Rethinking Race in Student-Faculty Interactions and Mentoring Relationships with Undergraduate African American Engineering and Computer Science Majors

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RETHINKING RACE IN STUDENT-FACULTY INTERACTIONS AND MENTORING RELATIONSHIPS WITH UNDERGRADUATE AFRICAN AMERICAN ENGINEERING AND COMPUTER SCIENCE MAJORS

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The purpose of this article is to explore the role of race in the interactions of undergraduate African American engineering and computer science majors with faculty members from a variety of racial backgrounds. Through an embedded multiple-case-study design, 37 African American college students were interviewed at two predominantly white public research universities. A pattern matching analytical technique led to three key findings: expectations of same-race faculty members, negative interactions with white faculty members, and race is not a barrier for faculty-student interactions outside the classroom. Findings suggest students desire more interactions with same-race faculty members in engineering and computer science. A small, but important faction of participants described negative interactions with a white faculty member and the serious potential impact of this experience. In the absence of a critical mass of African American faculty, a number of participants described positive interactions with faculty from similar and different racial backgrounds. African American, white, and Asian faculty members were identified as initiating contact with study participants and demonstrated a student-centered focus on the academic success of participants and their overall well-being. This paper concludes with a discussion and implications for policy, practice, and future research.

KEY WORDS: African American college students, engineering education, college teacher-student relationships, mentoring, racial relations, higher education

1. INTRODUCTION

In this study, I focus on the interactions between undergraduate African American engineering and computer science majors and faculty members through an embedded multiple-case-study research design. Scholars have found faculty-student interactions and mentoring to be important in increasing levels of overall college satisfaction, cognitive development, and persistence through graduation (Crisp and Cruz, 2009; Kuh and Hu, 2001; Pascarella and Terenzini, 2005). The literature points to the many benefits of increasing students’ interactions with faculty, which suggests faculty interactions would be particularly important to talented African American aspiring engineers and computer scientists. While a number of large-scale quantitative studies on student-faculty interactions are limited in the ability to account for the racial differences of faculty members (e.g., Kim and Sax, 2009), some scholars who focus on the salience of race in faculty members stress how important it is for students of color and women to have same-race and gender faculty role models (Guiffrida, 2005; Leggon, 2010; Newman, 2011; Slaughter, 2009). In STEM fields the lack of same-race role models is even more pronounced, with African Americans making up
only 2% of the engineering faculties at top research universities in the United States (Slaughter, 2009). There appears to be a contradiction between the importance of same-race faculty members and the lack thereof in STEM fields.

The seeming mismatch of the desire for African American faculty mentors and the limited population of African American engineering faculty members led me to an important research question: How does a professor’s race matter in the student-faculty interactions and/or mentoring relationships with African American engineers or computer scientists? Same-race faculty members may provide a role model and better relate to students’ backgrounds, but what happens when African Americans are not members of an engineering or computer science faculty? I explore these questions through an embedded multiple case study at two predominantly white public research universities. This study is part of a larger embedded multiple case study focusing on the experiences of high-achieving African American engineers and computer scientists and the institutional contexts which enable or impede their success. In this article, I focus specifically on the role a faculty member’s racial background may have on interactions and/or mentoring relationships with African American undergraduate students majoring in engineering or computer science.

2. LITERATURE REVIEW

Many scholars stress the importance for students of color and women to have same-race and same-gender faculty role models (Cole and Griffin, 2013; Griffin and Reddick, 2011; Guiffrida, 2005; Harper, 2013; Leggon, 2010; Newman, 2011; Slaughter, 2009). Cole and Griffin (2013) connect the principles of homophily (i.e., a tendency to associate with similar others) with findings in the literature suggesting students of color and women are inclined to search for same-race and same-gender mentors (e.g., Banks, 1984; Loo and Rolison, 1986; Patton and Harper, 2003). Scholars have asserted homophily impacts both students of color and faculty of color in predominantly white colleges and universities. While same-gender role models are important in STEM fields, the role of gender is beyond the scope of this study. In this section, I will discuss the literature focusing on the positive outcomes of faculty-student interactions/mentoring, discuss a model of faculty mentoring, and describe the potential ramifications for faculty of color who are often burdened with service overload in support of students of color.

