogation that appears normatively acceptable. Recent work by Rios (2021) attests to how Christians encountering the 'incompatibility' stereotype can experience social identity threat and a decrement in task performance, and this is exacerbated for those who, like our respondents, are strongly identified with science.

Theme 2: wider context and secondary harassment

Bullying and harassment is often viewed as a dyadic event involving the perpetrator and the target or victim. What was very clear in our data, however, is the ways in which this is a far more dynamic process embedded in wider social relationships. We explore this below, looking first at the contexts within which harassment and subsequent sense making happens with colleagues; and then at the more formal processes when a complaint is made.

Harassment is embedded in wider relationships

Whilst bullying and harassment frequently occurs in private settings, it can occur in public where the target is 'othered' in front of witnesses who are in turn invited to look at the target in that same 'other' way. Public othering when no one speaks up, communicates implicit endorsement of the behaviour as described by Emma: *"The entire department on the floor just pretended that the verbal and physical abuse to me and supervisor 2 by supervisor 1 never happened"*. The idea that many of one's colleagues 'pretended' nothing happened, suggests that non-action was not due to a failure to recognise what they had witnessed; rather it may be experienced as passive unconcern at best and complicity at worst. A more active demonstration of complicity is when others join-in by adopting the same view as the perpetrator:

"I have been subjected to very severe racism, sexual, physical and emotional abuse. This has been in front of and without witnesses, all who stood there or actually became like that towards me. []. It was humiliating and degrading to me as a person and led to multiple attempts of suicide." (Amara, early career researcher).

Here, we have someone who has experienced their abuse being sanctioned by the larger group. It is not clear how that larger group is constituted, but what is clear is her exclusion. According to Neuhäuser (2011), it is this sanctioning of one's exclusion that is especially painful and the mark of 'collective' humiliation based on one's category membership.

However, it is not just in the moment of bullying or harassment where others may be involved. Our data spoke to the importance of interactions after the event (Crutcher Williams & Violanti, 2024). Here, a female early career researcher describes the reactions of her male colleagues to another woman receiving a book of pictures of penises anonymously:

"I had a lot of conversations with colleagues many of the men didn't think it was a big deal until I pointed out what they would think if their wives got sent anonymously a book of penis's and that it could be seen as threatening. Most men thought it was just the complainant 'couldn't take a joke." (Amanda, early career researcher)

Recognition is the first step in acknowledging that a behaviour or comment is inappropriate (Banyard et al., 2004). Here, a woman receiving a book showing penises is dismissed as a joke, and it is she who is the problem for overreacting. Relegating problematic behaviour to a 'joke', silences those who might speak out and can lead to the normalisation of disparagement humour (Ford & Ferguson, 2004). Whilst this respondent was not silenced—having conversations with many colleagues—her experience is one of discovering a climate in which threatening behaviour towards female colleagues is considered normatively acceptable. Thus, whilst she may not have been the target of the 'joke' she shares in the experience of this as a space where all women can be humiliated and threatened.

Other strategies for diminishing or dismissing concerns about harassment were also described:

"There was also some classic 'are you sure he meant X?' and 'oh, he was just nervous and said daft stuff' from a male colleague about the situation, which really should also have been dealt with." (Jane, early career researcher).

Again, we see an incident being downplayed by a colleague who extends their support and empathy to the perpetrator. Prejudice and discrimination are sometimes less about outgroup hostility and more about ingroup favouritism, and in the absence of hostility, majority group members may fail to recognise harm done (Dancy & Hodari, 2023; Greenwald & Pettigrew, 2014). The effort to find excuses for the perpetrator in their 'nervousness' and to minimise any potential transgression by suggesting that they were saying 'daft stuff' is in keeping with this.

