The Pathway to Full Professor: Associate Professor Women's Institutional Concerns

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ABSTRACT

The route to tenure is often clear and well-defined, while the path to full professor is notoriously described as ambiguous and elusive, which raises questions and uncertainty on how to be promoted. In order to explore institutional concerns expressed by associate professor women in science, technology, engineering, and mathematics (STEM) and social and behavioral sciences (SBS) regarding the pathway to full professor, interviews were conducted with members of the Belayers Network at the University of Colorado Colorado Springs (UCCS). The Belayers Network consists of STEM and SBS associate professor women and is designed to support their promotion to full professor through opportunities to come together for informational, tangible, and emotional resources. An instrumental case study with a pragmatic theoretical lens was employed for this study. Interviews were analyzed inductively and resulted in five themes: (1) Full professor promotion criteria are ambiguous; (2) Teaching and service expectations are too high; (3) Lack of research collaborators inhibits scholarly output; (4) Scarce research-related resources are a persistent struggle; and (5) Mentoring and support are absent. The academy may find it instructive to understand better associate professor women's institutional concerns about the pathway to full professor and possible ways to offset the obstacles toward achievement. Additionally, pragmatic solutions and implications are offered to mitigate these concerns in the context of UCCS. This research is sponsored by a National Science Foundation ADVANCE Adaptation Award.

KEYWORDS

Associate professor women; full professor; institutional concerns; instrumental case study; pragmatic.

INTRODUCTION

This instrumental case study (Stake, 1995) delves into the institutional concerns of associate professor women in science, technology, engineering, and mathematics (STEM) and social and behavioral sciences (SBS) concerning the pathway to becoming a full professor. All participants are members of the Belayers Network at the University of Colorado Colorado Springs (UCCS), which provides support and resources for women interested in being promoted to full professors. Despite associate professors being in the most productive and influential years of their careers (Baldwin et al., 2008), women often remain at the associate rank longer than men (Fox Tree & Vaid, 2022), which begs the question: Why and what can be done? A pragmatic theoretical lens (Kelly & Cordeiro, 2020) is applied to the interviews to ground this inquiry in the potential solutions and practical implications that can be gathered. The academy may find it instructive to understand better the institutional concerns of associate professor women in STEM and SBS concerning the pathway to full professor and consider possible ways to offset the obstacles shared. The research question that guides this study is: What institutional concerns do associate professor women in STEM and SBS share about achieving full professor status?

The Belayers Network

Project CREST sponsors the Belayers Network at UCCS. UCCS is a public research university offering comprehensive undergraduate and graduate programs. In 2019, the university was reclassified as a "high research activity" or "R2" institution due to the number of doctoral degrees granted and total yearly research expenditures. This reclassification prompted the inception of Project CREST, which endeavors to systematically transform the research experiences of today's scholars and those of the next generation by building a responsive and inclusive research infrastructure and reshaping research policies, practices, and evaluation structures. Project CREST is funded by a National Science Foundation (NSF) ADVANCE Adaptation Award, in which evidence-based practices are "adapted" from other ADVANCE-funded universities. The Belayers Network was developed through an extensive literature review focused on the importance of providing individualized and tailored guidance and support structures to associate professor women to promote the advancement of their careers (Buch et al., 2011; Croom, 2017; Gehrke & Kezar, 2016; Hart, 2016; Smith et al., 2018).

The Belayers Network is based on an intersectional "ethos of care" (Skop et al., 2021) and utilizes the name Belayers—a person who holds steady the pullies of a rock climber moving toward the crest of a mountain and acts as a counterbalance if they fall—as a metaphor to illustrate the development of a cadre of mid-career women who support one another as they advance in their careers. It specifically supports associate professor women in STEM and SBS as they move toward promotion to full professor by providing the opportunity to come together for informational, tangible, and emotional resources. This provision allows them to develop peer and collaborative relationships, connect with a community of women at the same career stage, and engage in co-constructed professional development activities. Monthly events occur in person and online on various topics, such as tips for full professor dossiers, pathways to

leadership, and building equitable and inclusive research spaces. The Belayers Network also offers access to a repository of full professor dossiers designed to democratize the sharing of materials and resources and decrease stress and anxiety levels around promotion. Nearly 80% of eligible associate professor women actively participate in this opportunity. Evaluation data illustrate that it is highly beneficial—100% of participants agreed that "the Belayers group and events as a whole are valuable to me and my career."

