

Journal of Diversity in Higher Education

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Online First Publication, July 25, 2024. <https://dx.doi.org/10.1037/dhe0000589>

CITATION

Douglas, H. M., Settles, I. H., Spence Cheruvelil, K., Montgomery, G. M., Elliott, K. C., Cech, E. A., Davis, T. M., Ma, G., Hawkins, A. K., & Nadolsky, L. R. (2024). The importance of inclusive climate within the research group, department, and profession for marginalized science scholars' career outcomes.. *Journal of Diversity in Higher Education*. Advance online publication. <https://dx.doi.org/10.1037/dhe0000589>

The Importance of Inclusive Climate Within the Research Group, Department, and Profession for Marginalized Science Scholars' Career Outcomes

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Existing academic structures and norms perpetuate the mistreatment and marginalization of scholars resulting in a climate that is misaligned with the values of academics from marginalized groups. Therefore, we study how climates at multiple levels of the academy (i.e., research group, department, and professional field) shape marginalized scholars' careers and career attitudes. Participants ($N = 3,204$) were doctoral students, postdoctoral fellows, and assistant professors from four science fields (biology, physics, economics, and psychology) who completed an online survey about psychological safety and intragroup conflict within their research group, climate of diversity within their department, climate of scholarly inclusion within their professional field, and their career outcomes. We conducted three general structural equation models with marginalized identity status predicting three career outcomes: turnover intentions, burnout disengagement, and burnout exhaustion. We also tested the mediation effect of climate at the levels of the research group, department, and profession on these career outcomes. Participants with a greater number of marginalized identities experienced a more negative climate at all three levels compared to those with no and fewer marginalized identities. The climate experienced at these three levels also significantly mediated all three career outcomes for marginalized scholars. Climate of scholarly inclusion at the level of the profession was especially strongly related to intent to leave and burnout. These results add to the breadth of research on multiply marginalized scholars' negative experiences of academic climates and point to areas that may be particularly important for interventions.

Keywords: person–environment fit, academic climate, marginalization in academia, turnover intentions, burnout

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This work was supported by the National Science Foundation, Division of Human Resource Development, awarded to Kendra Spence Cheruvelil, Georgina M. Montgomery, and Kevin C. Elliott (Grant HRD-ECR-1954767) and Isis H. Settles and Erin A. Cech (Grant HRD-ECR-2000579). The authors thank Kathrina Robotham for her conceptual contributions to this project, Petal Grower for feedback on an early draft of this article, and Leslie Gonzales for her thoughtful review of this article.

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Isis H. Settles, Erin A. Cech, Kendra Spence Cheruvelil, Georgina M. Montgomery, and Kevin C. Elliott conceptualized the research idea and acquired funding. Kendra Spence Cheruvelil, Kevin C. Elliott, Georgina M. Montgomery, Guizhen Ma, Lexi R. Nadolsky, and Arika K. Hawkins generated the participant database. Hannah M. Douglas, Isis H. Settles, Erin A. Cech, and Tangier M. Davis created and distributed the survey. Hannah M. Douglas conducted the data analysis with feedback from Isis H. Settles and Erin A. Cech. All authors drafted portions of the text and provided feedback and revisions. Hannah M. Douglas created the figures.

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Promoting and supporting a diverse student body and faculty in academia is important for achieving equity and justice, improving student learning, and advancing knowledge and innovation. Evidence suggests that various forms of diversity, including heterogeneity in gender, race/ethnicity, and disciplinary background, can help teams approach problems more creatively and effectively (Nielsen et al., 2017; A. W. Woolley et al., 2010). Promoting diversity in academic science can also improve learning experiences for students from a variety of backgrounds through role modeling (Bumpus, 2015). Further, increasing the representation of women and underrepresented racial minority scholars (i.e., Black/African American, Latinx/Hispanic, Middle Eastern, Native American) helps prevent negative “token effects” that can arise when they are minoritized within their work environment (Nielsen et al., 2017).

Despite overwhelming evidence about the importance of diversity for academia, scholars from marginalized groups do not have equal access to research resources and career progression due to the persistence of racism, sexism, and devaluation in the academy. For example, research has documented inequality in grant funding for scholars of color, compared to white¹ counterparts (Chen et al., 2022). Despite some efforts to recruit a more diverse academic workforce, women, underrepresented racial minority scholars, and people from other marginalized groups (e.g., person with a disability, sexual minority, gender minority) remain numerical minorities in many professional fields (Cech & Blair-Loy, 2019; National Science Board, 2018). Moreover, efforts to address these disparities are inadequate, given the persistence of premiums in career opportunities, respect, and social inclusion afforded to white cisgender heterosexual men—those who have intersectional privilege—compared to all other social groups (Cech, 2022).

It is likely that existing academic structures, norms, and a climate that is misaligned with the values of academics from marginalized groups perpetuate these challenges. Therefore, this study investigates the role that the climate in research groups, departments, and professions plays in the experiences of early career scientists from marginalized groups. Previous research has made important contributions to our scholarly understanding of diversity and equity in the academy by focusing on one axis of marginalization at a time, such as women’s experiences in science, technology, engineering, and mathematics (STEM; e.g., Cameron et al., 2013; Docka-Filipek & Stone, 2021) or racial/ethnic minority scholars’ experiences of racism in the academy (Griffin et al., 2011). Recently, efforts have also been made to understand the nuanced consequences of intersecting forms of oppression on STEM scholars with multiple marginalized identities (e.g., both race and gender; Charleston et al., 2014; Sendze, 2023). Drawing from these perspectives, we attend to the experiences of individuals marginalized along multiple dimensions of race, gender and transgender identity, disability status, sexual identity, socioeconomic status, and first-generation student status. We contrast the career outcomes of those who are multiply marginalized with those who experience intersectional privilege, that is, those who hold privileged statuses along multiple dimensions (e.g., white, cisgender heterosexual men without a disability, from a middle- or upper-class background, and from families in which at least one caregiver attended college). Through this approach, we are better able to understand the consequences of both privilege and marginalization in academic STEM.

Although intersectional privilege and disadvantage are never fully additive (e.g., Crenshaw, 1991; Collins, 2021), we argue that

early career scholars with the greatest number of identity divergences from intersectionally privileged group members will experience the most negative career outcomes (Cech, 2022). Our approach, which employs a composite measure, helps capture the experiences of respondents who are multiply marginalized to answer the overarching question: “How does an inclusive climate affect academic science career outcomes (i.e., turnover intentions, burnout disengagement, and burnout exhaustion) for early career individuals from marginalized groups?”

