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Narratives of Black Women STEM Faculty: Breaking Barriers to Promote Institutional Transformation at Historically Black Colleges and Universities

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Author Note

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Abstract

Women faculty at Historically Black Colleges and Universities (HBCUs), experience many barriers. HBCUs' rich histories of advancing racial equity have often outweighed a focus on gender equity, with issues at the intersection of race and gender receiving minimal attention. This study highlights the need for institutional transformation at HBCUs by identifying the structural factors that promote and inhibit Black women STEM faculty advancement. Interviews (n=15) were conducted with HBCU Black women STEM faculty using the Life Interview approach. The three major themes related to barriers included: (a) greater likelihood of having their expertise questioned, (b) increased pressure to work harder, and (c) sexism, racism, and gendered racism. This study expands upon existing research in the literature by focusing on an understudied population, Black women STEM faculty at HBCUs. Findings suggest that to advance institutional transformation diversity, equity, and inclusion goals, colleges and universities must establish infrastructures that include supports of benefit to the professional advancement of all faculty.

Keywords: Black women faculty, STEM, advancement

Narratives of Black Women STEM Faculty: Breaking Barriers to Promote Institutional Transformation at Historically Black Colleges and Universities

Black women are grossly underrepresented in the academy and most drastically in full professor ranks (Walkington, 2017). It is difficult to ascertain the exact number of Black women in STEM, as their numbers are often couched within the statistics for underrepresented women, which includes Black, Latina and Native women, and people of color. According to National Science Foundation (NSF) data on science, health and engineering doctorates, Black/African American, Latina, and Native women accounted for less than 1 percent of full professors, less than 2.5% of associate professors and less than 3 percent of assistant professors (National Science Foundation, 2017). Therefore, it is essential to develop, diversify, and promote equitable organizational structures in the fields of STEM to increase the ability for Black women STEM faculty to attain leadership positions and full professorship. Much of the research on the intersectionality of race and gender in the STEM professoriate has focused on Predominantly White Institutions (PWIs). However, Historically Black Colleges and Universities (HBCUs) have organizational complexities emerging from race and gender intersectionality that can provide a much-needed perspective in the knowledge domain (Minor, 2005; Perna, 2001; Renzulli et al., 2006; Roebuck & Murty, 1993).

The daunting magnitude of underrepresentation of Black women in the STEM professoriate underscores serious equity concerns that have the potential to negatively impact institutional equity, undergraduate and graduate STEM education, and society at large (Monroe et al., 2008; Ong et al., 2011). The consequences of underrepresentation are fewer aspirational and support models for Black women students, fewer Black women faculty contributing their unique research and personal perspectives to problems plaguing Black communities, and fewer

Black women faculty involved in developing and implementing institutional policies that promote equity (Espinosa, 2011; Malcom & Malcom, 2011; Ong et al., 2011).

This work is part of a social behavioral science study funded by the NSF's ADVANCE Institutional Transformation (IT) grant program. The NSF's ADVANCE initiative has provided critical and transformative opportunities for higher education institutions to create a climate of institutional gender equity. Among the 70 institutional transformation awards, only four have been awarded to historically Black colleges and universities, indicating that PWIs have been the primary beneficiaries of this opportunity. Many HBCUs have a legacy of focusing on social justice that has sought to eliminate racial inequities. The current research explores specific gender/race intersectional equity issues within HBCUs, understanding that HBCUs operate within larger systems of privilege and oppression. Despite these complexities, HBCUs have demonstrated profound successes in educating Black STEM students. HBCUs awarded 20% or more of the STEM undergraduate degrees to Black students in the United States, even though HBCUs comprise only 3% of the nation's colleges and universities (Hunt et al., 2012; Mack & Rankin, 2011). Yet few studies have examined the benefits and barriers experienced by historically underrepresented women faculty at HBCUs. This study was guided by the following questions: What are the benefits and barriers Black STEM women faculty experience at HBCUs? What do Black women faculty recommend as strategies for institutional transformation? Based on the benefits and barriers identified, we provide recommendations for sustainable institutional transformation that institutionalizes benefits for all faculty by dismantling barriers for Black women STEM faculty.