LITERATURE REVIEW

Women faculty often report that the pathway to tenure is clear and well-defined, while the pathway to full professor is notoriously described as ambiguous and elusive, which raises questions and uncertainty on how to achieve such status (Coate et al., 2015; Van Helden et al., 2023). Little research has been devoted to understanding the mid-career stage despite associate professor women being in the most productive and influential years of their careers (Baldwin et al., 2008). Moreover, women remain in this career stage longer than men and are more likely to leave academia (Bird & Rhoton, 2021; Buch et al., 2011; Casad et al., 2022; Finkelstein et al., 2017; Fox Tree & Vaid, 2022; van Veelen & Derks, 2022). Much of the literature points to associate professor women's promotion trajectory being hindered due to it coinciding with greater family, caregiving, and domestic responsibilities and other life transitions that require women to reprioritize their work-life commitments (Baldwin et al., 2008; Bird & Rhoton, 2021; Carr et al., 2019; Casad et al., 2022; Coate et al., 2015; CohenMiller et al., 2022; Lufler & McNulty, 2022; Mason et al., 2013; McCullough, 2020; Ward & Wolf-Wendel, 2012). Relatedly, Coate et al. (2015) noted that women faculty, more than men, value flexibility, collegiality, and cooperative work environments, which can cause conflict as they determine the appropriate strategies to move forward in their careers.

Additionally, institutional-based concerns about how colleges and universities support the promotion of women to full professors are mounting. For instance, growing and changing workload responsibilities in teaching and service roles on their campuses can negatively impact associate professor women's research agenda and slow their progression to full professor (Baldwin et al., 2008; Domingo et al., 2022; Gasser & Shaffer, 2014; O'Meara, 2016). These responsibilities are referred to as "institutional housekeeping" and reflect gendered stereotypes of women's work expectations and allocations (Bird & Rhoton, 2021; Casad et al., 2022; Gasser & Shaffer, 2014; O'Meara, 2016). As full professor promotion criteria tend to place a higher value on research and scholarly productivity, women's high contributions to teaching and service can be marginalized in the traditional publish-or-perish value system in academia (Coate et al., 2015; Covarrubais et al., 2022; Lufler & McNulty, 2022; O'Meara, 2016; Van Miegroet et al., 2019). This context speaks to how gendered organizations, such as higher education institutions, hinder women's career decisions, advancement, and success (Hart, 2016).

As associate professor women begin to plan for promotion to full professor, they report that their institutions have failed to clearly outline expectations and consider rewarding the

unique ways in which many women contribute to their campuses (Buch et al., 2011; Gasser & Shaffer, 2014; Lufler & McNulty, 2022; Mitchneck et al., 2016; Van Helden et al., 2023; van Veelem & Derks, 2022). Moreover, they begin to voice concerns about how their gendered experiences have resulted in sexist environments where bias, harassment, and a lack of belonging pervade (Carr et al., 2019; McCullough, 2020). For women of color, persistent feelings of racism and isolation are reported as well, especially when they are the only woman of color faculty in their department (Croom, 2017; Garrett et al., 2023; Kelly & Winkle-Wagner, 2017; Tillman, 2018). These concerns become even more acute for women faculty when ideal worker norms come into play (Miller & Riley, 2022), in which faculty are expected to prioritize work over personal responsibilities and interests, creating a tense duality for academic mothers and caretakers. Ideal worker norms are in direct contradiction with women's desire for a healthy work-life balance to best fill their expansive work-life roles.

While many career challenges are related to associate professor women moving toward full professor, an array of best practices exists for institutions to consider in aiding their advancement. The most often cited best practice is mentoring around career planning, which must include renewing their professional purpose, addressing evolving expectations, typical career pitfalls, and personalized pathways for success (Baldwin et al., 2008; Buch et al., 2011; Coate et al., 2015; Garrett et al., 2023; Van Helden et al., 2023). Mentoring in academia is well-established as critical to aiding faculty in their career advancement, promoting equity in higher education, broadening institutional inclusion, and diversifying the professoriate (Garrett et al., 2023; Tillman, 2018; Zambrana et al., 2015). Women faculty particularly benefit from explicit guidance and mentorship, as often they do not receive informal career advice from peers, department chairs, and campus administrators as occurs for men (Blood et al., 2012; Buzzannell et al., 2015; Yun et al., 2016).