2.1 Student Experiences with Faculty Interactions and Mentoring

In focusing specifically on African American students, researchers have found a positive predictive relationship with faculty-student interactions/mentoring and satisfaction with the college experience (Strayhorn and Saddler, 2009; Strayhorn and Terrell, 2007), increased grade point average (Cole, 2008), and self-perception of academic ability and intellectual self-confidence (Cole, 2007). Lundberg and Schreiner (2004) disaggregated faculty-student interactions by students’ race and ethnicity and found “working harder due to instructor’s feedback” was a very strong predictor for African American students’ faculty interaction (p. 557). African Americans had the highest faculty interaction score but the lowest perception of the quality of their faculty relationships (Lundberg and Schreiner, 2004). In a qualitative study, Newman (2011) further explored Lundberg and Schreiner’s (2004) findings and found the African American undergradu-
ate engineering majors had very low expectations for quality interactions with their professors because of the perception that STEM faculty members’ focus was on scholarly productivity and not engagement with undergraduate students. In contrast, Guiffrida (2005) highlighted the differentially higher expectations African American students have for same-race faculty members being more “student-centered” with an interest in students’ academic and personal development. Additionally, Hurtado et al. (2011) found students positively responded to faculty members who recognized their academic potential and expressed interest in a student’s personal well-being. This interest in the “whole person” broke down barriers and softened the perception of faculty being unapproachable.

There is a substantial body of literature emphasizing the importance of “mentoring,” which is a much deeper level of faculty-student interaction (Crisp and Cruz, 2009; Jacobi, 1991). Crisp and Cruz (2009) conceptualized a model of mentoring for college student success. Grounded in previous research, Crisp and Cruz (2009) identified four underlying constructs, which include “(1) psychological and emotional support, (2) support for setting goals and choosing a career path, (3) academic subject knowledge support aimed at advancing a student’s knowledge relevant to their chosen field, and (4) specification of a role model” (p. 538). This framework provides a much clearer understanding of the level of mentorship needed to foster successful outcomes for college students.

### 2.2 Faculty of Color’s Experiences and Potential Ramifications from Service Overload

While faculty-student interactions and/or mentoring relationships are important to understand from students’ perspectives, scholars have found differences in the experiences of faculty of color and white faculty. Banks (1984) asserts a number of black scholars were hired in the late 1970s by universities for their academic talent, but also to indirectly assist the university in dealing with the “often troublesome realities of black students on white campuses” (p. 326). Cole and Griffin (2013) believe this trend still continues. For example, in a study of nearly 14,000 faculty members at 134 institutions, Umbach (2006) found African American faculty members interact with students more frequently than their white counterparts. This increased level of contact with students may be emblematic of what one of Griffin’s (2012a) study participants described as a “tax,” which is additional time African American faculty members devote to advising students of color, mentoring, and supporting student organizations. Devoting time to students reduces time allocated for faculty research and scholarship productivity and may lead to faculty of color feeling more anxiety and stress over the tenure and promotion process (Butler-Purry, 2006; Cole and Griffin, 2013; Decuir-Gunby et al., 2009, 2013; Fries-Britt et al., 2011; Jayakumar et al., 2009; Tierney and Bensimon, 1996; Williams and Williams, 2006).

Regardless of the potential productivity tradeoff associated with supporting students of color, some faculty members of color feel an obligation for increased faculty-student interactions. Griffin (2012a, 2012b) found black professors feel a desire to give back to others the mentoring they received along their career path, so faculty members of color may feel a sense of responsibility in preparing the next generation of scholars and practitioners for the field and academe. Guiffrida (2005) makes the connection between the perceived responsibility of African American faculty to a concept of “othermothering,” which suggests an interest in a student’s academic success and her or his emotional and psychosocial well-being. The notion of “othermothering” may be more pronounced for African American female faculty members, who are expected to mentor...
students in a more maternal and nurturing style (Griffin and Reddick, 2011). Additionally, African American female faculty members must deal with being a person of color and a woman in a white and male-dominated engineering field (Decuir-Gunby et al., 2009, 2013). The diversification of the field of engineering will come from a stronger representation of women and people of color (Fleming, 2008).