Person–Environment Fit Organizational Theory

We draw from the Person–Environment Fit (P-E fit) theory, which suggests that people have positive career outcomes when the organizational environment is congruent with their needs, skills, and values (Jansen & Kristof-Brown, 2006; Kristof-Brown & Guay, 2011). Meta-analyses indicate strong relationships between P-E fit and job satisfaction, organizational commitment, intention to quit, turnover, and job performance (Hoffman & Woehr, 2006; Kristof-Brown et al., 2005). Compared to their more privileged peers, marginalized scholars report a lack of fit—feeling devalued and tokenized by their colleagues, perceiving that their accomplishments are invisible or unrecognized, and encountering unequal treatment among classmates and peers (Cech et al., 2011, 2017; Cech & Waidzun, 2011; Settles, Brassel, et al., 2019).

For scholars from marginalized groups, fit involves academic climates that meet their needs and make them feel welcome (Roberts et al., 2008; Settles, Buchanan, et al., 2019; Velez & Moradi, 2012) and an environment that affirms their important identities (Kim & Gelfand, 2003). Previous studies have found that P-E fit is related to racial/ethnic minority and sexual minority individuals’ positive perceptions of inclusive climates (i.e., racial climate, sexual minority-supportive climate; Lyons & O’Brien, 2006; Velez & Moradi, 2012). We focus on fit within academic climates because they are directly related to faculty and graduate student career outcomes, including productivity, commitment, turnover intentions, and satisfaction (McKay et al., 2007; Nishii, 2013; Settles et al., 2007; Settles & O’Connor, 2014).

The refinement of P-E fit theory has conceptualized fit at multiple levels, including fit with the workgroup, the organization, and the profession, that is, the extent to which individuals’ values, interests, and abilities match those of their workgroup, organization, or profession, respectively (Dawis & Lofquist, 1984; Edwards, 1991; Jansen & Kristof-Brown, 2006). Therefore, we examine climates across three academic levels to conceptualize scholars as situated in nested contexts, all of which have unique qualities, norms, and values that differently contribute to the scholars’ academic experience. We hypothesize that marginalized scholars in academic science fields will report more negative career outcomes (i.e., turnover intentions, burnout disengagement, and burnout exhaustion), which can be partially attributed to their experiences of more negative academic climates at the *research group*, *department*, and/or *professional field* levels.

Inclusive Climates

Organizational climate is defined as an individual’s experience of their organizational environment that is shaped by interactions with

¹ We chose not to capitalize white as a racial category to decenter whiteness in our research.

others, organizational policies and practices, and leader behaviors and communications (Ostroff et al., 2012; L. Woolley et al., 2011). An *inclusive climate* is characterized by team members receiving fair treatment, inclusion in the decision-making process, and the integration of differences such that all members can be open about their identities without fear of negative treatment (Bodla et al., 2018; Nishii, 2013). The facet approach to the study of climate examines microclimates and recognizes that policies and practices, as well as leaders' values, may vary depending on the specific level of the organization (Schneider et al., 1994). For example, within an academic department, policies and practices related to the value and support for diversity (i.e., diversity climate) may be quite different from those related to the value and support for innovation (i.e., innovation climate). To better understand different academic climates and their relationship to career outcomes, we examine four *climate facets* at three organizational levels: *climate of psychological safety* and *climate of intragroup conflict* within the research group (e.g., collaborators on research, grant writing, or article writing), *climate of diversity* within the department, and *climate of scholarly inclusion* within the profession (Figure 1).

We study these four climate facets within the context of P-E fit because they fall under the broader umbrella of inclusive academic climates, which are especially important for individuals from marginalized groups. Studies find that more inclusive climates are associated with increased productivity, job commitment, and job satisfaction, as well as lower turnover intentions (McKay et al., 2007; Nishii, 2013). However, researchers consistently find that members of underrepresented groups perceive the climate more negatively than those from majority groups and subsequently have

worse career outcomes (McKay et al., 2007; Settles, Buchanan, et al., 2019). Compared to members of the majority group, individuals from marginalized groups are especially attentive to inclusive climates because of a long history of exclusion and discrimination (Purdie-Vaughns et al., 2008). Therefore, when an academic environment lacks inclusive climates, those from marginalized groups may feel especially unwelcome, with negative consequences for their career outcomes and persistence.

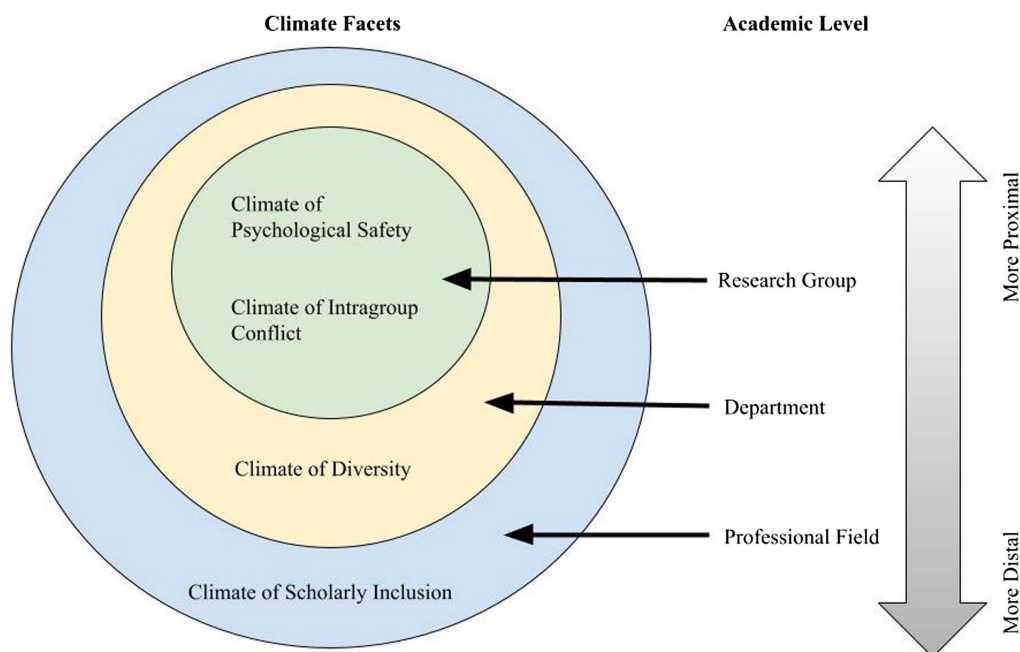
Three Levels of Inclusive Academic Climate

Consistent with P-E fit, we study four climate facets that reflect an inclusive academic climate at the three levels (i.e., research group, department, and profession) described above. There are many ways that career outcomes are influenced by experiences at multiple levels of academia. For example, policies, practices, and norms at the professional field level influence daily activities at more local levels of departments and research groups. Similarly, the work of scholars and research groups at more local levels can influence decision making within professional societies and scholarly journals.