Additionally, calls for reimagining the full professor promotion criteria to include official recognition of institutional-building activities, such as leading faculty governance efforts and community partnerships, have been heralded. These are particularly salient for women's careers since they are more likely to engage in these activities than men (Buch et al., 2011; Lufler & McNulty, 2022; Van Helden et al., 2023). Other calls for reforms appreciated and relevant for women include health and wellness promotion, revising workloads for those returning from family leave, and fostering collaborative environments (Coate et al., 2015; CohenMiller et al., 2022). It is important to note the COVID-19 pandemic magnified these gendered experiences in the academy, and colleges and universities began to redress them with specific attention to women (Lufler & McNulty, 2022). This occurred with stop-the-clock options, examination of salary and workload inequities by gender, and instituting inclusive, family-friendly policies (Smith et al., 2022; Witteman et al., 2021).

Theoretical Lens

A pragmatic theoretical lens was applied in this study to center on potential solutions and practical implications that result from uncovering the institutional challenges STEM and SBS

associate professor women share about their pathway to full professor. The focus was on problem-solving rather than describing or theorizing, as the goal was to ultimately increase the number of women in the academy who earned the rank of full professor. To do so, context had to be properly attended to during the selection of the research design, in the collection and analysis of data, and in the interpretations made. In employing a pragmatic approach to studying organizational processes, Kelly and Cordeiro (2020) outlined three core methodological principles: (1) emphasize actionable knowledge; (2) recognize the interconnectedness between experience, knowing, and acting; and (3) concede inquiry is an experiential process. Adhering to these principles was critical to this study.

METHODOLOGY

Research Design

An instrumental case study design (Stake, 1995) explored the institution-based concerns of associate professor women in STEM and SBS regarding the pathway to full professor. Instrumental case studies are valuable when illuminating a specific concern or problem within a setting that may be ambiguous to cursory observers (Stake, 1995). A pragmatic theoretical lens was applied to focus on potential solutions and practical implications resulting from the participants' concerns by prioritizing practical and real-world implications within the institution that could be applied broadly (Kelly & Cordeiro, 2020). Therefore, attending to context was foundational to the research design, data collection and analysis, and interpretations. The research question that guided this study was: What institutional concerns do associate professor women in STEM and SBS share about achieving full professor status?

Participants

All Belayers Network members were invited via email to participate in this study. Participation included 11 of the 16 associate professor women in STEM and SBS, representing nearly 70% of the population at UCCS. Seven individuals were in a STEM discipline (biology, chemistry, physics, or engineering), and four were in an SBS discipline (anthropology or psychology). Eight identified as White and three as Asian; three were born outside the US. All were between the ages of 39 and 53 at the time of the interviews. Nearly all identified as mothers, wives, and caregivers. They spoke with pride about how they cared for family, friends, and students. Only broad disciplinary fields are associated with individual quotes, not specific discipline or demographic descriptors, to limit the possibility that participants could be identified.

Data Collection

Per UCCS Institutional Review Board approval (#2021-150), all participants were provided with a consent form detailing the purpose of the study, interview procedures, and safeguards to protect anonymity and confidentiality. Interviews averaged 45 minutes and were conducted one-on-one through Zoom. An interview protocol was designed to explore support structures that aided their research success, institutional structures that would enhance their research productivity, and readiness for promotion to full professor. Sample questions included:

1. What is your most significant barrier to conducting research?
2. What kinds of support structures have aided in your research success?
3. What kinds of institutional structures would enhance your research productivity?
4. What factors influence your readiness to pursue full professor status?

As a pragmatic theoretical lens was employed, great effort occurred to highlight and determine potential solutions and consider practical implications to the institutional concerns shared by the participants. Thus, building rapport was essential to ensure participants felt heard and respected. This process created a natural, free-flowing dialogue, with a single interviewer serving as an active listener. After each interview, the recordings were transcribed through Zoom and permanently deleted once reviewed and cleaned for errors and identifying information.

