Exploring researchers' perspectives on authorship decision making

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CONTEXT Authorship has major implications for researchers' careers. Hence, journals require researchers to meet formal authorship criteria. However, researchers frequently admit to violating these criteria, which suggests that authorship is a complex issue. This study aims to unpack the complexities inherent in researchers' conceptualisations of questionable authorship practices and to identify factors that make researchers vulnerable to engaging in such practices.

METHODS A total of 26 North American medical education researchers at a range of career stages were interviewed. Participants were asked to respond to two vignettes, of which one portrayed honorary authorship and the other described an author order scenario, and then to describe related authorship experiences. Data were analysed using thematic analysis.

RESULTS Participants conceptualised questionable authorship practices in various ways and articulated several ethically grey areas. Personal and situational factors were identified, including hierarchy, resource dependence, institutional culture and gender; these contributed to participants' vulnerability to and involvement in questionable authorship practices. Participants described negative instances of questionable authorship practices as well as situations in which these practices were used for virtuous purposes. Participants rationalised engagement in questionable authorship practices by suggesting that, although technically violating authorship criteria, such practices could be reasonable when they seemed to benefit science.

CONCLUSIONS Authorship guidelines portray authorship decisions as being black and white, effectively sidestepping key dimensions that create ethical shades of grey. These findings show that researchers generally recognise these shades of grey and in some cases acknowledge having bent the rules themselves. Sometimes their flexibility is driven by benevolent aims aligned with their own values or prevailing norms such as inclusivity. At other times participation in these practices is framed not as a choice, but rather as a consequence of researchers' vulnerability to individual or system factors beyond their control. Taken together, these findings provide insights to help researchers and institutions move beyond recognition of the challenges of authorship and contribute to the development of informed, evidence-based solutions.

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INTRODUCTION

Authorship has high-stakes implications for researchers' promotion and tenure, future funding, career opportunities, wellness and sense of professional identity. Due in part to these consequences, questionable authorship practices and resultant authorship disputes are common.[1–4] Beyond the individual researcher, questionable authorship practices can have negative long-term effects on the scientific enterprise as a whole. These effects include distortion of the scientific record, dilution of authors' true contributions, reinforcement of hierarchical abuse in academia, resentment within research teams and negative impacts on patient care.[5,6] To date, questionable authorship practices have primarily been studied using surveys and bibliometric analysis.[7] Although these methods are valuable in estimating the frequencies and types of questionable authorship practices, they are limited in their capability to unpack the complex nature of authorship practices and hence provide little guidance on how to mitigate questionable actions and inactions.

In recognition of the gravity of authorship issues, journal editors, including those of this journal, have advocated authorship criteria to guide authors in planning projects and navigating authorship disputes.[8] The International Committee of Medical Journal Editors (ICMJE) has developed such authorship criteria and these have been widely adopted in biomedicine. According to the ICMJE criteria, each author must: (i) substantially contribute to the conception or design of the work, or to the acquisition, analysis or interpretation of data for the work; (ii) draft the work or revise it critically for important intellectual content; (iii) give final approval of the version to be published, and (iv) agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.[9]

Although a journal's authorship criteria may be informative in articulating expected norms, the prevalence of questionable practices suggests that such criteria are insufficient to prevent authorship abuses. From studies that report evidence of questionable authorship practices[7,10–12] it has become clear that authorship is a complex issue

that requires a multifaceted approach that extends beyond simply knowing what constitutes authorship. The variety of questionable authorship practices reflects this notion. For example, when an individual has not satisfied the journal's criteria for a given publication, his or her inclusion as an author is a questionable authorship practice, commonly referred to as the bestowing of 'honorary authorship'. In a recent survey of over 500 medical education researchers, 61% of respondents reported having given honorary authorship to individuals they felt did not qualify for authorship.[10] Honorary authorship may be given to an individual for a variety of reasons, such as the belief that adding the name of a well-known author might enhance the work's odds of being published, or as a reward for a collaborator who has contributed funding or resources to the research (so-called 'gift authorship').[2] Hence, although the ultimate action (honorary authorship) might be the same, the rationale behind the action is likely to differ from one paper to another. In addition to honorary authorship, several other practices fit into the general category of questionable authorship practices, including, but not limited to, the inappropriate use of positional power to demand authorship or a particular location in the author byline, and the exclusion of authors who have significantly contributed (so-called 'ghost authorship').[13,14]

With reference to the variety of questionable authorship practices, Moffatt recently proposed that the multiple ways in which researchers and their fields of study define and sanction authorship practices can contribute to conceptual confusion about authorship that negatively impacts ethical norms.[15] However, we know little about how researchers conceptualise questionable authorship practices, which makes it difficult to offer the clarity needed to reduce confusion and negative impact. As a field that draws researchers from a multitude of disciplinary backgrounds, medical education research offers a rich opportunity to explore the range of ways in which authorship might be conceptualised. In this study we used interviews to begin to unpack the complexities inherent in researchers' conceptualisations of questionable authorship practices and to further elucidate the personal and situational factors that make individuals, and perhaps their research units and institutions, vulnerable to questionable authorship practices.