In contrast to the experiences of faculty of color, white faculty members have a more privileged role in the academy. In a study focusing on the disparities between faculty of color and white faculty retention, Jayakumar et al. (2009) found, “White faculty retention is greater where racial climate is more negative” (p. 555). Jayakumar and her collaborators posit that white faculty members have the privilege of defining “what is valued and how excellence is measured” in the tenure and promotion process (p. 556). Moreover, white faculty members have been well documented in the literature as the perpetuators of prejudice, racism, and sexism (e.g., Cole and Griffin, 2013; Feagin et al., 1996; Fries-Britt and Turner, 2002; Fries-Britt and Griffin, 2007; Fries-Britt et al., 2010; McGee and Martin, 2011; Newman, 2011; Seymour and Hewitt, 1997; Turner et al., 2011). Feagin et al. (1996) suggests that at predominantly white campuses the negative experiences many African American college students have with white faculty members may decrease the likelihood of seeking these individuals for mentorship and advice.

In synthesizing the literature, there is much support for the conception that African American faculty members are expected by both their white colleagues and students to support the academic and personal development of African American students. Conversely, the literature also makes clear that some white faculty members are perceived to be insensitive to the experiences and needs of students of color and often perpetrate prejudice and racism. While there are a relatively small number of exceptions found in the literature, the notion that African American faculty members are overwhelmingly responsible for the support of African American college students is well established (e.g., Brown et al., 1999; Cole and Griffin, 2013; Loo and Rolison, 1986; Umbach, 2006; Williams and Williams, 2006). A key limitation in the literature on faculty-student relationships is that a number of large-scale quantitative studies on faculty-student interactions are limited in the ability to account for the racial and gender differences of faculty members referenced by survey respondents (e.g., Kim and Sax, 2009; Sax et al., 2005). In this study, I focus on the nuanced experiences of African American engineering and computer science majors and their experiences interacting with faculty of similar and different racial backgrounds.

2.3 Conceptual Framework

In examining institutional inequity, Bensimon (2005) presents a clear position on deficit framing. She argues well-meaning scholars employ a “deficit cognitive frame” in their research on students of color. The deficit framework suggests the academic and social barriers students of color face are either “self-inflicted or natural outcome[s] of socioeconomic and educational background[s]” (p. 102). This framing informed the research design of this study through Bensimon’s (2005) assertion that the key strategy in addressing equity issues on college campuses is not to focus on “fixing the student” (p. 103); rather, it is about transforming the institution. Bensimon’s work led me to focus on the ways institutions structure opportunity for African American engineers and computer scientists. Additionally, Harper’s (2010) Anti-Deficit Achievement Framework inspired the framing of this study, which is demonstrated in the participant inclusion criteria focusing on student success and the development of the interview protocol. Similar to Bensimon, Harper puts forward the notion that well-intended scholars “amplify minority student failure and
deficits” by focusing on nonpersistence instead of achievement (p. 64). While the exploration of why the achievement gap persists in engineering and computer science is an important topic for inquiry, there is less known about what leads African American students to be successful in these fields, which limits campus administrators and policy maker’s understanding of potential opportunities (Harper, 2011).

3. METHODS

3.1 Research Design

Utilizing Bensimon (2005) and Harper (2011) as a guiding framework, I identified universities with records of success in supporting African American engineers. To this end, I utilized an annual report of the top 50 producers of baccalaureate degrees in engineering among African Americans in the United States to identify institutions to request participation in this study (Borden, 2011). In a national study of 677 African American students who entered college with the intention of majoring in engineering or computer science, Newman (2013) found survey respondents attending the top 50 producers were 68% more likely to complete a degree in engineering or computer science than their counterparts not attending one of these campuses. One goal of this study was to explore the practices leading to the successful outcomes of these top 50 producers.