Review of the Literature

Barriers for Black Women Faculty

Previous research documents Black women's experiences of institutional racism and sexism at mostly PWIs (Harley, 2008; Patitu & Hinton, 2003; Thomas & Hollenshead, 2001; Turner, 2003; Turner, 2002; Villalpando & Delgado Bernal, 2002). This research has concluded that Black women's experiences at PWIs include the experience of race fatigue, feeling unappreciated, undervalued, and overextended in the capacity of representing faculty of color (Harley, 2008; Turner, 2003; Villalpando & Delgado Bernal, 2002). Scholars have also asserted that underrepresented women are less integrated into the academic culture, have fewer opportunities for collaborative research, and are disproportionately burdened with university service (Harley, 2008; Monroe et al., 2008; Turner, 2003). These multiple stressors, coupled with the intense time demands of the STEM professoriate, can adversely impact critical areas of underrepresented women's lives, such as well-being, productivity, and advancement (Mack & Rankin, 2011).

At any organization, institutional sexism and racism are obstacles to career development since they can manifest as marginalization, lack of support, and lack of opportunities for underrepresented women (Morimoto et al., 2013; Stepan-Norris et al., 2011; Turner, 2002; Zurn-Birkhimer et al., 2011). Patitu & Hinton (2003) define marginalization as "an issue, situation, or circumstance that has placed women outside the flow of power and influence within their institutions" (p. 82). Examples of marginalization include exclusion from meetings and lack of access to resources and collaboration opportunities, which can result in feelings of isolation, alienation, and decreased productivity (Patitu & Hinton, 2003; Turner et al., 1999). For underrepresented women, sexism and racism are not always distinguishable and may exist in

tandem (Patitu & Hinton, 2003). This tandem "double bind of race and sex" has been operationalized as gendered racism (Malcolm et al., 1975; Perry et al., 2012; Thomas et al., 2008; Wingfield, 2007).

Challenges Specific to HBCUs

There is a dearth of information about the specific barriers that Black women faculty experience at HBCUs. Previous research on institutional barriers has described challenges for those working at HBCUs related to lack of funding (Kim & Conrad, 2006), burdensome teaching and mentoring loads (Baskerville et al., 2008; Guy-Sheftall, 2006; Hubbard & Stage, 2009), taboos about speaking out against administration (Hamilton, 2004; Johnson-Bailey, 2003), and lack of organizational trust (Mack et al., 2010). HBCUs have a history of activism and challenging racist policies; however, this does not necessarily translate into addressing institutional sexism and its intersection with racism at these institutions (Jean-Marie & Lloyd-Jones, 2011).

Additionally, there is a general misconception that all departments within HBCUs are predominantly staffed by Black faculty because of the large population of Black students enrolled at most HBCUs (Bonner, 2001). For example, most HBCUs have predominantly Black and female student populations (Statistics, 2011); however, Black women faculty make up less than a quarter of STEM faculty at HBCUs (Mack et al., 2010). Therefore, most faculty at HBCUs, especially in STEM, do not demographically reflect the students they teach. This imbalance in representation between the faculty and students' demographics can place high demands on Black women faculty. Black women faculty are often sought for mentorship and support by Black undergraduate and graduate students, which may limit the extent to which faculty can focus on research productivity (Bonner, 2001).

Another issue that impacts Black women faculty at HBCUs is rank. Black women faculty are grossly underrepresented at the senior faculty and administrative levels (Stephens & Wilson-Kennedy, 2019). Research has shown that when Black women attain leadership positions at HBCUs, they are vital in effecting positive social change to benefit their university communities (Jean-Marie, 2017). In a study examining the gender pay gap using the Integrated Postsecondary Education Data System, it was found that although there is a smaller wage gap between women and men at HBCUs relative to PWIs, women still were paid less and were more likely to hold lower academic ranks than their male counterparts (Renzulli et al., 2006). Furthermore, "elite" HBCUs, defined as HBCUs that maintain strong academic programs and large endowments, show gender pay gaps comparable to those at PWIs where men appear to enjoy a bonus in pay (Renzulli et al., 2006). The magnitude of these challenges can cumulatively undermine an HBCU's capacity to address sexism and gendered racism.