METHODS

We conducted a qualitative interview study using thematic analysis guided by a constructivist approach. This study was determined to be exempt from ethical approval requirements by the Uniformed Services University of the Health Sciences Institutional Review Board (protocol no. HU-MED-83-9684) and was approved by the Netherlands Association for Medical Education Ethics Review Board (dossier no. 1039).

Recruitment, data collection and analysis took place between May and December 2018. We focused recruitment on the multidisciplinary field of medical education. Medical education researchers hail from a variety of academic backgrounds and research traditions (e.g. clinical medicine, psychology, biomedicine, education). We believe that the inclusion of a broad spectrum of researchers within a single field widens the applicability of our findings. We purposively sampled participants who had published multi-authored medical education research studies during 2016 and 2017. To identify participants, we searched Web of Science (WOS) for articles published in *Academic Medicine* and *Medical Education*. We limited our initial search to these journals as they are the top two medical education journals based on impact factor. To broaden our sample, we also searched WOS for research articles in the 13 *Journal of the American Medical Association (JAMA)* family journals using the keywords 'medical education' OR 'health professions education' (Appendix S1 gives a complete list of journals). All journals included explicitly require that authors adhere to ICMJE[9] guidelines.

Upon the retrieval of papers from all journals, we retained articles defined by WOS as research articles first authored by individuals based in the USA or Canada. We focused on North American authors because of what we perceived as similarities in university structures, such as promotion and tenure processes and hierarchy. Owing to the sensitive nature of the topic, we largely excluded authors from our own institutions although a single participant came from the same institution as one of the authors. From the articles included, we extracted the first authors' names and contact information. Our strategy yielded 119 potential participants, each of whom was invited to participate by the lead author LAM a single time by e-mail. A total of 31 potential participants responded to the invitation and were scheduled to be interviewed.

The lead author LAM conducted all interviews between June and August 2018 by telephone using a semi-structured interview guide. We piloted the interview guide with two researchers outside the study sample. Based on pilot feedback, we revised the guide accordingly prior to launching the study (Appendix S2 provides the final interview guide).

Interviews ranged in duration from 45 to 60 minutes. All participants were provided with informed consent documents prior to the interviews. Before the interview began, each participant was asked to give oral confirmation that he or she understood the documents and consented to participate in the study. In the interview, the lead author LAM first asked the participant to describe his or her reactions to two scenarios in which, respectively, the department chair added his or her name to the participant's manuscript despite having made minimal contribution, and the participant's position in the author order was shuffled from second to fourth author without notification. We opened the interviews with these two scenarios to provide participants with the same stimulus and starting point for considering questionable authorship practices. We selected these particular scenarios as they represent prevalent questionable authorship practices as reported in the literature.[7,10–12] We believed the scenarios presented relatively clear and straightforward violations of authorship criteria. Following discussion of these scenarios, participants were asked to describe any questionable authorship practices they had personally faced and how they had handled those situations. Participants were also asked about their familiarity with the ICMJE[9] criteria.

The lead author LAM conducted interviews in blocks of six participants. Upon the completion of each interview block, recordings were transcribed, anonymised and made available to the research team for discussion and preliminary analysis.

In alignment with qualitative methods, we stopped conducting interviews when the team agreed that we had reached data sufficiency. This occurred after 26 interviews. We defined data sufficiency as the point at which we could derive a clear and coherent understanding of key issues and could identify no additional nuances or insights into the issues.[16,17] Upon reaching data sufficiency, the lead author LAM thanked previously scheduled participants for their willingness to participate and cancelled their interview appointments.

We interviewed 26 (13 female) researchers based at 26 institutions in the USA ($n = 16$) and Canada ($n = 10$). Participants represented assistant ($n = 9$), associate ($n = 8$) and full ($n = 9$) professors and held MD ($n = 17$) and PhD ($n = 9$) degrees. Participants had published a mean ± standard deviation of 56 ± 68 journal articles (range: 1–301).