At the most local level, positive research group climate is related to greater individual job satisfaction, commitment, and involvement (Braun et al., 2013; Parker et al., 2003). Perceptions of climate at that level (person–research group fit) are especially influenced by trust, support, and cooperation among group members (James et al., 2008) and intragroup conflict or tension (de Wit et al., 2012). For example, psychological safety (i.e., the ability to take risks, feelings of trust in other group members) is associated with group outcomes, including greater productivity (Bradley et al., 2012) and knowledge sharing

Figure 1

Research Conceptual Framework Showing the Four Climate Facets (Left) Nested Within the Three Academic Levels (Center) That Range From More Proximal at the Top to More Distal at the Bottom for Scholars' Daily Experiences (Right)



Note. See the online article for the color version of this figure.

(Xue et al., 2011). Although conflict is a normal and necessary aspect of research groups (e.g., Tuckman & Jensen, 2010), without effective conflict management, persistent relationship tension can reduce collaborative problem solving (De Dreu, 2006) and group performance (de Wit et al., 2012). Therefore, we examine the effects of research group climate as measured by psychological safety and intragroup conflict on career outcomes.

At the department level, studies have examined how the climate affects the outcomes of graduate students and faculty (person–department fit; Griffith et al., 2022). For example, research finds that more positive departmental climates are associated with higher job satisfaction and productivity among academic science faculty (Settles et al., 2006), turnover intentions among faculty (Callister, 2006), and academic performance among women students in STEM (Settles et al., 2016). Women faculty also perceive their department as being more exclusionary when women are underrepresented, even when departmental procedures are perceived as fair (Maranto & Griffin, 2011). Finally, transgender and sexual minority STEM faculty are twice as likely to report considering leaving their department when they perceive the climate as being exclusionary (Barthelemy et al., 2022). Thus, we examine whether a climate of diversity at the department level that provides scholars from marginalized groups with a sense of belonging and greater value congruence positively affects career outcomes.

At the professional field level (person–profession fit), cultural beliefs about who are competent and valued members of a professional field are embedded in daily interactions. These cultural beliefs are inflected with gender, racial/ethnic, and anti-LGBTQ+ (lesbian, gay, bisexual, transgender, queer) biases, such that those scholars most often seen to epitomize professional competence are heterosexual white men (Cech et al., 2018; Cech & Waidzun, 2011; Gonzales & Terosky, 2016). Students and early career scholars are socialized into these professional cultural beliefs in higher education (Cech, 2014). As a result, students and professionals who perceive themselves as having the least alignment with cultural norms of excellence may have worse career outcomes (Blair-Loy & Cech, 2022). Although some research has explored how profession-level biases are related to career outcomes such as job satisfaction and turnover intentions (e.g., Posselt, 2020), more work is needed to understand how professional field climate (i.e., the extent to which scholars feel that they and their scholarly work are accepted in the professional field/discipline) influences marginalized scholars' turnover intentions and burnout.

The Present Study

Building on P-E fit theory, we suggest that an academic climate at the research group, department, and professional field levels that does not support marginalized scholars is associated with their negative career outcomes. We measured three career outcomes: turnover intentions (i.e., scholars' level of organizational withdrawal behaviors or the likelihood of an employee leaving their job; Hanisch & Hulin, 1990; Johnsrud & Rosser, 2002), scholars' burnout disengagement (i.e., low levels of work dedication and behavioral avoidance of work-related tasks; Basinska & Gruszczynska, 2020), and burnout exhaustion (i.e., cognitive and physical fatigue related to one's work; Basinska & Gruszczynska, 2020). Turnover intentions and burnout disengagement measure an individual's overall behavioral (e.g., avoiding work tasks) and

psychological disengagement (e.g., desire to leave) from work. Therefore, we refer to both outcomes as "work disengagement." Throughout this article we refer to turnover intentions, burnout disengagement, and burnout exhaustion as "career outcomes." These three constructs refer to the psychological and behavioral consequences of the work environment that influence intentions to stay in academia (Hunter & Devine, 2016).

We use a composite measure that simultaneously captures individuals' multiple marginalized identities (e.g., race/ethnicity, gender, sexual identity; Elliott et al., 2017; Settles, Brassel, et al., 2019; Settles et al., 2018) and categorizes them as having none, one, two, or three or more marginalized identities. We take this different approach from the literature that spotlights one axis of disadvantage (e.g., race or gender) because we are interested in the extent to which greater divergence from an intersectionally privileged status is likely to be accompanied by negative career outcomes. This approach also allows us to assess how being a member of multiple marginalized groups (e.g., transgender people of color) relates to experiences of climate when the sample sizes for individual groups are too small to be analyzed separately.

Given the existing literature on the relationships between climate and career outcomes (Braun et al., 2013; Parker et al., 2003) and the comparatively negative climate perceptions among members of underrepresented groups in STEM (Settles, Brassel, et al., 2019; Settles et al., 2016), we expected inclusive climates to be a central factor affecting career outcomes for marginalized early career scholars. We examined how inclusive climates at three academic levels affect academic science career outcomes in four science disciplines: biology, economics, physics, and psychology. These four fields were selected because they include fields within both the natural sciences (biology and physics) and social sciences (economics and psychology). Although racial–ethnic minorities are underrepresented in doctorate recipients for all four fields (under 15% at the time of the study), we selected disciplines in each area of science (natural vs. social) that varied in their representation of women. Specifically, there is relatively more gender parity in psychology and biology at the early career level, whereas physics and economics are male dominated at all career stages (National Science Board, 2018). Therefore, using these four fields allows us to study climate and its effects on career outcomes across the spectrum of sociodemographic representation, research practices, and epistemic norms in fields under the umbrella of science. Specifically, we hypothesize that among early career scholars:

1. Individuals belonging to more marginalized groups will report greater work disengagement and greater burnout exhaustion compared to those belonging to fewer marginalized groups.
2. These differential outcomes will be partly explained by climates being less inclusive at the research group, department, and professional field levels for those with more marginalized identities as compared with those with fewer marginalized identities.

Additionally, we pose one preliminary hypothesis:

3. The more proximate climate at the local level of the research group will most affect career outcomes, especially for individuals belonging to more marginalized groups, with climate at the department level in the middle

and climate at the more distal level of the professional field being least influential on career outcomes of early career scholars from marginalized groups.