Need for Institutional Transformation

For an institution to benefit from a diversity, equity, and inclusion framework, barriers that limit the professional advancement of its faculty must be interrupted and dismantled. Black women faculty at institutions of higher education expect and deserve welcoming and equitable environments. Previous research has reported that Black women faculty at U.S. higher education institutions experience barriers related to funding, high teaching and mentoring loads, reluctance to speak out about administration, and lack of trust in institutional leadership (Baskerville et al., 2008; Guy-Sheftall, 2006; Hubbard & Stage, 2009; Kim & Conrad, 2006; Mack et al., 2010). They have also reported a lack of belonging, lack of diversity in leadership, and lack of support (Alfred et al., 2019). Most of this work has been conducted at PWIs, which leaves a gap in understanding what is known about Black women STEM faculty at HBCUs. This study seeks to

elucidate those experiences, and in doing so assist in creating more equitable and inclusive workplaces for all faculty.

Theoretical Framework

This study was framed using systems of oppression theory and intersectionality theory. The systems of oppression theory acknowledges that multiple systems of oppression occur at the individual, institutional, and symbolic levels; and this oppression can include racism and sexism (Collins, 1993; Shaw et al., 2019). At the institutional level, organizations are structured in ways to maintain power and privilege or confer subordination; and they put those without power in those spaces, such as Black women faculty, at a disadvantage (Collins, 1993). Black women faculty experience oppression rooted in the combined impact of their race, gender, and other identities. Intersectionality is a term that explains the reality that Black women are socialized to respond to their gender or their race separately, although their identities are inextricably linked (Crenshaw, 1991). Intersectionality theory asserts that individuals with multiple group identities, associated with race, class, gender identity, sexual orientation, religion, and other identity markers, intersect and are impacted by multiple systems of privilege and oppression (Dill & Kohlman, 2012). One example is the wage gap; for every dollar that White men make, Black men and White women make comparatively less at \$0.74 and \$0.78, respectively. However, due to multiple oppressions of racism and sexism, Black women's pay is even more negatively impacted at \$0.63 (AAUW, 2021). In higher education, multiple systems of disadvantage exist, and therefore continued work is needed to address the extent to which intersecting systems of inequity impact faculty outcomes (Nichols & Stahl, 2019). In this study, a qualitative analysis was conducted focused on illuminating the experiences of Black women STEM faculty to inform ways to further strengthen HBCUs. To provide some context to the positionality of the work, it is

important to acknowledge that the authors are Black women STEM faculty, administrators, and staff at HBCUs presenting data gleaned from study participants of all ranks of the academy, including adjunct, assistant, associate, and full professors at multiple HBCUs.

Methodology

Participants

Participants consisted of Black women STEM faculty at all ranks, including non-tenured, tenure-track, and tenured faculty at the rank of assistant, associate, and full professor at HBCU institutions. There were a total of 15 participants, including five non-tenure-track, six tenure track junior faculty, and four tenured senior faculty. Due to concerns regarding confidentiality and anonymity, we grouped participants as STEM (Chemistry, Biology, Physics, Astronomy, Technology, Computer Science, Information Science, Engineering, or Mathematics) and STEM Social/Behavioral Science (Psychology, Sociology, Economics, Geography, Political Science or Anthropology). Participants were faculty at four-year HBCUs and seven were from institutions that award only bachelor's degrees, two were from master's degree granting institutions, and six were from doctoral degree granting institutions. There were 12 STEM and 3 STEM Social Behavioral Sciences (SBS) participants (See Table 1).