To identify, analyse and report patterns found in our transcripts, we utilised thematic analysis.[18] Analysis was primarily conducted by two authors LAM and BCO'B beginning with the line-by-line reading of transcripts to identify and define potential codes. In this close reading, which began after the first six participant interviews, we identified preliminary codes and working definitions related to factors described by participants. The two authors LAM and BCO'B coded all transcripts using Dedoose (SocioCultural Research Consultants, LLC, Los Angeles, CA, USA). To complement the efforts of the two authors LAM and BCO'B, throughout the data collection the other members of the research team (ARA, CJW and EDW) actively reviewed transcripts, and considered and discussed the resonance and fit of the identified codes, thereby helping to raise the level of analysis from one of categorising to conceptualising.

The lead author LAM assembled the research team based on members' topical interests and the variety of roles each plays within the scientific community to inform the conceptualisation of the study and data analysis. Our research team included five faculty members, all of whom hold PhD degrees. CJW is also a practising physician in Canada. Combined, the team has engaged in authorship discussions for over 300 publications and its members, as authors, have strived to meet ICMJE guidelines[9] for all authored publications. The authors also serve as editors and editorial board members on journals that require authors to adhere to ICMJE guidelines[9] and hold leadership responsibilities in medical education graduate programmes in schools of medicine. The lead author LAM is an associate professor and all other authors are full professors (BCO'B was an associate professor at the time of the study). EWD is also a department chair. All authors except EWD are faculty members at North American medical schools; EWD is based at a medical school in Europe. We recognise that our backgrounds and experiences as authors in the same scholarly community as many participants in our study both facilitate our interpretations of our data (from an insider perspective) and put us at risk of making assumptions. As a team, we discussed the meaning and interpretation of data carefully to minimise unfounded inferences.

RESULTS

Participants conceptualised questionable authorship practices in various ways and articulated several ethical 'grey areas'. All participants described diverse personal experiences of and reactions to questionable authorship practices, including those presented in the two scenarios. Personal and situational factors contributed to participants' perspectives on and involvement in questionable authorship practices. Some factors were sources of vulnerability; others served protective functions. Over time and the course of a career, some factors initially associated with vulnerability became protective factors. We will elaborate on researcher conceptualisations and factors contributing to or protecting against vulnerability, using representative quotations from a variety of participants.

Conceptualisations of questionable authorship practices

The ICMJE criteria[9] offer a way for authors to determine whether or not their contributions, and those of their colleagues, warrant authorship. Participants' reactions to the scenarios presented and the examples they related from their own experiences revealed that even when they were familiar with the ICMJE criteria,[9] as most were, their sense of what contributions warrant authorship varied. For example, some participants regarded the scenario in which the department chair added his or her name to the list of authors as a clear ethical violation:

> To go against established understanding of rules of authorship is unprofessional ... The most important ethical issue is that of professionalism and disrespect for the precepts on which we base our work as professionals. Also called lying. (Participant A)

Others considered additional criteria that might make their chair's behaviour less clearcut, providing a rationale that might make a decision to take honorary authorship less questionable or unethical. For example, several participants rationalised that if the chair had provided funding or had mentored

the researcher, even if not in relation to the manuscript in question, then authorship might very well be warranted. In more than one case, participants admitted that they would actively seek out a potential justification to include the chair. For example, one participant said:

> I would be looking for an answer to find a case in which I wouldn't need to have that very uncomfortable conversation with the chair. I'd love to find some evidence of circumstances that would justify the inclusion. (Participant K)

As participants delved into the details of a variety of their own authorship situations, we found many were complex, nuanced and difficult to evaluate based on the ICMJE criteria[9] alone. In several situations, some participants described circumstances in which good intentions might underlie questionable authorship practices; that is, although the actions might technically violate the criteria for authorship, they might also be perceived to benefit the community and its researchers. For example, several participants rationalised engagement in questionable authorship practices as contributing to the greater good, especially when their actions benefitted junior researchers. When discussing the scenario on authorship order, one senior participant responded:

> I might also find out that this move was an attempt to help two junior authors in their careers who would really benefit. So that this was done not as a reflection of my contribution, but really to address another value, which I would agree with, which is helping a junior faculty [member]. (Participant K)

Another participant likened the department's efforts to include junior researchers, even if they did not meet all ICMJE criteria,[9] to a necessary form of 'academic socialism' (Participant C) to enable academic success for its clinicians and clinician-educators in light of their heavy clinical and teaching responsibilities and the challenges associated with promotion and tenure requirements.