Reflexivity and Positionality

Prior to data analysis, the research team engaged in the process of reflexivity, individually and collectively considering experiences, beliefs, values, and assumptions on how women's pathway to full professor could prove challenging, with particular attention to the context of UCCS (Watt, 2007). Reflexivity is integral in qualitative research because it forces the consideration and exposure of researcher bias through analytical reflection and dialogue. The researchers are primarily from the university under study, are in community with the participants, and can empathize with the viewpoints shared. Therefore, the data were mainly approached from an insider's perspective, so it was critical that the researchers purposefully separated their own experiences from those of the participants. To aid in this effort, two researchers with no connection to the Belayers Network were included on the research team to minimize bias in the data analysis process.

Per the guidance of Lincoln and Guba (1985), the positionality of the researchers must be clarified, as it directly influences the administration of the study, as well as the principal findings and interpretations. The research team included a demographically diverse group of women professors, administrators, and a postdoctoral scholar with disciplinary homes in educational leadership, psychology, physics, engineering, and geography. All demonstrate a commitment to breaking down barriers and demystifying the full professor promotion process for women through research lines and service endeavors that advocate for inclusive policies and practices. The researchers attribute great value to increasing the number of women full professors as a matter of social justice and advancing innovation and creativity in the academy. The practices of reflexivity and positionality were purposely embedded in the methodology to emphasize the participants' experiences and perspectives and to mitigate the researchers' points of view.

Data Analysis

Silverman's (2019) thematic content analysis method was used to explore the institutional concerns of associate professor women in STEM and SBS regarding achieving full professor status. This technique follows an inductive approach to search for themes related to the

research question. Using this method, the researchers coded the transcripts individually and then collectively refined the codes by clustering them into initial patterns by combining like codes and eliminating duplicative codes. In vivo codes—the participants' own words—were used. Common codes included "lack of institutional support," "expectations are too high," "isolation is high," "criteria are vague," and "no mentorship."

The initial patterns in the data were refined into themes by synthesizing and grouping the codes. This occurred until all the data were represented in the final themes, which led to more precise themes. Once the themes were established, a pragmatic theoretical lens was purposefully applied using the three core methodological principles of Kelly and Cordeiro (2020) to place at the forefront potential solutions and practical implications that arose from the institutional concerns shared by the participants. This process resulted in five themes: (1) Full professor promotion criteria are ambiguous; (2) Teaching and service expectations are too high; (3) Lack of research collaborators inhibits scholarly output; (4) Scarce research-related resources are a persistent struggle; and (5) Mentoring and support are absent.

Trustworthiness

Multiple verification strategies ensured the findings were trustworthy by attending to credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). In order to address credibility, cross-case synthesis was utilized throughout the data analysis process to examine whether the themes were cases of similar or different perspectives of the participants and whether the methodological procedures were made explicit. To achieve transferability, thick and rich descriptions were utilized with participant quotes so readers could determine applicability to their own contexts (Lincoln & Guba, 1985). Reflexivity and stating the researchers' positionalities bolstered the findings' dependability. Confirmability occurred by involving multiple researchers in evaluating the findings through several feedback loops on the identified themes (Miles et al., 2019). As noted above, researchers without connection to the Belayers Network or study participants were included on the team to help combat bias in the data analysis process.

Limitations

As in all research inquiries, this study has several limitations. First, all participants are from a single higher education institution, which may limit the transferability of their experiences to others in different institutions and contexts. This is particularly salient since the focus was on understanding their institutional concerns regarding achieving full professor status and identifying potential solutions and practical implications in the context of UCCS. Moreover, while the study exposed researcher bias through reflexivity and positionality, its potential to influence the findings and interpretations cannot be guaranteed since, as an all-woman research team, our lived experience directly connects to the participants' viewpoints. Relatedly, some research team members lead the Belayers Network activities, so our closeness to the project could have clouded our ability to be neutral about the perspectives shared by the participants.

FINDINGS

Full Professor Promotion Criteria are Ambiguous

All participants indicated that their departmental full professor promotion criteria were riddled with ambiguous language, and the vagueness in the norms and process created undue stress, anxiety, and uncertainty about their path to full professor. The university criteria states that a faculty member's teaching, research, and service record must be judged "excellent as a whole" to earn full professor status, which does not equate to being "excellent" in all three areas. However, participants were all striving for excellence in teaching, research, and service, which they believed to be the "unsaid expectation" for becoming a full professor. However, none had a clearly defined trajectory to follow or a solid understanding of how "excellence" was defined by their department. An SBS faculty member noted, "For full professor, it seems like there isn't as much care given to that criteria…it's actually very ill-defined…there's an expectation that you should be able to figure it out." The lack of understanding of the full professor promotion criteria was unmistakable.