In recent years, the focus on training to address unconscious bias has come under scrutiny as a practice that fails to hold perpetrators accountable for their ingroup favouring motivations as well as the consequences of their actions (Metinyurt et al., 2021). Moreover, by individualising the problem, the notion of 'unconscious bias' directs attention away from structural issues of power and inequality (Noon, 2018). One implication is that it becomes easier to describe all egregious behaviour in terms of a personality quirk and this was certainly evident in our data: *"accepted by other academics as a 'you know he's racist etc.' attitude"* (Paul, early career researcher). The upshot is that majority members do not experience being challenged by fellow ingroup members, and it is minority group members who must learn to change their perspective to that of the majority or risk marginalisation: "*I was told 'it's just his way' when I complained and that I should be the bigger person and ignore it*" (Blake, early career researcher). Locating the issue as a matter of individual thoughtlessness or attitude makes it impossible to constitute it as a problem that needs addressing; thus, rendering the construction of robust responses unnecessary and excessive.

Finally, we see below a non-binary early career researcher's experience which speaks to practices that may reflect and contribute to the normalisation of bullying and harassment:

> *"I was told when discussing discrimination based on gender that that's "just the way it is" All by senior female faculty."* (Robin, early career researcher).

Importantly, what is being communicated to someone at the beginning of their career, who is wanting to discuss discrimination, is that it is something to get used to. This message is received from senior female faculty who may well be regarded as potential role models and allies. One understanding of this dynamic is that minority group members who succeed via individual mobility strategies, may nonetheless remain on the periphery, where they are constrained to be complicit in protecting majority group boundaries, or at least not challenging them (Branscombe & Ellemers, 1998).

Complaints and power dynamics

There was a very clear narrative in our data that making a complaint in academia is high risk—that it tends to have negative repercussions for the complainant and is widely discouraged. In the words of one respondent, "*It's been made clear that people who make complaints about these things experience difficulty finding future employment in academia*" (Lucy, early career researcher). Moreover, our respondents described a mistrust in formal complaint systems, and a belief that perpetrators will be protected: *"...I believe that the institute culture was such that it was very difficult to raise a complaint or, more importantly, have the bully in question taken to task."* (Caroline, tenured). What was central in people's accounts was the issue of power—of early career researchers having far too little and senior staff having far too much. We explore these dynamics below.

The respondent below reflects on the implications of being an early career researcher for her actions:

> *"...In all cases I have stayed quiet. Until recently, I was on probation and could have been sacked for any or no reason [...] risking my job, and thus my visa and my ability to remain with my husband."* (Elizabeth, early career researcher).

This respondent makes clear that it is the insecurity caused by her employment as well as her visa status that affects her ability to speak out. The potential costs in terms of risking both her job and her ability to stay with her husband are high indeed. Whilst many of our respondents spoke of the powerlessness women feel in these situations, this respondent reflected on her sense of having failed in her duty to protect other women: "*I know, I'm a coward, I should be protecting the female students".* Thus, despite the personal risks entailed in acting, there is an awareness of shifting between positions of relative power and a sense of culpability. The tenured man below provides insight into how this power dynamic compounded by precarious employment, affects all those who might take on the positive bystander role and intervene:

> *"...In all cases, due to the power dynamic (usual Professor-level staff made the comments) between myself at the time and those making the comments and the precarious nature of postdoctoral contracts I did not feel safe or protected enough to comment without affecting my own career."* (David, tenured).

Once again, the phrase '*in all cases*' and reference to the '*usual Professor level staff*' signals that for some respondents, the bullying and harassment that they experienced and/or witnessed, were not isolated incidents but part of localised cultures defined by groups of senior academics.

The extract below makes explicit that the problem is not simply one of the power dynamics between perpetrator and target but includes all those who have the capacity to intervene:

"I talked to internal abuse people, but no formal complaint could be made as supervisor 1 was [Head of Department] and the internal people wanted proof of the occurrence and other than my verbal description I had no other 'proof' and no one would witness the occurrence as they were either supervisor 1 personal friends/in his cohort of buddies or they were too worried about negative repercussions from him." (Emma, early career researcher).