Participants also indicated that the desire to act for the greater good, although not always strictly aligned with ICMJE criteria,[9] supported the broader ethos of their scientific community:

> Intellectual communities are really feisty and individualistic and fight tooth and claw for dominance . . . We don't want to be these people.

We want to be caring and thoughtful. We want to bring people in and scaffold them and say: "Oh, so this is your first publication and, you know, you have just reviewed the manuscript, but that's OK you can be a first author this time." (Participant Q)

In addition to casting questionable authorship practices as both vice (i.e. unethical) and virtue (i.e. benefiting the greater good), participants described other authorship 'grey zones' (Participant F) and pointed out that the ICMJE criteria[9] were silent on many of these more nuanced points. These grey zones encompassed confusion around the inclusion of authors whose levels of contribution may have shifted over the course of a project as a result, for example, of illness or maternity leave, participants who had engaged in a single component of a project, such as in the conducting of statistical analysis only, and authors who were unable to fully contribute as a result of lack of knowledge or skill in a given area. One participant's example illustrates the challenges these grey zones might create for authorship decisions:

> I work with people in the international setting and their English is really bad and so their ability to contribute to the writing is practically non-existent. So they don't contribute a whole lot to the writing . . . but it is only because they couldn't, not because they didn't contribute to the study in many other ways or deserve to be authors. So, yes there are grey areas, but in these cases it is really about capability. (Participant F)

Factors contributing to authors' vulnerabilities

Although participants identified nuance and grey areas in authorship practices, most also related experiences that they clearly considered to have been problematic or harmful. In exploring these experiences, we identified situational and personal factors that contributed to participants' vulnerability to questionable authorship practices. These factors included hierarchy, resource dependence, institutional culture and gender. In some circumstances, participants consciously chose to engage in these practices based on a perception or recognition of their own vulnerability; in other circumstances, they felt victimised by others' practices.

Hierarchy both contributed to perceived vulnerability and served as a way of rationalising questionable authorship practices. Several participants described hierarchy as a power

differential between junior and senior faculty staff. Junior faculty members generally associated hierarchy with diminished power and lack of voice. In response to the scenario involving the department chair, a junior researcher explained:

> In this situation you are telling someone in power that you don't think their contributions warrant authorship. I think that's a hard conversation up the hierarchical slope. At a minimum it's going to be uncomfortable, but in a bad situation I could imagine real-life repercussions in terms of losing opportunities if you challenge the authority figure. (Participant O)

In response to the same scenario, one senior researcher noted:

> The hierarchy thing puts a lot of people in a position of inability to speak up. I fear so much for junior people in this and perhaps in many institutions that have no voice because they will get destroyed. (Participant A)

Within the context of hierarchy, several participants noted that researchers' inexperience and lack of familiarity with cultural norms could increase their vulnerability to questionable authorship decisions. For example, a junior researcher said:

> I can imagine being more bendable at an early stage. I would be driven by fear that I would be fired. I don't think I would have any idea what my rights are and what the chairman's rights are and are not. So I think I'd be confused about whether this was something that is typical or not. (Participant J)

Resource dependence was also presented as a vulnerability. Participants discussed pressure to include as authors individuals who had provided access to resources, or helped to secure resources, despite their not meeting ICMJE[9] criteria. Specifically, some participants described the inclusion of authors who were initially involved in attaining grant funding:

> I've carried 12 people on an authorship byline and two of them never made any contributions to the writing, but they had their names on the funding that funded the study. It was crazy – they never contributed anything. I had never seen them. I'm not even sure they know what I look like and I've given them several papers because they brought in the money. (Participant Q)

The addition of authors who provided access to research data or study populations necessary for study completion was also described. For example, one participant described an instance in which a programme director demanded authorship on a survey study that included data from his residents although he had contributed nothing to the conceptualisation or writing of the manuscript. When describing a similar situation, a participant reported feeling like a 'data hostage' (Participant C). Data access issues were frequently mentioned in relation to multi-institution collaborations and to the implementation of research projects that were longitudinal, included multiple stakeholders, or cut across programmes or departments:

> So I think it's access to the data, but it is also keys to the kingdom that you need to make your work work … In order to operationalise the idea you need the buy-in of a course director or someone that needs to do some nominal administrative thing and they are not really willing to do those nominal things unless there is the carrot of authorship. (Participant C)