Table 1

Summary of rank, discipline, and race of study participants

Rank	N=15
Non-Tenure Track	5
Tenure-track Junior Faculty (Assistant, Associate)	6
Tenured Senior Faculty (Assistant, Associate, Full)	4
Discipline	
STEM (Chemistry, Biology, Physics, Astronomy, Technology, Computer Science, Information Science, Engineering, or Mathematics)	12
STEM Social/Behavioral Science (Psychology, Sociology, Economics, Geography, Political Science or Anthropology)	3
Race/Ethnicity	
Black/African American	15

Measures

The interview guide consisted of questions adapted from the Life Interview Approach by focusing on the individual's professional career journey rather than overall life experience (McAdams, 1995). This approach was used to elicit participant descriptions of her career journey, perception of support, perception of equity/inequity, recommendations for positive procedural and policy change, and visions for her professional future. To maintain participant confidentiality, we only report career-related responses to interview questions and not personal details of the participants' lives. Additionally, open-ended questions were created to explore participant strategies used to overcome barriers, including institutional sexism and racism, as well as recommendations for institutional policies and procedures for promoting equity.

Procedures

The study procedures were approved by the Institutional Review Board (IRB) of North Carolina A&T State University prior to contacting potential participants. To recruit study participants, a purposeful sampling frame was implemented (Patton, 2005). A graduate research assistant conducted a systematic national search for Black women faculty listed on university websites that included the disciplines recognized by NSF as STEM and SBS disciplines and created a database of their email addresses. Recruitment flyers with a hyperlink to a screening questionnaire with questions to confirm faculty eligibility and determine their willingness to participate in the study were sent via email. Using a snowball approach, participants were asked to forward the recruitment flyer to others or to provide the contact information of other faculty. After completing the screening questionnaire, eligible participants provided a mobile telephone number and were subsequently interviewed by a consultant external to the university. The external interviewer informed each eligible participant of the certificate of confidentiality in

place for the study and offered an opportunity for the participant to create a pseudonym for the interview before obtaining verbal consent. All interviews were conducted via telephone, audio recorded, and transcribed verbatim by a professional transcriptionist.

On average, interviews lasted 60 minutes and began with questions to build rapport, such as: "How is your day going so far?" and "What led you to be willing to share your story?" To orient the participants and engage them in narratives related to the overall research topic, the interviewer told participants: "First, I would like to hear the story of your career. It is okay to be brief here because we will be asking more questions about the story of your career." Other questions included: "Think back over your career to a story where you experienced a high point in your career that represents what it means to be a Black woman in a STEM field. A high point is when you experienced your job/position as very satisfying or rewarding. A low point in your career is when you experienced extreme frustration, stress, anger, anxiety, sadness. Even though this memory is unpleasant, I would still appreciate an attempt on your part to be as honest and detailed as you can be." Near the end of the interview, participants were asked: "Now, imagine a positive future for your career and your institution. This positive future involves things that you would most like to see happen in your career and at your institution. We are particularly interested in how you see the impact on Black women." Each participant received a \$50 gift card as compensation for their participation in the study.

Data Management

An experienced professional transcriptionist transcribed all audio files verbatim and redacted any identifying information before analysis. The exchange of audio files and electronic versions of transcripts between research staff and the transcriptionist took place using a secure, password-protected server. Transcripts were then verified through two independent audio replays

by research staff and finalized when all relevant edits were made to the document. Transcript labels matched the pseudonyms provided by study participants. The manuscript was shared with participants for review and accuracy, and to ensure participant comfort with the documented quotes. It is important to mention that none of the participants suggested any changes to their respective interview transcript.

Analysis

NVivo 12.0 qualitative software was used for the organization and analysis of the qualitative data. Qualitative themes for debriefing interviews were developed through a deductive approach in which codes were developed from interview guide questions. These themes were compiled into a codebook that detailed the code mnemonic, a brief definition, and a full description of inclusion and exclusion criteria. Two members of the research team independently reviewed each transcript and developed and applied appropriate codes to the text. If new codes were interpreted during the analysis of transcript data, they were added to the codebook and applied to subsequent transcripts. A third reviewer audited the codes to determine that the text was applicable to each code.

Results

The presentation of results is based on the process described by the Consensual Qualitative Research (CQR) approach. CQR shares the features of other qualitative methods and has been used in various research studies (Hill et al., 1997). This approach was selected because it allows researchers to categorize themes as general (90-100%), typical (50-90%), variant (25-49%), and rare (1-24%) to capture the extent to which they were endorsed across participants. We do not present the exact percentage for each theme because of the small sample size.