Here, we have someone whose experience speaks eloquently to the potential power ranged against an early career researcher making a complaint. As Head of Department, her supervisor was in a particularly powerful position. All those who might speak on her behalf were either part of his *cohort of buddies* or people whose work and careers he could affect. Moreover, what is implicit is a collective belief that he can and will act on this power. The failure of the institution is arguably in requiring a standard of proof that does not recognise the structural problems in obtaining that proof. From Emma's perspective, further evidence of the impotence (or apathy) of the institution in protecting her, is her supervisor's subsequent retaliatory action, delaying a publication that was important to her: "[] *for almost 4 months- Supervisor 1 just refused to sign off the submission form as a form of punishment and control)."*

The extracts above speak to perpetrators' positional power. However, there is also the power that is bestowed on and shared by those who are prototypical or are seen to embody the STEM academic identity. Peter describes a problem of "*older men, who make up the majority of leadership*" and the way in which "*academia is built to reward those with middle-class and affluent backgrounds*". He associates this with a context where:

Having social norms, accents, or communication styles born from a less privileged background creates a negative first impression that makes securing research funding, promotions, and respect more difficult. Negative behaviours based on socioeconomic background are completely normalized." (Peter, tenured).

This extract presents a view of academia as not based purely on merit; rather one where the ability to succeed and attain positions of power and authority depends on one's gender and class. This is entirely at odds with the positioning of science as rational and neutral (Mattheis et al., 2022). Moreover, the suggestion here is that this is due to both ingroup favouritism leading to the accumulation of career enhancing opportunities as well as the normalisation of outgroup discrimination (Li, 2020). These dynamics are important to understanding how power is both accrued and mobilised by majority group members; and cultures where majority group members may develop a sense of their superiority and rightful immunity from judgement. This is perhaps embodied in Angela's account of the support given an '*upcoming*' male against whom there had been multiple complaints:

"But he was protected to the detriment of several PhD and Master students (with serious consequences for them) and despite several official complaints against him). The reason why he was protected is, that he was an upcoming individual with high publication output and good at obtaining grants. In other words, reputation of the Department over student health and career" (Angela, early career researcher)

From Angela's perspective, the Department was presented with a choice; to protect someone who is 'prototypical' and embodies what is valued by the organisation, or to protect vulnerable PhD and Masters students. The decision to do the former is consistent with the notion that prototypicality endows 'idiosyncrasy credits' where one is forgiven violations (Barreto & Ellemers, 2003). Importantly, this decision is not just consequential for the 'several PhD and Masters students'; it is also consequential for the wider academic community's understanding of who and what is valued.

Finally, consistent with the above analysis, some respondents commented on cultures of peer-to-peer bullying, where perpetrators "*seem close with the management or at least able to skew it their way*" (Sue, early career researcher). Perhaps even more telling, some respondents commented on hostile comments from majority group members of lower organisational status:

"It is worth noting that in all of the above instances, I have also been subject to inappropriate comments by the people "lower in the pipeline" (e.g., inappropriate comments related to my gender by my students from when I started teaching at PGR [postgraduate research] level onward). For example, on course evaluations, comments such as "this bitch is crazy" "I would do her" etc. that would be highly unlikely to translate if I were a male instructor." (Katherine, tenured).

Whilst power may reside in a position within the hierarchy, it also resides quite simply in majority group membership, and this is particularly evident here where the hostile behaviour emanates from those "lower in the

pipeline". Rospenda et al ([1998]) describes this phenomenon as contrapower in which gender, race, and class positions imbue harassers with informal power, even when targets possess greater organizational status than the perpetrators.

Theme 3: reactions, responses, and impacts of bullying for the targets

Our respondents describe their experiences entailing a range of emotions (e.g., belittled, othered, uncomfortable, angry, frustrated, scared, and sad). Some also spoke of impacts on physical and mental health beyond the immediate context: *"I also suffered from depression, physical exhaustion and stress-related illnesses including severe migraines"* (Harry, tenured). Here, however, we focus on the impacts that are more directly consequential to people's understanding of their place and their ability to prosper within academia. We begin our analysis with an early career female who had experienced comments in relation to her disability:

> *"I find the things I have experienced more easy to brush off than others but I would say that with regards to my disability which I am still coming to terms with myself, comments really knock your confidence and make you feel unwelcome and like you cannot ask for support." (Sharon, early career researcher).*