Eight institutions were purposefully selected based on geographic location and similarity of institutional characteristics. All eight institutions were contacted through their respective College of Engineering dean’s office; two institutions agreed to participate in this study. As a result, study participants were from one of two predominantly white public research universities: “Porter State University” and “Baldwin University.” Pseudonyms are used for both study participants and the institutions. Porter State and Baldwin university are both ranked within the top 20 universities on the top 50 producers list (Borden, 2011).

This research utilized an embedded multiple-case-study design. Figure 1 is a conceptual model adapted from Yin’s (2009) case study design with an embedded unit of analysis. The dashed lines between the different layers of the case signify there may not be a sharp distinction between the layers. A clear example is found in the distinction between a university and the College of Engineering. The university’s culture may permeate the College of Engineering through traditions and institution-wide initiatives. Therefore, it may be difficult at times to distinguish the unique identity of the College of Engineering as compared to the umbrella institution. Similarly, Fig. 2 illustrates the conceptual model utilized in this study. The College of Engineering serves as the case under study, with the university providing the institutional context for the case. Undergraduate students and recent alumni are the embedded unit of analysis.

3.2 Institutional Characteristics

“Porter State” is a public research university in the Southeastern region of the United States; it has 35,000 students. This university has considerable research activity and expenditures of nearly $400 million annually. The total undergraduate student population consists of 8% African Americans. Among the 6,000 students in the College of Engineering, 6% are African American and 70% are white; women constitute 17%. African Americans make up just fewer than 6% of
the 250 tenure-line faculty members within the College of Engineering.

“Baldwin University” is a public research university in the Midwestern region of the United States with 44,000 students. Baldwin has considerably larger research expenditures (over $900 million), is more selective, and has a more highly ranked College of Engineering than Porter State. Baldwin’s overall undergraduate African American student population is approximately 4%, which is appreciably smaller than Porter State’s (8%). Within the College of Engineering, African Americans make up 4% and whites are 60% of the 8,000 undergraduate students; women account for 22%. Among the faculty in the College of Engineering, African Americans make up approximately 6% of the 350 tenure-line faculty members.

3.3 Data Collection

Individual face-to-face interviews were conducted for all study participants. Students were asked to complete a short demographic and biographical questionnaire prior to the interview. This questionnaire gathered information on a range of relevant background characteristics and college experiences (e.g., household income and parent’s level of education, high school demographics, student organization participation). The interviews lasted between 60 and 75 minutes. A semi-structured interview technique was used, which allowed me to be more responsive “to the situation at hand, to the emerging worldview of the respondent, and to new ideas on the topic” (Merriam, 1998). The interviews were audio-recorded, transcribed verbatim, and checked for accuracy.

3.4 Study Participants

The 37 participants included 29 African American undergraduate engineers/computer scientists and eight baccalaureate recipients who received a bachelor’s degree within 3–5 years. Pseudonyms are used for both study participants and the universities. The study participants chose their own pseudonym name at the beginning of the interview.

Participants were recruited through the respective university’s minority engineering program (MEP). These MEP programs offer a number of support programs for undergraduate engineer-
ing and computer science majors, including summer transitional programs, assistance finding internship sites, peer mentoring programs, and financial support through scholarships to name a few. Directors of the programs emailed study recruitment announcements to US-born African American students meeting the minimum study inclusion criteria, which included the following:

1. Students must identify as African American or black (including multiracial backgrounds).
2. Students must be a declared undergraduate engineering or computer science major or recent alum (completed baccalaureate degree fewer than 5 years ago).
3. Students must have achieved success, which is defined as maintaining at least a 3.0 undergraduate cumulative GPA, been involved in a faculty member’s research or relevant corporate internship, and persisted to upper-division coursework as indicated by junior or senior class standing.