All study participants perceived that their identities as STEM Black women impacted their careers. Five major themes were interpreted from the data (see Figure 1). As Black women, participants placed a high value on the benefits of (a) opportunities to give back to the next generation of students and faculty and (b) contexts that valued their expertise and contributions. Participants also reported three barriers they experienced including: (a) greater likelihood of having their knowledge, experience, and expertise questioned, (b) increased pressure to work harder and prove themselves, and (c) sexism, racism, and gendered racism.

Figure 1

Themes

STEM Black Women Faculty Benefits	STEM Black Women Faculty Barriers
<ul style="list-style-type: none"> • Opportunities to give back to next generation (Typical) • Contexts that valued their contribution and expertise (Variant) 	<ul style="list-style-type: none"> • Questioning of Expertise (Variant) • Pressure to Prove (Variant) • Sexism, Racism, and Gendered Racism (Typical)

Benefits

Opportunity to Invest in the Next Generation. The opportunity to invest in the next generation of young people from similar backgrounds emerged as a typical theme (endorsed by 50-90% of participants). Participants noted the lack of representation of researchers who "looked like them" as they navigated undergraduate, graduate, and post-doctorate studies and the effects this lack of representation had on their personal and professional development. Many participants noted the first Black researcher they encountered throughout their academic training and the importance of seeing someone who "looked like them" thriving in a career they

perceived as dominated by White men. That said, participants expressed a commitment to serving as role models for students enrolled in STEM fields. For example, Elena described:

At both places that I've worked, there just weren't tons and tons of BLACK faculty....When I encountered students, it was almost like a little light went off in their eyes. You could kind of see how it makes a difference of being able to see people who look like you.

Elena's comments highlight the benefits of increasing the representation of Black women faculty in STEM fields for students. Similarly, Jessa stated,

A lot of them have told me I was their first black professor in STEM or their first black teacher in my field, period..... If they see someone like themselves, they realize that, particularly in the major, they can succeed when they see someone like themselves doing what they aspire to do.

Building the capacity of Black students emerged as a general theme (90-100%) among study participants. Many spoke about cultivating and nurturing students who did not see the "bigger picture" of their role as a Black woman engaging in STEM research. Several participants stated their Black students did not picture themselves as scientists—despite being enrolled in a STEM field at an HBCU. Participants noted opportunities to mentor Black students as being the most rewarding part of being a Black faculty member in STEM, citing them as the moments that encourage them to persist through challenges they experienced at their universities or otherwise enhanced their faculty experience as Black faculty. Sue discussed the importance of investing in junior faculty:

...There have been a few committees that I've worked on where we were able to help other faculty members and students. Those are the most rewarding [experiences]--to see

them do well. When you work on a project, and [they] get recognized and they're able to move their project forward--those are the highlights.

Tamara discussed her experiences meeting with new junior faculty on campus:

I've had meetings with them. I sat down and talked with them about things that they should be doing to get through the tenure process, how they should think about setting up their labs, how they should think about collaborating with other people and writing. What kinds of things they need to do regarding managing their teaching load, as well as balancing or building their research lab and what is going to serve them better in the long run...to be successful at the university.

Thriving In Environments that Value Their Expertise. In addition to highlighting the importance of mentorship and representation for Black students and junior faculty, participants detailed the importance of thriving in an environment that valued their expertise. They provided examples of spearheading research efforts at their institutions (including multidisciplinary collaborations across departments), having opportunities to share their work within their field of expertise (i.e., conferences), publishing their work, and securing grant funding. Loretta described:

I participate in regular national and regional conferences and then also one [conference] for African Americans specifically. Even other Black faculty, but especially faculty that are not Black, really denigrate those conferences, and you know 'That's a waste of time.'

Why would you go to those Black ones? Those aren't real.

Rhonda shared her experience in securing an independently funded grant despite being told by her colleagues that she would not be awarded the funding:

I think my high point may definitely be my first independently funded grant. I was the sole PI...and it was solely based on my data and my idea. So, it felt like a personal accomplishment...especially coming to this institution where there aren't a lot of women in sciences, and definitely not a lot of African American women in sciences.