Participants also identified a high-pressure institutional culture as a situational factor related to: (i) demanding messages from leaders who articulated the need for faculty staff to publish, especially as first or last author; (ii) poor role-modelling of authorship behaviours, and (iii) tacit institutional endorsement of questionable authorship practices. One participant noted:

> At a lot of institutions, I think there is such pressure for junior faculty to do well and to publish and to advance that it becomes oppressive. I think under that system of oppression people may end up doing things that they normally wouldn't do or that they aren't ethically comfortable with, but they need to do them out of necessity … I think what we are saying in a way is that this pressure is leading to a system or climate that leads to compromised ethical ways of being. (Participant N)

In relation to institutional culture, one participant shared a recent salary-related development at the university which he or she felt would negatively impact authorship practices:

> The administrators basically said we are now going to pay you based on a formula that looks at the number of your publications a year. So

now instead of getting an envelope of funding which would guarantee me time out of clinic, I have to worry about how many publications I get in a year. (Participant D)

Gender was also perceived as a potential vulnerability. In several instances, participants said that being female influenced their ability and willingness to advocate for authorship, receive opportunities to earn authorship, and speak up against what they felt were injustices. For example, one female participant stated:

> Gender discrimination against women in academia is alive and well, and I think a lot of junior women suffer the brunt of these abusive authorship practices because they are disempowered compared to the dominant men in the field. (Participant Q)

Several participants also remarked that they or their female colleagues had 'no voice' (Participant L) as female researchers with which to speak out against honorary authorship practices. Participants of both genders described this factor as a vulnerability for women.

Protection from vulnerability

Although we have focused on vulnerabilities, some participants also discussed protective elements that could help to counterbalance these vulnerabilities. For example, several participants described components of their institutional processes and cultures as protective. Such protective institutional factors included researcher training, the provision of resources to assist in authorship decisions (e.g. an ombudsperson) and the strict enforcement of authorship standards:

> My institution has workshops … from an institutional standpoint this institution has tried to send messages about the importance of truly meeting guidelines of authorship and not just adding names to add names to papers. I think these workshops have contributed to a culture that values that type of integrity.
> (Participant M)

Several physician participants mentioned their salary source, which was often linked to patient care and not to research output, as protective and influential in their willingness to speak up about questionable authorship practices, or not to be concerned about them. Commenting on the scenario in which a department chair attempts to claim undue authorship, one physician participant noted:

> I'm an MD. Almost none of my income is controlled by my chair … So she could be mad at me, but unless she was so mad at me that she trash talked me to the dean, it's hard to imagine her having much control. (Participant AA)

We observed some examples of factors that seemed to shift over the course of a career, moving from a vulnerability to a source of protection; these included movement up the organisational hierarchy and greater experience. For instance, several senior participants reflected on personal experiences in which they felt that their lack of power as a junior researcher had influenced their decision to engage in questionable authorship incidents, an effect that changed as they attained greater experience. One participant reflected on a personal experience from decades earlier:

> I did a research project on haemophilia and I worked with one guy closely and we did everything. Then in the last drafts of the paper there was some other guy's name on it. I said: "Who is this?" "Oh, that is so and so and he runs the haemophilia lab." And you know being a PGY-2 [postgraduate Year-2 resident] at that time, I didn't say anything … I think as you get older in your career you realise well no it's not the way it should go. You now have a little bit more security and start to challenge. (Participant D)

Additionally, senior researchers noted that their years of experience could be protective in that they increased their awareness of questionable authorship practices. In the course of discussing the scenario on authorship order, one participant stated:

> I'm just much more aware of these issues than someone who is diving into it brand new. So now I think about it right up front and address it with people when we start doing research.
> (Participant E)

DISCUSSION

Although over 1000 journals require authors to adhere to ICMJE[9] or similar criteria, our results underscore the suggestion that these criteria are insufficient for many of the complex and nuanced circumstances encountered in practice. Our results

suggest that researchers' conceptualisations of questionable authorship practices vary in intent, perceived consequences and surrounding circumstances. Researchers' experiences of such practices are influenced by multiple personal and situational factors such as hierarchy, resource dependence, experience, institutional culture and gender. Some of these factors make researchers vulnerable to questionable authorship practices. In the sections that follow, we explore the implications of our findings, as well as some opportunities to address the complexities of authorship practices.