A STEM faculty member also shared concern about the requirements and expectations to be promoted to full professor:

> I am nervous about what I need to do to be prepared to go up for full. I don't understand what the norms are, I feel like I'm on a good trajectory, I just got a grant, my teaching is good, but I don't know…I'm going to go full throttle and make sure that I get excellent in everything and keep going.

While nearly all participants spoke of going "full throttle" in their quest to be judged as excellent across teaching, research, and service, the feeling among all the participants was that "research productivity is all that matters." As noted by an SBS faculty member, "Looking towards moving to full and the idea that really only research is going to count moving forward…I don't know how I can advance and be successful." Clearly, explicitly defined promotion criteria would alleviate the ambiguity, uncertainty, and stress the participants experienced.

Teaching and Service Expectations are too High

All participants indicated that teaching and service workload expectations were too high at UCCS. They believed their teaching and service workload expectations were detrimental to their pathway to full professor because it took time and energy away from furthering their research productivity. As noted by an SBS faculty member, "Collectively between the teaching and service, it is pretty intense, I could definitely be a lot more productive research-wise if even a third of that went away." They all spoke of "the need to sacrifice" their research agendas to meet the more "immediate needs" of teaching, service, and mentoring students and early-career faculty. Nearly all spoke of mentoring as distinct to service, as it was emotionally laborious and time-consuming. They knew that sacrificing their time for research could have consequences for being promoted to full professor, but they did not see any other way to manage all their responsibilities.

In each interview, participants found navigating teaching responsibilities the most significant barrier to devoting time to their research. At UCCS, most tenured/tenure-track faculty are required to teach five courses per year, while some STEM faculty must teach four. An SBS faculty member noted, "We have a really high teaching load, and that makes it kind of difficult to juggle…that's my biggest barrier to conducting research." Relatedly, a STEM faculty member said, "It is hard with teaching to find a block of time to focus on research, so it's hard to get that momentum to just focus and think about research questions." The participants also noted the continuously rising service expectations at their institution as placing more demands on their time and taking away from their research focus. As one participant described: "The amount of service has been growing for everybody, and that definitely cuts into my ability to be able to do research."

Nearly all participants suggested that the teaching load requirement must be lowered if the university expects to promote greater research and grant activity as the central criteria for becoming a full professor. However, many participants also suggested that explicitly expanding the promotion criteria for full professors to encompass extraordinary teaching and institutional-building service would benefit the university and the professoriate. As one SBS faculty member suggested, the university should promote "people who are just really phenomenal teachers, and it would be great if they could move up to full professor for that, as opposed to solely research." For all participants, the stress of not having a clear path to follow while juggling all the demands on their time to achieve excellence left them feeling anxious and unsure about their potential to become full professors. Having multiple pathways to the rank of full professor that were explicitly defined would alleviate much of the stress.

Lack of Research Collaborators Inhibits Scholarly Output

Several participants discussed that the lack of internal research collaborators inhibits their scholarly output, which they perceived affected their full professor pathway. An SBS faculty member noted, "We definitely look for breadth when we're hiring…so we don't have like kind of clusters of people who do similar work, which would generate collaborations and help early career people build networks." UCCS is a smaller campus where faculty often are the "only one," for example, the only geneticist or social psychologist in their department. While this is not unique to similarly sized institutions, it requires faculty to seek external research collaborators to a greater extent than those who can "walk down the hall to find someone to write a grant with." A STEM faculty member suggested, "It's time to start recruiting people that at least fall under a general umbrella that's similar so that we can have more fruitful collaborations. We can get more grant funding." With a lack of internal research collaborators, many participants discussed feelings of isolation, as shared by a STEM faculty member: "I do feel isolated in trying to really connect with other people in the department, I don't have anyone to collaborate with."