Barriers

Greater Likelihood of Being Questioned. Black women faculty also described challenges related to having STEM careers and their identities as a Black woman, one of which was having their knowledge and expertise questioned in various domains with both students and colleagues. This theme emerged as a variant (endorsed by 25-49% of participants). For example, Ericka described experiences of being questioned or challenged compared to her White male colleagues—even by students:

I don't think [White male faculty] would be questioned or challenged as much [as Black women faculty]. You walk into the environment and you can already tell that people want to know, 'Does she really know this stuff?' or 'Can she really teach us this stuff?' or some of them are a little reluctant at first to even listen.

Ericka's comments highlight the additional stressors experienced by Black women faculty in their interactions with students.

Increased Pressure to Work Harder and Prove Themselves. Another stressor that Black women reported was pressure to work harder to prove themselves. This theme emerged as a variant (endorsed by 25-49% of participants). Participants discussed the necessity of Black women's contributions being acknowledged and valued in the academy amongst their peers. Participants mentioned feeling "invisible" and provided several examples of being excluded, dismissed, or reprimanded based on their identity. Black women faculty were clear

about the value of their research and the necessity of their perspectives as Black women in their fields but often felt this was not valued by their peers. For example, Lelani described:

For the STEM fields, in general, I think that women and minorities must work a little harder to prove ourselves, and that has historical reasons. Women were just starting to really break ground in certain areas. So, I think there is not that much margin for error for us, especially as it relates to technology and engineering, which are mostly dominated by males. There is no margin for error for us. We have to stay current ... to remain competitive because we are already outnumbered, and we are already viewed as women [that] don't perform well in certain areas.

Sexism, racism, and the intersection of gendered racism. Participants' challenges with their experiences of sexism, racism, and gendered racism emerged as a typical theme. Some expressed uncertainty with identifying sexism, racism, or both, even when there was a clear differential in their treatment compared to their male counterparts. Participants felt it was important to highlight how racism impacts their experiences as STEM faculty in ways that individuals outside of this context may not be aware. For example, Wanda stated:

The student population is a lot more homogeneous than the faculty population. I think people believe that [at an HBCU] all the faculty will be African American, or you won't have to worry about the "isms," but you certainly do, even at HBCUs.

Participants expressed concern about how they were viewed by international faculty and faculty that devalued the contributions of Black women. Many rooted these views in cultures and industries heavily dominated by men. For example, Sue described:

If you grow up in a country or an environment—because it could be in America too—where you're constantly taught that women are not equal with men, because of your

religious training or it could be because of cultural training. So, if ...your mind has been programmed or conditioned to believe that women are there to serve and that women aren't equal with men, then a male [professor]--and even sometimes female [professors] have a hard time adequately assessing a woman's performance versus a male.

Sue's comments underscore how society's socialization of gender role expectations across cultures impacts the pervasiveness of sexism and racism within the academy. Similarly, Wanda described these "isms" compared to her colleagues at PWIs:

They're at White schools. So they're like, 'Oh, there's a career racism.' They often think for me, I'm probably not experiencing that. But they don't realize [because of] the African population, the high Indian population at the school, there are some just direct [incidents]--and you try not to over-read because you don't want to spend all of your time kind of processing the possibility of racism, but sometimes it really does appear. Even from other BLACK administrators, there is a value placed on professors who are not African American.

For some, sexism, racism, and gendered racism manifested as exclusion from opportunities to collaborate with their colleagues, often white males. Kay detailed an experience where, despite being hired for her STEM specialty, she was excluded by her White male colleagues:

They were having difficulty running their own model, and they wanted to know how I accomplished it. When I explained it to them, they realized that it was the right thing—the best thing that could have been done in order to run the model. They had not thought about taking the model on at that angle...[but] they refused [my] expertise...being Black

and a female was the worst thing that could ever happen. They would not even accept a suggestion.

Sue detailed these exclusions in the context of grant funding and publication opportunities:

Well, I see that when it came to grant, proposal, and publication opportunities to publish together, work together to help that junior faculty member, I didn't see others reaching out to help the Black females as much--or the women of color as much--as I saw when we had White faculty. White [faculty] would help one another out a lot more. And people of other races would help White [faculty] out too.