This respondent reports that it is comments directed at her disability that impact her self-confidence and she links this with a sense of being unwelcome—of not belonging. This in turn is consequential for how she can act—she cannot avail herself of the privileges of group membership which include the ability to ask for and receive support (Ellemers, [2001]; Haslam et al., [2014]). Others too speak of the impact on confidence both in one's work and in how one is regarded by colleagues:

> *"In my first 2 research contracts the bullying was so extensive that I was frequently in tears and suffered mentally and landed up in therapy. [...]. When this happens, especially as it is from senior members of the team, it makes you feel very small and degrades the belief in your research, both to yourself and others you could potentially collaborate with. In all these experiences I have not stood up for myself but have internalised the unhappiness and tried to not let it show in the workplace." (Emma, early career researcher).*

In Emma's experience, we see the perniciousness of experiences of bullying, where in addition to the consequences for her own self-belief, the actions of senior (prototypical) members of the team also affect how other team members regard her. This is consistent with research on how the actions of those in positions of authority are seen as both reflecting *and* influencing how other group members think of us (Sunshine & Tyler, [2003]; Talbot & Bose, [2007]). This then matters for her ability to develop collaborations and to stand up for herself; there is not the expectation of support (Ellemers, [2001]; Haslam et al., [2014]). Importantly, this also matters in terms of the internalisation of unhappiness and the effort to not show one's emotions within the workplace.

Leaving academia is of course one response and some respondents spoke of those who had done so: *"Although she confided in a few close colleagues, she didn't seek formal help and eventually left."* (Alex, tenured). In terms of those who stayed, respondents reported a range of coping strategies. Some spoke of changing the field in which they worked: *"...I believe it did affect my willingness to work on that particular area since this person was the top guy in the field"* (Katherine, tenured). In addition, some spoke of concealing or changing aspects of their identity to fit in (e.g., losing their accent). Helen's approach is instructive:

> *"As a result of this I didn't start a family until after I received a permanent contract. I have had male colleagues make passes at me (off campus—they also knew I was in a relationship). I have had to work extra hard to convince colleagues that I am a competent researcher and not 'over-emotional like many women in academia.'" (Helen, tenured).*

In Helen's account, we see a cost—the notion of the price one pays being a woman in academia: delaying starting a family and becoming a mother; dealing with being sexualised by the advances of male colleagues; and labouring to disprove a stereotype of women in academia as 'over-emotional'.

Finally, alongside identity-management strategies designed to either protect oneself (e.g., through psychologically or physically withdrawing) or to advance oneself through fitting in (e.g., through distancing oneself from minority identities), we identified strategies of solidarity (Crutcher Williams & Violanti, [2024]; Van Knippenberg, [2020]). One manifestation of this, is in providing advice and support to victims (Louise, early career researcher). Another, is in the creation of informal warning systems about potential harassers:

> *"There is a well-known male academic who is known for inappropriate dancing with female academics at the conference dinner of a conference I regularly attend. I had been warned by a colleague and refused his offer to dance" (Amy, early career researcher).*

"One a technician with whom it was well known there were problems, people warned new postgrads/ postdocs, but nothing was actually done. As a postgrad myself at the time, I managed the risks to me and did my bit to try not to leave others vulnerable but didn't really see what else I could do." (Jane, early career researcher).

These collective acts of solidarity as well as the more individual coping mechanisms, are all ways in which academics regain control despite a sense of powerlessness. However, all these strategies are consequential in terms of how academics see themselves, the institution, and their relationship with the organisation: not belonging, not being valued, doubting self-worth and ability.

Discussion

Our analysis provides insight into how experiences of bullying and harassment in STEM academia are structured in intergroup terms and why these experiences are consequential for individuals' self-perception and actions. In our first theme, we saw how majority group members draw on group-based stereotypes and discourses that warrant the exclusion of minority group members. Our second theme shows the ways in which bullying, and harassment are embedded in wider social relations where who is the perpetrator and who is the victim is not arbitrary but reflects group-based status relations within organisations and society that protect and even reward perpetrators. Finally, in our third theme, we see not just the emotional and psychological toll of being bullied or harassed, but the ways in which people's ability to self-categorise as an academic is compromised and how this constrains their ability to act with confidence on that identity and leads to a range of strategies that often come at personal cost.