Method

Procedure

We identified early career scholars from 124 departments of biology, economics, physics, and psychology at 94 PhD-granting academic institutions across the United States. We created stratified random samples of departments in the four professional fields using a 2011 National Research Council ranking of departments and stratifying them by three tiers according to the National Research Council's institutional prestige measure (National Research Council, 2011). We then randomly selected 10 departments from each of the three tiers and supplemented these with four additional departments to ensure each field/tier combination included at least one institution with the federal designation of "Minority Serving Institution" (Gasman et al., 2008). We identified the contact information for potential participants from departmental websites or with information provided by the department. Individuals were invited to participate in the survey via email between April and May 2021. We sent four reminder emails to nonrespondents.

The survey was administered using Qualtrics online survey software. Participants indicated their consent by selecting "Agree" on the informed consent page, and nonconsenters were redirected out of the survey. The survey took approximately 30 min to complete, and participants were given a check for either \$35, \$25, or \$20 depending on how soon after the initial invitation they completed the survey. All materials used in the survey were approved by the institutional review boards at both research team institutions (Michigan State University: STUDY00004853 and University of Michigan: HUM00193386).

Participants

We contacted 10,658 early career scholars from four academic science fields, received 3,512 valid responses (33% response rate), and excluded 308 participants because they were no longer in the department from which they were recruited or did not complete the items included in the analysis (approximately 45% of the survey); this resulted in a final sample size of 3,204. The sample included doctoral students ($n = 2,697$, 84.2%), postdoctoral researchers ($n = 282$, 8.8%), and assistant professors ($n = 225$, 7.0%). Participants were from 124 departments across the fields of biology ($n = 837$), economics ($n = 635$), psychology ($n = 888$), and physics ($n = 844$). Regarding racial/ethnic identity,² 59.7% identified as white or Caucasian ($n = 1,914$), 29.5% as Asian or Asian American or Pacific Islander ($n = 946$), 9.5% as Hispanic or Latina(o) or Latinx ($n = 305$), 3.9% as Black or African American ($n = 124$), 3.5% as Middle Eastern or North African ($n = 112$), and 0.8% as Native American or American Indian or Alaskan Native ($n = 25$). Participants self-identified their gender as woman ($n = 1,537$, 50%), man ($n = 1,537$, 48.9%), or genderqueer/gender nonbinary ($n = 64$, 2%); respondents were primarily cisgender ($n = 3,116$, 97.6%), with 1.2% identified as transgender ($n = 38$). Participants self-identified as straight or heterosexual ($n = 2,546$, 79.8%), gay ($n = 102$, 3.2%), lesbian ($n = 43$, 1.4%), bisexual ($n = 264$, 8.3%), or a different label ($n = 163$, 5.1%). Just under half of the respondents ($n = 1,444$,

46.4%) reported having either a physical, mental, or learning disability, whereas 53.6% ($n = 1,667$) did not. The majority of participants were not first-generation students (71.9%), grew up having more than enough money/resources to get by (58.9%), and the average age was 29.6 years old ($SD = 4.7$).

Measures

Unless otherwise specified, measures were on a response scale of 1 (*strongly disagree*) to 5 (*strongly agree*) and averaged such that higher scores indicate higher levels of the construct unless noted otherwise.

Marginalized Identities

We generated a composite variable that captured the number of marginalized identities a participant held along seven dimensions: gender minority (woman, nonbinary), transgender identity (transgender), person of color (Asian, Asian American, or Pacific Islander; Black or African American; Hispanic or Latin(a/o/x); Middle Eastern or North African; Native American, American Indian, or Native Alaskan), sexual minority (lesbian, gay, bisexual, pansexual), at least one disability (physical, mental, or learning disability), first-generation college student, and low socioeconomic status growing up ("very poor, not enough to get by" or "barely enough to get by"). We categorized participants as having 0, 1, 2, or 3–7 marginalized identities. A 0 was given to participants who were white, able-bodied, neurotypical, heterosexual, of middle or high socioeconomic status as a child, not a first-generation college student, and cisgender men. Due to small cell sizes, we aggregate individuals with 3–7 marginalized identities into one group. Our final group sizes for number of marginalized identities were 0, $n = 346$; 1, $n = 857$; 2, $n = 972$; 3–7, $n = 1,029$ (3, $n = 634$; 4, $n = 304$; 5, $n = 74$; 6, $n = 16$; 7, $n = 1$). Individuals with a score of 2 might have any two marginalized identities such as sexual minority women, first-gen men with a disability, or nonbinary people of low socioeconomic status as a child. The most common marginalized identities self-reported in our study were based on participants' gender, race, and disability status.

Climate of Psychological Safety

Psychological safety at the research group level was measured with an adapted version of Edmondson's (1999) team psychological safety measure. It assesses one's assurance of taking interpersonal risks among a team. We adapted items to ask about collaboration within the participant's research lab or research group (e.g., "People in your research lab are able to bring up problems and tough issues with one another"; $\alpha = .85$, $M = 4.0$, $SD = 0.7$).

Climate of Intragroup Conflict

Climate of intragroup conflict at the research group level was measured with five items adapted from the intragroup conflict scale (Jehn & Mannix, 2001) and one item written for our survey. These items assessed the frequency of relationship- and work-related conflict within research groups. Items were adapted to ask participants about

² Participants were instructed to select all response options that apply to their racial or ethnic identity; therefore, the total percentages reported exceed 100%.

their research group or research lab (e.g., “How often is there relationship tension in your research group?” “How often is there unpleasant conflict in your research lab?”). All items were measured on a scale from 1 (*never*) to 5 (*always*; $\alpha = .85$, $M = 2.0$, $SD = 0.7$).

Climate of Diversity

We measured department diversity climate with a five-item measure adapted from Pugh et al.’s (2008) *organizational diversity climate* and a seven-item measure adapted from McKay et al.’s (2007) *diversity climate perceptions* scales. We combined these measures as they were highly correlated at $r = 0.84$. The items were adapted to examine the diversity climate within the participant’s department (e.g., “In my department, it is easy for people from diverse backgrounds to fit in and be accepted” and “My department has a climate that values diverse perspectives”; $\alpha = .89$, $M = 3.5$, $SD = 0.9$).

Climate of Scholarly Inclusion

We measured climate of scholarly inclusion at the professional field level using an adapted version of the *professional respect* scale (Cech, 2022). Participants responded to nine items asking the degree to which they are valued and represented in their field. Four of the items were original to Cech (2022; e.g., “My scholarly work is represented in my field”), and we created five additional items such as “Issues of diversity and inclusion are important to my field” ($\alpha = .79$, $M = 3.5$, $SD = 0.9$).