Double-edged sword. Although participants expressed positivity in their opportunities to invest in future generations, some participants reported that this created the additional burden of increased workload, due to spending a substantial amount of time on mentoring. They also commented on their race, gender, and age being a challenge in the way they are perceived. For example, Tina described:

When I started my very first semester, I was pregnant with my first child and in my third trimester. This was my first adjustment of having a heavy teaching load and also being expected to be a scholar. Because you are young and you are Black and your students are young and Black they want to come to you about everything. I guess for me it is that work/life balance, finding my fit, and realizing what I am willing to do and what I'm not willing to do in the politics of higher education.

The politics of higher education, mentioned by Tina, can often mean that mentoring students may not be treated as a valued aspect of the promotion and tenure process. Jade further highlighted the distinction between mentoring and advising, emphasizing the importance of sharing personal experience and career options:

For me, the distinguishing point is that when you're advising, you're strictly talking about classes that they need for graduation, and it usually stops there. For me, mentorship extends beyond the classroom, and the current school at which they are enrolled. So, yes, we talk about classes that the school offers, but we also talk about how those classes benefit their career. We talk about additional career options. I talk about my experiences, and ... I think my being able to talk about my experiences in the sciences is probably the best tool and resource that I have to offer them. It was a lot of struggle for this. A lot of life struggles, and a lot of just schooling struggles that I made it through. And being able to share that with my advisees showed that I care.

Others framed their experiences through more positive lenses, noting both the benefits and challenges. Mina states,

I think for me as a black woman I get to reshape things in a way and bring a perspective that potentially has not been at the table before. Not to toot my own horn, but I think being a not yet forty-year-old, black woman in the STEM field is novel in a lot of ways. So, I think being under forty and being able to do that offers an even more interesting perspective because of that intersection between race, sex, and age. So, I think it comes with its challenges. It means that I am a disruptor and I am disrupting the status quo. In many circles that is welcomed and in others it is really an affront to people. So, it is part of a double-edged sword.

Discussion

This study expands upon diversity, equity, and inclusion research by identifying Black STEM women faculty specific barriers at HBCUs. Frequently, the experiences of Black women are collapsed into broader categories such as women or people of color, an approach that groups

both men and women of color together. These data analysis strategies, while necessary when small samples of Black women are recruited, may overlook nuances of their experiences. Black women faculty make up a greater percentage of tenured and tenure-track faculty at HBCUs in comparison to PWIs (Mack & Rankins, 2011). Moreover, Black women faculty in STEM fields in higher education are more likely than those in non-STEM fields to be the only person of their gender and race in their department (Turner & González, 2011; Turner et al., 2008).

For example, participants described that advising sessions often moved beyond the mere discussion of courses and extended to discussions about navigating gendered racism within the academy. Study participants also described shouldering various additional forms of labor, including emotional labor which is the often invisible dimensions of relational work that people do to maintain employment (Mirchandani, 2003). Participants described the emotional stressors and labor associated with having their expertise questioned, working harder to prove themselves, and interpreting and responding to microaggressions. They also described the additional burden of providing additional work for committees, the work of ensuring that their tenure and promotion packets fare well against higher levels of scrutiny, and the challenges of exclusion from collaborative opportunities.

Cumulatively, these experiences can create high levels of stressors for Black STEM women faculty at any institution, including HBCUs where some may have assumed these stressors were minimal or non-existent. It is for all of these reasons that institutions focused on transforming their environments to ensure the professional success of all faculty, must standardize policies, practices, and procedures within departments, colleges, or across the university to create equitable teaching and service (e.g., advising, committee) loads to alleviate the burdens Black women STEM faculty experience. These same progressive institutions should

also consider strategies for sensitizing faculty and administrators to unconscious bias, to enable them to counter its influence on academic operations and rites of passage.