An important theoretical contribution lies in the shift from viewing bullying and harassment merely as interpersonal acts to recognizing their structured nature (Lewis et al., 2020; Thomas, 2004). This shift offers a deeper understanding of how these acts are tied to broader social dynamics and group identities. Social identity theory emphasises the role prototypical majority, ingroup members have in deciding who belongs— the role of supervisors and senior academics is crucial in this process and our research certainly attests to the impact of career status in academic bullying (Dellifraine et al., 2014). Moreover, within organisations, it is not just those who are more powerful by virtue of their place in the organisational hierarchy bullying those of lower status. We also observed these behaviours from peers and students whose power resides in membership of a high-status social category. Similar patterns of horizontal and vertical bullying and harassment are observed across many industries and organisation (Roscigno, 2019). Previous research looking specifically at harassment in STEM academia identified the importance of peer-to-peer interactions in disconfirming academic identities (Miles et al., 2020). In addition, Keashly's (2019) analysis shows how it is not just any peer, but *majority group* peers who gain additional power through valued academic processes such as critique, peer review, and involvement in organisational governance. In recent research, Tauber and Mahmoudi (2022) have suggested that bullying and (sexual) harassment may be used as a tool for career advancement in academia; that some 'star' academics attain their position "*because of not in spite of*" their behaviours. When we consider the above practices through a social identity perspective lens, what is at work is not just the exclusion of individual minority group members fuelled by personal ambition. Such practices serve to maintain majority group dominance within organisational hierarchies and thereby the power to define both the boundaries and normative content of the organisational identity (i.e., who and what is included and valued).

What is also theoretically important is the group-based processes whereby being bullied and harassed is an atomizing experience; though being denied a shared identity, victims are cut off from the support of others (Blackwood et al., 2013a, 2013b, 2015; Crutcher Williams & Violanti, 2024). This experience of atomization was clear in the accounts of both those who have been the targets of bullying and harassment and of those who have witnessed this and failed to either validate the victim's experience or speak up and challenge perpetrators. Moreover, this atomization of the victim needs to be contrasted with the ways in which perpetrators are protected by networks comprising those who have organisation status and share their category membership. Our respondents' observations of this resonate with Hutchinson et al. (2006) research, which found that bullies in a hospital worked cooperatively in 'predatory alliances' built around shared group norms. This has consequences not only for the victim, but also for others who share the minority category membership and who may themselves feel excluded, silenced, and disempowered. Moreover, there are consequences for the wider culture where perpetrators learn that they can act with impunity and where such behaviours become normalised. Wider literature on pluralistic ignorance (Prentice & Miller, 1996) and spiral of silence (Noelle-Neumann, 1974) provides some insights into this process. People look to others for cues about what is normatively acceptable—when they see others not acting, they may mistakenly infer that the attitude of the majority is different to their own (Prentice & Miller, 1996),

and so refrain from acting themselves for fear of themselves being isolated (Noelle-Neumann, 1974) or rejected (Bergsieker et al., 2010).

Practical implications, limitations, and future directions
Our research findings have implications for STEM academia and for wider organisational strategies designed to address bullying and harassment. First, we need to challenge discourses that narrowly define the boundaries and content of STEM academic identity; this can only be achieved by those who are seen as prototypical (i.e., senior, White male science academics) leading the way. Specifically, what is required it that they (a) champion alternative representations of 'good' science and 'good' scientists and (b) communicate normative attitudes and behaviours that explicitly align STEM with values of diversity and inclusion. For instance, values of intellectual humility, curiosity, collaboration, and real-world problem solving are not only intrinsic to STEM, they demand diverse and inclusive work practices, and are incompatible with cultures of bullying and harassment.