With the lack of internal collaborators, many participants sought external research collaborators; however, participants shared the challenge of maintaining those collaborations because of different teaching, research, and service expectations across institutions. An SBS

faculty member noted, "It is hard to balance with my [external] research networks because of things like our teaching load and our service load and all of that. I feel like they don't understand that our jobs are a little bit different, which is difficult." A STEM faculty member indicated a parallel concern: "I have been trying to keep my connections…but I just don't have the time they have; they are pretty much 80-90% research and minimal teaching, so it just feels like I get very behind and outdated." To counter this predicament, a few of the participants commented on the need to expand their research lines, as described by a STEM faculty member:

> I became more of a jack of all trades, as opposed to a real expert in one area…but without true collaborators, you can get spun in different directions, and that's not always good for your career…you have to be a little opportunistic which can take you away from a direct line of research.

While not the ideal situation, several participants indicated that being a "jack of all trades" was their strategy for tenure and remained their strategy for being promoted to full professor.

Scarce Research-Related Resources is a Persistent Struggle

Not only was a lack of research collaborators a concern for the participants, but they also pointed to scarce research-related resources as a persistent struggle to further their research agendas and become full professors. Scarce resources were most often couched around grant support and graduate student funding. An SBS faculty member shared her frustration in working with the institutional grant office:

> The bureaucracy in place around submitting grants is a proven barrier that sometimes I don't even want to apply because I don't know if I have the time to do it based on the deadlines given…we need to figure out how to have more flexibility in the grant submission process.

Beyond the grant submission process, which all indicated was challenging and rigid, many discussed the grant administration process as just as difficult. A STEM faculty member indicated, "I feel like with grants, there's a lot of onerous on me, and that's not where my expertise lies, that's not what I'm bringing to the project, but compared to our [external] peers, we are so understaffed." Staffing issues were palpable across the interviews, as another STEM faculty member noted: "The lack of support staff, sometimes it's just sheer frustration with grant budgets, and we are not trained…the level of complexity with the budget is really high."

Funding graduate students was also discussed as a persistent struggle among STEM faculty. UCCS does not provide tuition waivers or graduate fellowships to all students; instead, a limited pool of highly sought-after funding allotments is available that often covers only a portion of a student's tuition, which places an undue burden on faculty to secure full funding for students. A STEM faculty member stated:

> If you really want to be an internationally renowned researcher in your area, you have to have guided students. For that, you have to bring in students, and you have to have real support for them, so we have to figure out how to get more money.

Another STEM faculty member indicated the value of team science with students: "Those relationships [with students] can really help you develop your research program, so I'd say definitely having a strong laboratory group or cohort with student funding is essential [to my research productivity]." Collaborating effectively and successfully with students was critical to advancing their research in light of the few opportunities to collaborate with internal disciplinary faculty.

Mentoring and Support are Absent

All participants cited a lack of mentoring for associate professors as one of the major impediments to more women being promoted to full professor. At the start of the Belayers Network, UCCS had only one full professor woman in STEM. To counter this trend, all participants suggested that individual departments and the university must provide mentorship to ensure women faculty receive the insight and advice to attain full professor status successfully. An SBS faculty member shared why this was a challenging task:

> There's no active mentoring…people feel like they're doing these things out of their own volition, and no one has really promoted it or even talked about it…there's so much work for everybody that people don't have the bandwidth really do a whole lot of faculty mentoring, it is very limited on our campus, and I think that's a real gap.

Participants desired a mentor to provide guidance and support in the process of becoming a full professor, especially because of the ambiguity surrounding the criteria for promotion. As one participant shared, "I would absolutely love to hear how they navigate different things…what do you invest your time in…help me think about my purpose." The participants also desired a mentor to not only solidify expectations but also to review their promotion materials. As one STEM participant noted, "Having that kind of relationship or mentorship from someone at that level to just read the executive statement and give honest feedback about red flags would be incredibly beneficial before even starting to put the full dossier together." Without those connections, participants felt isolated and unsure of how to proceed.

Furthermore, the participants also desired mentoring and support in targeted areas, namely in grant writing. The STEM participants, in particular, lamented the lack of grant writing support from senior faculty in their departments, as they saw colleagues at other institutions experiencing "high-touch" support. This appeared to be a heightened concern for those in STEM, as most STEM departments had external funding thresholds for tenure and full professor eligibility. Meaning, that they would be denied tenure or promotion to full professor if they did not attain a certain amount in grant dollars. One STEM faculty member remarked, "I wish I had more help with grant writing at the beginning and some direction on the kind of grants I should be applying for. It didn't stop me, but now, I know so much more." Another STEM faculty member said, "It would have been helpful if I got more guidance from senior faculty, specifically with writing proposals together and learning about more education-related grants and technical research grants." For all the participants, the presence of a mentor to guide them in becoming

a full professor, as well as in grant writing, would have helped alleviate much of the stress they faced in the promotion process.