Most authorship guidelines (e.g. the ICMJE criteria[9]) portray authorship decisions as black and white, effectively sidestepping key dimensions that create ethical shades of grey. Our findings show that researchers generally recognise these shades of grey and in some cases acknowledge breaking or bending the rules themselves. Sometimes, their flexibility in applying rules of authorship is driven by benevolent aims that align with their own values or prevailing norms such as generosity and inclusivity. At other times, their participation in questionable authorship practices is framed not as a choice, but rather as a consequence of their vulnerability to individual or system factors beyond their control. Although researchers recognise these latter breaches as potentially harmful to individuals, institutions and the scholarly enterprise, they tend to characterise the former breaches as potentially helpful and as supporting the progress of individual colleagues and nurturing the larger research community in the process. Hence, we see decision making around authorship as far more complex than a simple application of guidelines. Rather, researchers navigate tensions between guidelines, their own values and the factors that either protect them from or make them vulnerable to pressures from the often hierarchical systems in which they work.

However, when authorship decision making is driven by individual circumstances and institutional culture, the resulting decisions may be idiosyncratic and inconsistent, threatening the integrity of the resulting scholarship, such that by misrepresenting someone's role on a project (i.e. by including or not including that person as an author) we are harming the field in terms of fairness and distorting the extent of individual contributions in the scientific literature. Our results do highlight grey areas in which flexibility may be needed, such as circumstances in which individual authors make very meaningful contributions to a piece of work but are unable to meet all of the authorship

criteria. However, they also point to authorship decision making that may be motivated by a misguided sense of serving the greater good. For example, junior faculty members would surely be better served by being mentored to undertake all of the tasks that would earn them first author status, rather than being gifted with the status simply because their colleagues feel it will help their careers.

We contend that researchers need more than guidelines; they require resources that assist in the situational interpretation of guidelines, mentorship in how authorship decisions can be made consistently and fairly, and education in the distinctly challenging communication skills they require to lead and participate in authorship discussions. This is especially important in medical education, a multidisciplinary field, which brings together researchers from a variety of epistemic and methodological traditions and increasingly from different cultures. Researchers also require leadership from their more senior colleagues and a firm institutional commitment to integrity around authorship. Such commitment must not be undermined by a hidden curriculum that values productivity over authorship ethics.

This study should be considered in light of its limitations. Although we purposively sampled researchers, there may be some degree of selection bias in our sample; that is, individuals who volunteered to be interviewed may differ in important ways from those who did not. That said, it is important to note that we collected a spectrum of responses from our participants, including those who reported direct engagement with such practices and those who had not experienced them. Another important limitation relates to participants' willingness to share experiences with us. Although all participants acknowledged the existence of questionable authorship practices, none admitted to having perpetrated clearly unethical authorship practices. Social desirability bias may in part explain this finding. Next, we only sampled medical education researchers, which limits the extent to which these findings might generalise to researchers in other scientific disciplines. Nonetheless, because medical education is a multidiscipline field, our sample included researchers from a range of disciplinary backgrounds and thus we believe the findings offer a broad perspective on the problem. We recruited first authors, so our findings may capture the perspectives of dominant authors. However, our sample included faculty staff of all ranks and many participants

described experiences that pertained to occasions in which they were not first authors, had succumbed to subordination to co-authors' questionable authorship practices or had felt powerless in situations similar to those described in the scenarios. We focused only on North American researchers; given the perceived influence of institutional culture, the issues related to authorship in non-North American cultures may be distinct and may offer a potential area of future research. In relation to culture, we did not ask participants to identify their country of origin, ethnicity or race, which may also have implications for their authorship experiences and suggests an important consideration for future researchers. Finally, we recognise that as an author team our geographical and academic backgrounds generally align with those of our participants. We acknowledge that this alignment plays a role in our data analysis. As such, it is possible that because of these similarities with participants, we inadvertently made assumptions regarding the data or missed important aspects of the phenomenon that are outside our shared experience.

CONCLUSIONS

Although formal authorship standards such as the ICMJE criteria[9] provide guidelines for researchers, they appear to be inadequate to consistently mitigate questionable authorship practices. Our findings suggest that questionable authorship practices are complex, variably conceptualised by researchers and situation-dependent, and thus somewhat resistant to a 'one-size-fits-all' solution. We believe our findings provide insights that may help researchers and institutions to move beyond recognition of the problem and to begin frank and constructive conversations across the field about the complexities and related culture of questionable authorship practices in medical education.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article:

Appendix S1. Complete list of journals searched to identify first authors of research studies.

Appendix S2. Semi-structured interview guide.