Because of the multitude of challenges Black women experience due to gendered racism, few studies have focused on the positive aspects of this experience. The findings of this study indicate that despite numerous barriers and challenges, participants perceived that their identities as Black women in STEM created several benefits. Our findings suggest that Black STEM women faculty at HBCUs have frequent opportunities to support their psychological well-being and life satisfaction through opportunities to contribute to service activities. Moreover, students benefit from the opportunity to have aspirational models from similar backgrounds and mentorship with high levels of investment (Blake-Beard et al., 2011; Patton & Harper, 2003). However, these benefits may also lead to exploitation of their labor and excessive time dedicated to volunteerism, which can be emotionally demanding and decrease the ability of Black women faculty to dedicate the time required for activities deemed valuable for promotion and tenure success.

Participants described the experience of mentoring and advising Black students and early career faculty particularly rewarding because of students' limited opportunities to be exposed to mentors from similar backgrounds. The field of developmental psychology describes this phenomenon as generativity, or passing knowledge to others and contributing to society, as one of the critical components of psychologically healthy adult development. Researchers have consistently found a positive association between generativity and psychological well-being and life satisfaction (Grossbaum & Bates, 2002; Grossman & Gruenewald, 2018; Rothrauff & Cooney, 2008). Moreover, Black women are more likely to adopt a collectivist orientation, which emphasizes the needs and goals of the group as a whole over the needs and desires of each

individual. People with a collectivist orientation prefer careers that allow for contribution to their communities and have healthier outlooks and higher investments in their work (Healy et al., 2004; Kerka, 2003). Therefore, higher education institutions, striving to sustainably transform into environments that attract all faculty, should include tangible support. This support should include elements Black women faculty identified as important, such as clearly articulating and designating mentoring and advising as valued and important in tenure and promotion criteria (Moss-Racusin et al., 2021). Such institutional transformation initiatives should be designed to ensure that Black women faculty, and others who are traditionally burdened with excessive service activities, benefit from those contributions since they are critical to the educational and inclusion climates of STEM higher education environments. This would simultaneously allow these critical STEM faculty to gain recognition for work they value (e.g., generativity).

The findings of gendered racism as barriers for Black women at HBCUs are consistent with that reported in the literature (Pittman, 2010). There is a false presumption that faculty at HBCUs do not experience anti-Black racism because of their high population of Black students. In reality, the fact that the majority of STEM faculty at HBCUs are either male or non-Black, enables these institutions to also inadvertently foster norms characteristic of work environments where a segment of the community benefits from systems of power and privilege, which can leave Black women STEM faculty vulnerable to gendered racism. As discussed by the participants of this study, Black women in STEM departments at HBCUs can still experience tokenism and negative evaluations/judgments from faculty whose cultures may devalue women or minimize the impact of racism on African Americans.

This study is purposefully adding to the national discussions of diversity, equity, and inclusion in higher education by illuminating the experiences of Black women STEM faculty at

HBCUs, and highlighting the opportunity for institutional transformation to restructure STEM workplaces to foster inclusion, support valued engagement, and sustain representation of all faculty (Moss-Racusin et al., 2021). The relatively small number of Black women STEM faculty at HBCUs, combined with the decision by potential participants to opt out of the study for various reasons (e.g., fear that their anonymity could be compromised, lack of motivation to participate, etc.) undoubtedly reduced the number of responses informing this study.

Nevertheless, despite these limitations, the study's findings suggest that HBCUs could benefit from targeted actions for promoting equity and inclusion to transform the institutions, particularly as it relates to Black women in STEM disciplines, and other faculty that are under-represented compared to the dominant demographic of their disciplines.

Conclusion

Healthy and inclusive climates at colleges and universities require academic leaders to examine policies and practices to ensure fairness and consistency in the tenure and promotion process, in operating norms, and in the dynamics of collaborative teaming (e.g., committees). Consequences of unfair and discriminatory practices should be clear and executed when apparent bias is identified and documented. It is also recommended that there be clear and ongoing training for administrators and faculty on conducting equitable hiring, workload, and evaluative processes; thereby creating inclusive environments, and identifying and thwarting micro-aggressions, all of which are critical to the systemic transformation of institutions of higher education to environments that equitably seek to enable the professional success of all faculty. Threading these activities through every aspect of the campus environment, including hiring, promotion, and professional development, is critical to demonstrating that a diverse, equitable,

and inclusive environment is highly valued at the institution, and success in achieving and sustaining it is the responsibility of everyone.

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