DISCUSSION

This instrumental case study explored the institutional concerns of associate professor women in STEM and SBS about achieving the rank of full professor with a pragmatic theoretical lens (Kelly & Cordeiro, 2020). Consequently, the research team focused on how the literature can inform the experiences shared to create actionable knowledge at UCCS. Findings indicate five main concerns: (1) Full professor promotion criteria are ambiguous; (2) Teaching and service expectations are too high; (3) Lack of research collaborators inhibits scholarly output; (4) Scarce research-related resources are a persistent struggle; and (5) Mentoring and support are absent. The concerns were ubiquitous despite disciplinary, race, age, and homelife differences. This suggests that systemic changes at UCCS are needed to support the promotion of more associate professor women to full professors in STEM and SBS.

Participants found the criteria vague for promotion to full professor, with little to no mentorship within departments or the university to help navigate this crucial next career step. The lack of clarity in what defined "excellence" in teaching, research, and service meant they were all striving to be stellar researchers, superb teachers, and star campus citizens, hoping they were meeting the mark. Nevertheless, they acknowledged that they believed research to be the most important criterion for promotion, even though it was not clearly defined. Not surprisingly, teaching and service workload expectations were considered the most significant barrier to conducting research and being prepared to go up for full professor promotion. As Gasser and Shaffer (2014) indicated, the participants were steeped in "institutional housekeeping" activities, which reflected the gendered work they were expected to engage in, such as administering academic programs, leading faculty governance committees, and mentoring students and early-career faculty. While the faculty assumed these responsibilities because they cared about the institution and its people, they expressed anxiety about their pathway to full professor being stalled as a result, a notion all too common in the literature (Baldwin et al., 2008; Coate et al., 2015; Covarrubais et al., 2022; Domingo et al., 2022; Gasser & Shaffer, 2014; Hart, 2016; Lufler & McNulty, 2022; Van Miegroet et al., 2019).

Additionally, the lack of internal research collaborators was considered an impediment, as the university does not prioritize a "deep bench" of faculty expertise that could facilitate internal research collaborations. Thus, this lack of prioritization perpetuates the difficulty faculty experience in forging collaborative research groups and engaging in team science. While the participants sought external research collaborators, it was challenging to maintain those relationships as the teaching, research, and service expectations at other universities were vastly different. Moreover, as they all reported, their own teaching and service expectations overshadowed their ability to conduct more research and disseminate their work. Relatedly, as faculty are in "disciplinary silos," securing research-related resources is challenging in terms of

grant support and graduate student funding, which only increases their workload. The lack of research collaborators led to more feelings of isolation as the participants did not have colleagues surrounding them to contribute to their research. As noted in the literature, women faculty value collaboration and teamwork (Coate et al., 2015), and in the area of research, the participants found this to be lacking. This finding may shed much light on why women remain in this career stage longer than men and are more likely to leave academia (Bird & Rhoton, 2021; Buch et al., 2011; Casad et al., 2022; Finkelstein et al., 2017; Fox Tree & Vaid, 2022; van Veelen & Derks, 2022).

While these concerns are mirrored in the literature, there are practical steps to alleviate some of the stress and anxieties the participants highlighted. As the participants suggested, creating multiple pathways to full professor, as opposed to a singular focus on research output, should be considered, especially given UCCS's high teaching and service demands. The participants all felt they were lagging in their ability to do research due to the strains on their time, much of which was required by their institution. Having access to mentors to provide insight into the promotion process and practical support in areas of concern, namely grant writing, is another practical step institutions can take to improve the experience of associate professors. The benefits of mentorship are well highlighted in the literature with specific recommendations regarding reimagining full professor promotion criteria by creating multiple, inclusive pathways to full professor beyond research output and reputation (Baldwin et al., 2008; Bird & Rhoton, 2021; Buch et al., 2011; Coate et al., 2015; Garrett et al., 2023; Lufler & McNulty, 2022; Mitchneck et al., 2016; Van Helden et al., 2023). To create inclusive pathways to full professor status, much can be applied from *Scholarship Reconsidered* by Boyer et al. (2016). They outline an expanded view of scholarship to include scholarly activity in the areas of discovery, integration, application, teaching and learning, and creative works. Promotion criteria that recognize the diverse scholarly work of faculty, including institutional-building and mentorship, will ensure a broader array of faculty are promoted to full professor by honoring their contributions to their field, institution, and the academy.