Work Disengagement

We assessed work disengagement with two relevant measures: turnover intentions and burnout disengagement. Turnover intentions were measured with four items from the *organizational withdrawal* scale (Hanisch & Hulin, 1990). Participants indicated the frequency with which they had engaged in behaviors, such as “Completed work or school assignments late” and “Thought about quitting because of school or work-related issues” within the past year on a 5-point scale (1 = *never* to 5 = *once a week or more*; $\alpha = .70$, $M = 2.4$, $SD = 0.9$). Burnout disengagement ($\alpha = .69$, $M = 3.3$, $SD = 1.0$) was measured by adapting three items from the *burnout disengagement* subscale developed by Demerouti et al. (2010). These items asked about the frequency that participants engaged in behaviors such as “Talked about your work in a negative way” and “Done your work without thinking, almost mechanically” on a 5-point scale (1 = *never* to 5 = *once a week or more*).

Burnout Exhaustion

We measured burnout exhaustion using four items from the *burnout exhaustion* subscale developed by Demerouti et al. (2010). Participants responded with the degree to which they agree or disagree with statements such as “After work, I tend to need a lot of time to relax and feel better” and “I can tolerate the pressure of my work well” ($\alpha = .78$, $M = 3.2$, $SD = 0.8$).

Analytic Plan

We fitted three multilevel general structural equation models, one for each career outcome (turnover intentions, burnout disengagement, and burnout exhaustion) using Stata software v16.0.

A multilevel general structural equation model was used to test our hypotheses because it takes into account the nested nature of data (participants at Level 1 within departments at Level 2) and allows us to quantify both direct effects and the indirect/mediation effects of climates on the relationships between marginalized identities and outcomes. We specified each general structural equation model using the marginalized identity composite variable (0, 1, 2, or 3+) that predicts the climate mediators at the levels of the research group (as measured by psychological safety and intragroup conflict), department (as measured by diversity climate), and profession (as measured by climate of scholarly inclusion).³ These different climate mediators were in turn used to predict the career outcomes of turnover intentions, burnout disengagement, and burnout exhaustion. Using indirect effects, we assessed whether the climate variables significantly mediated the relationships between the marginalized identity composite variable and the three career outcomes.

We also included professional field (biology, economics, physics, psychology) and career stage (graduate student, postdoctoral scholar, assistant professor) as model covariates (Table 1). The predictor, mediators, outcomes, and covariates were entered at Level 1 because they are individual-level demographics, climate perceptions, and outcomes. The academic department was entered as a Level 2 covariate to account for variability in the outcome measures among the 124 different academic departments studied. We did not predict or detect a significant effect at Level 2 and thus focused results on Level 1 relationships.

Results

Table 1 presents the means, standard deviations, and bivariate correlations between the marginalized identity composite variable, climate mediators, and career outcomes. In support of Hypothesis 1, we found that individuals with a greater number of marginalized identities reported significantly worse career outcomes—higher turnover intentions, burnout disengagement, and burnout exhaustion. Further, as shown on the left side of Figures 2a–c, participants with more marginalized identities reported significantly less inclusive climates for all climate facets and academic levels measured. In other words, early career scholars with more marginalized identities reported less psychological safety and more intragroup conflict within research groups, lower diversity climate within departments, and a less inclusive professional climate of scholarly inclusion compared with those with fewer marginalized identities. Because the relationships between the marginalized identity composite variable and the four climate mediators are the same for all three career outcome models, we do not repeat them below.

In our model of turnover intentions (Figure 2a), we found that higher turnover intentions were significantly associated with more intragroup conflict, worse departmental diversity climate, and less professional climate of scholarly inclusion. However, there was no significant association between psychological safety and turnover intentions. There were also significant indirect effects between participants’ marginalized identities and turnover intentions through intragroup conflict, department climate of diversity, and professional

³ We replicated the analyses with alternative ways of structuring the composite measure including grouping at 2+ marginalized identities and not grouping at all and found the results to be robust to alternative operationalization strategies. Results available upon request.

Table 1

Means, Standard Deviations, and Pearson Correlations (r) for Main Study Variables as Well as the Unstandardized Coefficients (B) of the Covariates From the Generalized Structural Equation Models

Variable	<i>M (SD)</i>	Pearson correlation							
		1	2	3	4	5	6	7	8
1. Marginalization composite		—							
2. Research group psychological safety	4.0 (0.7)	-.14*	—						
3. Research group intragroup conflict	2.0 (0.7)	.09*	-.60*	—					
4. Department climate of diversity	3.5 (0.9)	-.16*	.32*	-.28*	—				
5. Professional climate of scholarly inclusion	3.5 (0.6)	-.27*	.44*	-.29*	.50*	—			
6. Turnover intentions	2.4 (0.9)	-.18*	.19*	.22*	-.25*	-.25*	—		
7. Burnout disengagement	3.3 (1.0)	.10*	-.21*	.22*	-.34*	-.26*	.61*	—	
8. Burnout exhaustion	3.2 (0.8)	.24*	-.30*	.25*	-.26*	-.35*	.48*	.49*	—
GSEM model covariate		Turnover intentions <i>B (SE)</i>		Burnout disengagement <i>B (SE)</i>		Burnout exhaustion <i>B (SE)</i>			
Profession (psychology [ref])									
Biology		-0.06 (0.06)		-0.21* (0.07)		-0.09* (0.04)			
Economics		-0.26* (0.06)		-0.57* (0.08)		-0.15* (0.05)			
Physics		-0.05 (0.06)		-0.37* (0.07)		-0.17 (0.04)			
Career stage (assistant professor [ref])									
Graduate student		-0.09 (0.06)		0.14* (0.07)		0.01 (0.05)			
Postdoctoral scholar		-0.21* (0.08)		-0.29* (0.09)		-0.24 (0.07)			

Note. Referent groups are indicated by [ref]. *SE* = standard error; GSEM = general structural equation models.

* $p < .05$.

climate of scholarly inclusion, but not research group psychological safety, offering partial support for Hypothesis 2 (Table 2).

In the model predicting burnout disengagement (Figure 2b), we found a similar pattern of results such that greater burnout disengagement was associated with more intragroup conflict (but not psychological safety), worse department diversity climate, and lower levels of professional climate of scholarly inclusion. There were once again significant indirect effects between participants' marginalized identities and burnout disengagement through research group intragroup conflict (but not psychological safety), department diversity climate, and professional climate of scholarly inclusion, again partially supporting Hypothesis 2 (Table 2).

Consistent with the other models, the model predicting burnout exhaustion (Figure 2c) indicated that more research group intragroup conflict, worse department diversity climate, and lower levels of professional climate of scholarly inclusion were associated with more burnout exhaustion. However, this model also indicated that participants who reported less research group psychological safety reported more burnout exhaustion. There were significant indirect effects between participants' marginalized identities and burnout exhaustion through their experiences of research group psychological safety, research group intragroup conflict, department diversity climate, and professional climate of scholarly inclusion, fully supporting Hypothesis 2 (Table 2).