Second, we need to challenge discourses that locate the problem (and solution) of excluding practices (bullying and harassment) in individuals' personalities and cognitions (e.g., unconscious bias) and shift our focus to strategies that address the group-based nature of enabling cultures. Fundamental to this shift is the development of organisational cultures where both the injunctive norm (what the organisation communicates people should do) and the descriptive norm (what people in the organisation actually do: Jacobson et al., 2020) empowers third parties—including majority group allies—to intervene directly (e.g., challenge perpetrator) and indirectly (e.g., raise awareness and validate the victim). We did see instances in our data of informal collective strategies such as sharing information about known perpetrators. In addition, initiatives such as 'Bringing in the Bystander Training', which has been used in different industries (e.g., military, schools and colleges) and is designed to develop communities of responsibility, hold some promise (Banyard et al., 2004; Bouchard et al., 2022). However, whilst these strategies might de-atomize the experience through providing recognition and support, they are typically engaged in by those in positions of low power and are unlikely, therefore, to produce the cultural change called for. Indeed, their very existence may sometimes be seen as a reflection of the failure of those who have more power and status, and who are seen as representative of organisations, to respond adequately.

The ultimate responsibility for culture change lies with institutions. Formal processes of remedy (e.g., central complaints procedures) are structured by the same asymmetries of power that enable bullying and harassment in the first place (Tauber & Mahmoudi, 2022). When they fail to respond adequately, the experience for the victim is of being re-bullied, and the loss of trust in institutional processes may be shared more widely (Keashly, 2019; Naezer et al., 2019). What is required is recognition of what is entailed in group-based bullying and harassment—particularly where status differences based on societal group memberships and organisational group memberships combine. This means removing the onus of complaint from isolated, low status individuals; for instance, through the facilitation and recognition of 'third party' complaints and organisations assuming responsibility for gathering evidence based on patterns of behaviour and outcomes within work groups. Crucially, in industries such as academia, it also means organisations recognizing that perpetrators are embedded in networks of support both within and outwith the organisation and so widening the scope of evidence gathering and intervention; for instance, failure by line-managers to report complaints or evidence of blocking career advancement. What matters most is that all members of a community perceive an alignment between the purported values of an organisation for diversity, inclusion, and respect (injunctive norms) and how that organisation responds when those principles are violated (descriptive norms; Jacobson et al., 2020).

As with all research, there were both strengths and limitations associated with our choice of method for collecting qualitative data—a single free-text question embedded in a larger, mainly *quantitative* survey. The strengths lay in our ability to collect data from a large national sample of STEM academics from different institutions and disciplines. The limitations lay in our inability to probe for additional detail about people's experiences and ask follow-up questions. Thus, whilst our approach allowed us to reach a dispersed population and provided a wide-angle lens on the problem, some responses were less detailed and rich than others. Future research using interviews and/or *qualitative* surveys could provide deeper insights into some of the processes identified in this research (Braun et al., 2021). Further research is also needed in different contexts. Whilst similar social psychological processes might be evident elsewhere, how industries are structured, the normative content of group identities, and the nature of relations between groups will shape who is involved and how. For instance, how power is conferred will differ markedly across industries; and even within academia, there will be national contexts, where a religious identity is not seen as incommensurate with a science identity.

Conclusion

Our fundamental argument is that bullying and harassment are tools in an intergroup contestation of who does (and does not) belong and who gets to define organisational identities and values. Who is targeted, by whom and how, are not arbitrary but structured in group terms. This might not be readily recognised by members of the majority group (Dancy & Hodari, 2023), who are motivated to view their ingroup positively and status differences as legitimate and so may take refuge in representations of bullying and harassment as arising from unconscious bias, personality quirks, and lapses in judgement. Moreover, in contexts where there are power asymmetries, the powerful have been shown to be less oriented to perspective-taking (Galinsky et al., 2006) and to meta-perceptions (beliefs about how one is seen by another group: Lammers et al., 2008). This is perhaps a particularly challenging message for the sciences, which, as Mattheis and colleagues (2022) observe, is positioned as a neutral space, dedicated to objective truths and so free from bias and subjectivity. It is nonetheless an important message as recognising the terms of a problem is a necessary first step to addressing it.

Declarations

Competing interests
The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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