Implications

This study's pragmatic policy and practice implications abound for UCCS and the academy at large. To this end, Project CREST directed several initiatives at UCCS. For instance, they led a white paper with a diversity of faculty across ranks and disciplines to encourage full professor promotion criteria to be expanded to account for institution-building activities, the scholarship of teaching, and community-engaged work. As noted previously, Project CREST formed the Belayers Network to provide mentorship and tangible support to associate professors seeking promotion to full professor. In this effort, Project CREST hired a campus-level research development coordinator to provide wrap-around research support, from reviewing grant proposals to making internal and external research connections to helping address publication feedback from reviewers and editors. The coordinator also leads an evidence-based grant writing boot camp (Smith et al., 2018) designed for participants to produce a full proposal ready

to submit upon completion of the boot camp. Moreover, Project CREST created ADVANCEment mini-grants for associate professor women to acquire funds for summer salary, a course buy-out, or to fund a student research assistant.

Investments must be made in people, infrastructure, and programs to ensure associate professor women possess the insights, resources, and workload to attain full professor status successfully. One of the biggest dilemmas for institutions to grapple with is leveling out the teaching, research, and service expectations (Malisch et al., 2020). Perhaps a first step is to avoid assuming all faculty engage in these areas uniformly and instead leverage strengths, provide flexibility, and allow for more nuance in full professor promotion criteria and processes. Relatedly, realistic role expectations must be enacted to dismantle the ideal worker norms (Miller & Riley, 2022) that often disproportionately disadvantage women faculty, particularly those who are caregivers (Casad et al., 2022; CohenMiller et al., 2022; Hart, 2016; Mason et al., 2013; Ward & Wolf-Wendel, 2012). Increasing family-friendly policies such as childcare services, elder care investments, part-time tenure-track options, and restructuring the traditional teaching-research-service workload to meet different work-life needs could tremendously affect the number of full professor women in the academy (Carr et al., 2019; Casad et al., 2022; CohenMiller et al., 2022; Mason et al., 2013). In addition, institutions must improve the criteria and process language for promotion to full professor and provide relevant mentoring in this area. Many institutions have implemented women's mid-career mentoring programs to support career planning, understanding full professor criteria, and reducing feelings of isolation, with much success (Buch et al., 2011).

Future Research

Future research is warranted to explore how effective policy and practice can mediate these institutional concerns. Is a multi-pronged approach needed, or are targeted approaches more efficacious, such as mentoring programs? Also, understanding the ways in which department chairs and other campus administrators are aware and combat these concerns is vital. In this vein, much of the research, particularly the solutions, is hidden away in singular institutional efforts and must be brought to the forefront of scholarship so more knowledge-sharing and action can occur. It also would be helpful to understand if these institutional concerns are unique to associate professors in STEM and SBS at R2 institutions or if there is a universal nature to these concerns across disciplines, institutional types, and those with other minoritized identities. Conducting comparative studies across different institutions would shed additional light on the nature of these concerns, extenuating patterns of concern, and highlight areas in which institutional policies and practices impact women's experiences in the academy. Endless explorations are possible if the focus is on developing more potential solutions and practical implications from this research inquiry.

Conclusion

To fully support women's advancement in the academy, institutions must understand their challenges and address them responsively and inclusively. Using a pragmatic theoretical lens

(Kelly & Cordeiro, 2020), this instrumental case study (Stake, 1995) provides a rich understanding of the institutional concerns shared by associate professor women in STEM and SBS on the pathway to full professor, as well as the potential solutions and practical implications. Their concerns center on unrealistic workload expectations, lack of internal research collaborators, scarce research-related resources, and vague full professor promotion criteria coupled with no mentorship and too little support. Attending to these concerns with effective policy and practice will support women's retention and advancement in higher education and promote greater disciplinary creativity and innovation—all worthy and necessary endeavors.

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