For each model, we tested Preliminary Hypothesis 3 by examining the contrasts of the indirect effects to determine the relative statistical strength of each mediator (inclusive climate at the research group, department, and professional field levels) on the relationship between marginalization and each career outcome (Table 2). For turnover intentions and burnout exhaustion, the indirect effects of scholarly inclusion at the level of the profession were significantly larger than the indirect effects of the other three climate mediators at the levels of the department and research group. However, for burnout

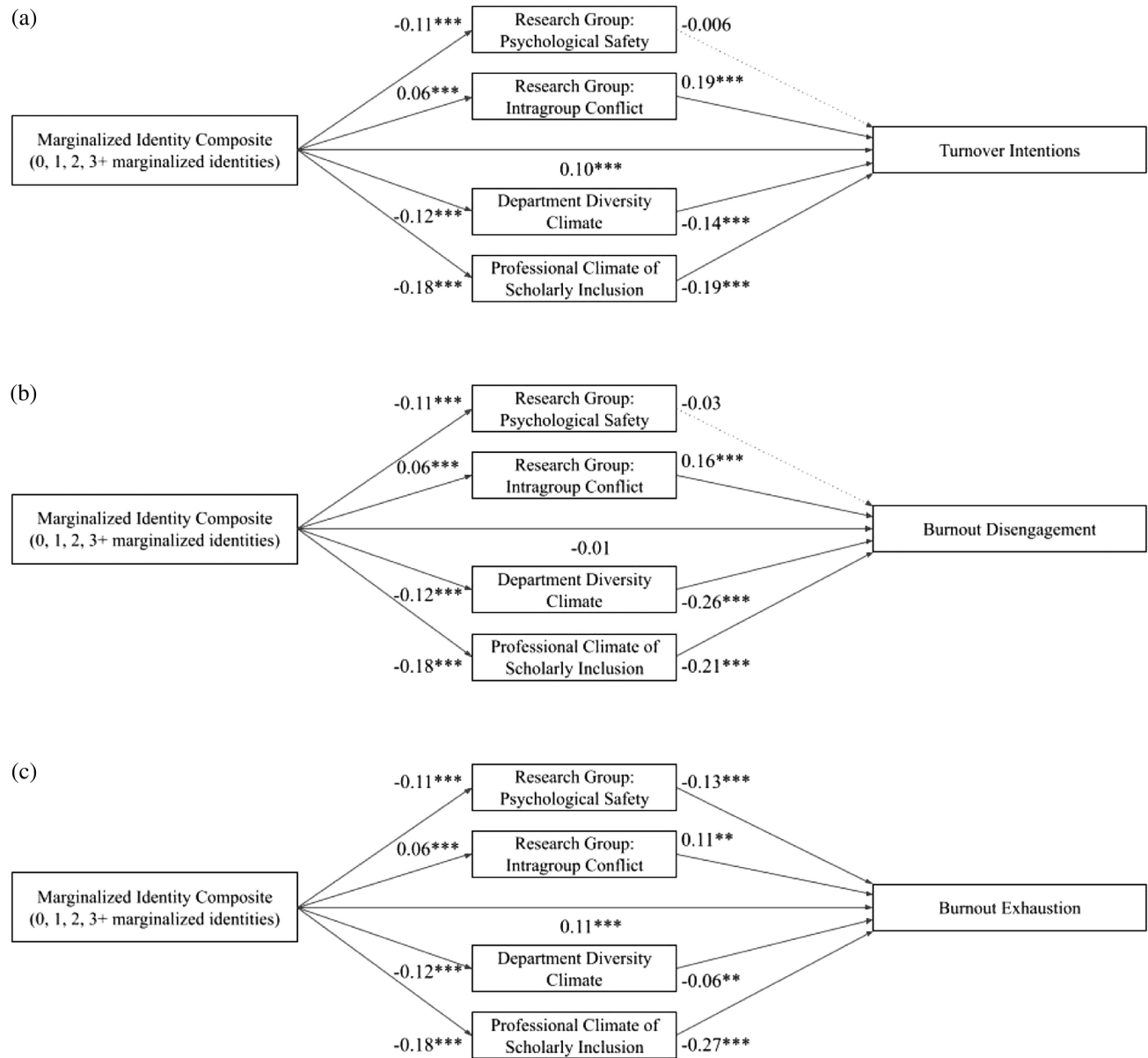
disengagement, the magnitude of the indirect effects for scholarly inclusion within the profession and diversity climate within the department were similarly higher than those for the other two climate facets. Contrasts of indirect effects also showed that diversity climate within the department was a stronger mediator than psychological safety within the research group. The relative strength of the two research group climate mediators differed by career outcome. Intragroup conflict was a stronger mediator than psychological safety for turnover intentions, whereas psychological safety was a stronger mediator than intragroup conflict for burnout exhaustion, and there was no difference between intragroup conflict and psychological safety for burnout disengagement. Overall, in contrast to our tentative prediction, professional climate of scholarly inclusion (and to a lesser extent diversity climate in the department) was the strongest mediator across outcomes.

Discussion

Our research extends previous work by examining the mediating effects of inclusive climate at three academic levels on multiple career outcomes for early career science scholars. We do so using a composite identity variable that helps capture the experiences of scholars who are members of multiple marginalized groups, compared to intersectionally privileged scholars. Aligned with our hypotheses, we found that early career scholars with multiple marginalized identities experienced a more negative climate at the levels of the research group, department, and profession as compared to those with fewer or no marginalized identities. Scholars with greater numbers of marginalized identities also reported higher levels of work disengagement via turnover intentions and burnout disengagement, as well as higher levels of burnout exhaustion. Except for research group psychological safety, all climate facets significantly mediated the relationships between

Figure 2

Marginalized Identities and (a) Turnover Intentions, (b) Burnout Disengagement, and (c) Burnout Exhaustion Mediated by Inclusive Climate at the Levels of the Research Group (Psychological Safety and Intragroup Conflict), Department (Diversity Climate), and Profession (Scholarly Inclusion)



Note. Coefficients are unstandardized. Not pictured are paths controlling for career stage (doctoral student, postdoctoral scholar, and assistant professor [referent]) and profession (psychology [referent], biology, economics, and physics). Solid lines represent significant effects, while dotted lines refer to nonsignificant effects between psychological safety and turnover intentions and psychological safety and burnout disengagement.

** $p < .01$. *** $p < .001$.

the marginalized identity composite variable and career outcomes. Finally, and counter our expectation, we found that an inclusive climate at the professional level was most significantly related to career outcomes, as compared to climate at the more proximate research group and department levels. Below, we highlight results and implications synthesized at the research group, department, and professional field levels.

Task-related conflict, when handled inclusively, can be a necessary and important part of productive teamwork (DeChurch & Marks, 2001), and building skills in effective conflict management can result in high-functioning science teams (e.g., Cheruvil et al., 2014). However, we found that intragroup conflict significantly mediated the relationships between identity and worse career outcomes, suggesting that intragroup conflict may result in

Table 2

Indirect Effects and Contrasts Between Indirect Effects With 95% Confidence Interval for Mediation Analyses Predicting Turnover Intentions, Burnout Disengagement, and Burnout Exhaustion

Predictor and mediator path	Turnover intentions <i>B</i> [95% CI]	Burnout disengagement <i>B</i> [95% CI]	Burnout exhaustion <i>B</i> [95% CI]
Indirect effects			
Marginalized identities → research group psychological safety	-.0007 [-.01, .01]	.004 [-.003, .01]	.01*** [.01, .02]
Marginalized identities → research group intragroup conflict	.01*** [.01, .02]	.01** [.004, .01]	.01*** [.002, .01]
Marginalized identities → department diversity climate	.02*** [.01, .02]	.03*** [.02, .04]	.01** [.002, .01]
Marginalized identities → professional climate of scholarly inclusion	.03*** [.02, .05]	.04*** [.02, .05]	.05*** [.04, .06]
Contrasts between indirect effects			
Research group intragroup conflict—research group psychological safety	.01* [.002, .02]	.006 [-.005, .02]	-.01 [-.02, .001]
Research group intragroup conflict—department diversity climate	-.01 [-.01, .003]	-.02*** [-.03, -.01]	.0003 [-.01, .01]
Research group intragroup conflict—professional climate of scholarly inclusion	-.02** [-.04, -.01]	-.03*** [-.04, -.01]	-.04*** [-.05, -.03]
Research group psychological safety—department diversity climate	-.02*** [-.03, -.01]	-.03*** [-.04, -.01]	.01 [-.0004, .02]
Research group psychological safety—professional climate of scholarly inclusion	-.03*** [-.05, -.02]	-.03*** [-.05, -.02]	-.03*** [-.05, -.02]
Department diversity climate—professional climate of scholarly inclusion	-.02* [-.03, -.002]	-.01 [-.02, .01]	-.04*** [-.05, -.03]

* $p < .05$. ** $p < .01$. *** $p < .001$.

higher work disengagement and burnout exhaustion. Therefore, at the research group level, forms of relational conflict such as interpersonal conflict and conflict around decision making may be deleterious, particularly for scholars who hold multiple marginalized identities. This highlights the importance of building teamwork competencies in the areas of conflict management and managing power dynamics (e.g., Cheruvelil et al., 2014; Lotrecchiano et al., 2021) and additional research to understand how to foster productive communication in diverse research teams to ensure the voices of marginalized scholars are not silenced or devalued.

Previous research has noted the mediating role of psychological safety on turnover intentions in the health care context (Hebles et al., 2022) and for workers with a chronic illness (Kirk-Brown & Van Dijk, 2016). However, we found that perceptions of psychological safety within the research group were not associated with lower turnover intentions or burnout disengagement for marginalized scholars. This result might suggest that positive relationships at the research group level are not sufficient to outweigh the negative effects that marginalized scholars experience in academic science more broadly. Alternatively, given the significant bivariate correlations between psychological safety and the three career outcomes, the lack of significance in the models may be due to intragroup conflict accounting more strongly for their shared variance. In contrast, psychological safety was a significant mediator for burnout exhaustion, which is related to energy depletion (Basinska & Gruszczynska, 2020). These results may indicate that positive interpersonal relationships within research groups may help to alleviate feelings of burnout exhaustion but are not sufficient to overcome work disengagement behaviors.

At the department level, we found that diversity climate was related to all three career outcomes and significantly mediated the relationship between marginalized identities and turnover intentions, burnout disengagement, and burnout exhaustion. These results are consistent with past research conducted at the department level. For example, it is well-documented that “chilly” climates and

greater obstacles to success in U.S. academic science departments exclude gender minority scholars, scholars of color, and sexual minority scholars (e.g., Bourabain, 2021). Further, a less inclusive departmental climate is associated with more negative experiences in collaborative research groups for scholars with multiple marginalized identities (Griffith et al., 2022).

Compared to what is known from research on experiences of climate within research groups and departments, less scholarly attention has been paid to understanding marginalized science scholars' perceptions of climate at the level of the profession (i.e., climate of scholarly inclusion). Our results suggest that scholars with multiple marginalized identities experience climate at the level of their profession as being less open to diversity and as devaluing scholarship by people from marginalized groups. In fact, across the three academic levels studied, climate at the level of the profession was the strongest mediator of the relationship between marginalized identities and all three career outcomes.

These findings point to the importance of professional norms and values that are communicated to scholars by their profession. For example, the research and methods that are funded, published, and rewarded send a message about what constitutes “good” science in a given field. Scholars from marginalized groups whose research may be devalued by top journals (Settles et al., 2021) or who experience discrimination at professional conferences (Segarra et al., 2020) are confronted with a fundamental lack of fit with their organizational environment. The professional field thus sets the standard for how academic departments decide recruitment and promotion criteria and, in turn, influences the work done by research groups (Gonzales & Terosky, 2016). Therefore, although counter to our expectations, perhaps it is not surprising that scholarly inclusion helps explain the relationships between marginalized identities and career outcomes. Importantly, these results also point to the enormous potential professional fields have for positively shaping the careers of marginalized scholars through broad-ranging culture, practice, and policy changes.

Implications for Practice and Policy

To fulfill the goal of achieving a more inclusive academy, we suggest an array of policies and practices that can help foster an open and positive work environment for marginalized early career scholars. Although we organize these recommendations in terms of the three levels of research groups, departments, and professional fields, it is important to recognize that activities at one level may be able to reduce negative outcomes of poor climate at other levels. For example, inclusive climates within research groups or at the professional level may help alleviate harm done by poor climate at the department level. However, for a truly inclusive academy, we must improve climate at all levels.

Within the *research group*, we recommend that research labs and groups develop and maintain policies and behavioral expectations. These policies and norms can include information about collaborative writing and authorship practices (Douglas et al., 2024; Elliott et al., 2017; Soranno & Cheruvilil, 2019); guidelines regarding effective communication, particularly around conflict; and information on how to use materials, equipment, and software. All team members should be included in creating these policies and norms to ensure that everyone's input is valued and that the policies and expectations are inclusive. Providing marginalized scholars with agency, impact, and voice in these processes has been shown to increase job satisfaction (Settles et al., 2007). Team policies can also increase transparency about the often unspoken and unwritten cultural norms necessary to adhere to in order to succeed in traditional academic settings (White & Lowenthal, 2011). By promoting transparency, team members can better understand their role in the research project, feel more engaged in the research process, and have a better understanding of the potential impact of their contributions.

An important intervention for administrators and leaders at the *department level* is to cultivate an organizational climate that values, promotes, and uplifts its student body and faculty. There are a number of practical ways departments can support marginalized scholars' research agendas and recruit, retain, and promote scholars from marginalized groups. University departments can provide department-level training and resources for faculty and principal investigators about issues related to diversity, equity, and inclusion, including on creating inclusive research group policies and effective team management. By demonstrating the importance of maintaining research group policies at the team level, department leadership can empower principal investigators to take the time to generate team policies. This training can include guidelines on how to create equitable team policies that promote inclusion, diversity, and transparency. Additionally, departments can encourage principal investigators to utilize these policies and offer support to those who may need assistance implementing them.

Departments should strive to create a welcoming and inclusive environment for all members and work to ensure marginalized voices are involved in decision making by actively recruiting marginalized faculty into leadership and providing them with opportunities for career growth and advancement. Indeed, fostering a department culture of transparency has an influence on scholars' perceived agency over their professional lives (Campbell & O'Meara, 2014). It is also important that department leaders and administrators model the main tenets of inclusive climates by employing an equity lens (i.e., fairly implemented employment

practices, integration of differences, and inclusion in decision making; Nishii, 2013) regarding funding opportunities, mentorship programs, and access to necessary equipment, facilities, and training. Finally, department leaders and administrators should model these behaviors and hold themselves accountable for creating an inclusive environment.

Our results suggest that a climate of inclusion at the *professional field level* was particularly important in affecting career outcomes for scholars from marginalized groups. Norms about who belongs and what types of scholarly work are valued in a professional field are communicated in several ways, including through what is published and funded, and during interactions in professional settings such as conferences. Therefore, to increase belonging among marginalized scholars, these are critical points of intervention. Professional societies can take the lead in fostering more inclusive climates by incorporating diversity, equity, and inclusion in their mission statements and in their conference programming and by including marginalized scholars in leadership roles (Madzima & MacIntosh, 2021). Funding agencies can encourage professional societies in these efforts with initiatives that support culture change (e.g., the U.S. National Science Foundation's "Leading Culture Change Through Professional Societies of Biology").

Scholars absorb information about their profession's climate and values through recognition and reward structures that reflect historical biases (O'Meara, 2021). Some examples of this may include the naming and types of awards and the positioning of certain subfields and research methods (Settles et al., 2021, in press). Some concrete steps to counter the exclusionary reward systems of the past include renaming existing awards with names of scientists from marginalized groups and creating new ones for historically devalued subfields and methods. Societies can also create networks to provide support and mentoring for groups of scholars who have been historically marginalized in their professions, democratize conferences by increasing accessibility and transparency for those outside of the academy, and communicate their norms and values through their journals and periodicals. Through training of and partnerships with journal editors and editorial boards, these publications can be used to alleviate historical biases and demonstrate a commitment to diversity, equity, and inclusion in the profession. These efforts have the potential to improve the professional climate of scholarly inclusion, thereby enhancing the P-E fit for scholars with marginalized identities.

Limitations and Future Directions

This study has limitations that contextualize our results and suggest avenues for further research. One limitation is the study's approach to analyzing marginalized identities; for the purpose of these analyses, all respondents were grouped into one of four categories: 0, 1, 2, or 3+ marginalized identities. Although this strategy facilitates exploring the experiences of those occupying multiple marginalized identities, this study does not address particular forms of oppression (e.g., sexism, racism, ableism) or their specific intersections (e.g., gendered racism) that may uniquely impact the academic experiences and outcomes of scholars with particular combinations of marginalized identities. For example, although these results speak to the ways the academic system across levels negatively relates to the outcomes of marginalized scholars writ large, our approach does not speak to specific groups in STEM

(e.g., women of color), nor do we compare groups with different intersections of race, gender, sexual identity, etc. (e.g., women of color vs. sexual minority women; low socioeconomic status men vs. white women with a disability). This additive approach to studying marginalization is not interchangeable with an intersectional analysis (cf. Crenshaw, 1991) but does afford insight into how scholars with multiple marginalized identities experience the academic environment differently from those with intersectional privilege and how climate at the research group, department, and professional field levels mediates potentially negative outcomes (e.g., turnover). Moreover, this approach allowed us to include all study participants in our marginalization variable, rather than having to exclude participants whose combination of marginalized identities is not common enough to examine as its own group. There are also numerous demographic and contextual factors that contribute to turnover intentions and burnout that were outside the scope of the present analyses. For example, work-related strain, job satisfaction, and caregiving responsibilities can contribute to, or ameliorate, negative career outcomes (Dorenkamp & Weiß, 2018; Manchester et al., 2023).

Another limitation of our study is its focus on early career scholars in four academic science fields. We chose to focus our study on graduate students, postdoctoral scholars, and assistant professors because these early career stages are when people face barriers to entering the academy or choose to opt out of the academic pathway. However, an opportunity for further research is to examine how academic climates relate to long-term career outcomes. For example, a longitudinal study would help us understand how inclusive (or exclusionary) climates influence turnover behavior, and studies of a wider range of academic positions (e.g., associate and full professors, contingent faculty) could identify other positions or career stages that are particularly affected by climate. Finally, although the breadth of fields we studied provided a range of sociodemographic representation, research practices, and epistemic norms in the sciences, future research could explore a greater range of professional fields to discern differences in the effects of climate on career outcomes between, for example, the sciences and humanities.

Conclusion

We found that marginalized early career scholars report more negative experiences of climate at three academic levels: less psychological safety and greater intragroup conflict at the research group level, more negative diversity climate at the department level, and diminished professional climate of scholarly inclusion at the professional field level. The climates experienced by marginalized scholars at these three levels also significantly mediated their turnover intentions, burnout disengagement, and burnout exhaustion. In line with the P-E fit theory, early career scholars who perceived their work environment as less inclusive reported more work disengagement and burnout exhaustion. Interestingly, an inclusive climate at the level of the professional field was the strongest predictor of career outcomes for early career marginalized scholars in academic science. Therefore, it is critical that leadership within academic institutions, professional societies, and scientific journals make policy and norm changes. Without such shifts in values and expectations at the professional field level, changes within the department and research group levels will be both difficult to achieve and limited in impact.

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Received June 1, 2023

Revision received March 20, 2024

Accepted April 3, 2024 ■