The 37 participants came from a variety of engineering majors. Table 1 lists all participants for Porter State and Table 2 lists all participants for Baldwin. Computer science was included with engineering in this study because both colleges of engineering offered computer science majors. Additionally, comparable institutions to Baldwin and Porter State offer a computer science major within their respective College of Engineering. Perhaps due to some minor selection bias, there were no study participants majoring in computer science from Baldwin University.

Students from Porter State collectively maintained a mean cumulative 3.3 undergraduate GPA, and students from Baldwin achieved a mean cumulative 3.4 undergraduate GPA. Fifteen participants were women (40.5%). In terms of socioeconomic status, 12 of the students’ household incomes were less than $60,000 per year, and 13 were between $60,000 and $99,999. Ten students were in the highest range with a household income of $100,000 or more (two participants had missing data). Interestingly, over two-thirds ($n=26$) of participants were raised within 100 miles of their respective campus.

3.5 Data Analysis

![FIG. 2: Conceptual model of embedded multiple-case-study design](image-url)
TABLE 1: Student participants from Porter State University (n=23)

<table>
<thead>
<tr>
<th>Pseudonym name</th>
<th>Sex</th>
<th>Academic standing</th>
<th>Major</th>
<th>UPG GPA*</th>
</tr>
</thead>
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<td>Alum</td>
<td>Industrial</td>
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<tr>
<td>Avery</td>
<td>Female</td>
<td>Junior</td>
<td>Industrial</td>
<td>3.01</td>
</tr>
<tr>
<td>Bella</td>
<td>Female</td>
<td>Senior</td>
<td>Computer Science</td>
<td>3.66</td>
</tr>
<tr>
<td>Caden</td>
<td>Male</td>
<td>Alum</td>
<td>Computer engineering</td>
<td>3.08</td>
</tr>
<tr>
<td>Carter</td>
<td>Male</td>
<td>Alum</td>
<td>Electrical</td>
<td>3.76</td>
</tr>
<tr>
<td>Charlotte</td>
<td>Female</td>
<td>Junior</td>
<td>Computer engineering</td>
<td>3.14</td>
</tr>
<tr>
<td>Chloe</td>
<td>Female</td>
<td>Senior</td>
<td>Chemical</td>
<td>3.30</td>
</tr>
<tr>
<td>Damien</td>
<td>Male</td>
<td>Senior</td>
<td>Computer science</td>
<td>3.12</td>
</tr>
<tr>
<td>Elizabeth</td>
<td>Female</td>
<td>Junior</td>
<td>Computer science</td>
<td>3.70</td>
</tr>
<tr>
<td>Ethan</td>
<td>Male</td>
<td>Junior</td>
<td>Computer science</td>
<td>3.28</td>
</tr>
<tr>
<td>Gabriel</td>
<td>Male</td>
<td>Senior</td>
<td>Electrical</td>
<td>3.38</td>
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<tr>
<td>Grace</td>
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<td>Electrical</td>
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<tr>
<td>Isabella</td>
<td>Female</td>
<td>Junior</td>
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<td>Kaleb</td>
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<td>Alum</td>
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<td>Layla</td>
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<td>Junior</td>
<td>Biomedical</td>
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<td>Mikayla</td>
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<td>Xavier</td>
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<td>Senior</td>
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</tbody>
</table>

* Mean college GPA of 3.3 with a std. dev. of 0.21.

In analyzing the case study data, my goal was not to simply generalize the experiences of African American engineers and computer scientists but to “preserve the multiple realities, the different and even contradictory views” of African American students’ interactions with faculty members (Stake, 1995; p. 12). Several techniques were used to code and analyze data collected from the multiple–case-study interviews (Bogdan and Biklen, 2007; Miles and Huberman, 1994; Yin, 2009). I first bracketed my thoughts and perceptions as I read each line of participants’ interview transcripts. The margins of the transcripts were marked with comments regarding initial reactions and summarizations of participants’ main points. A reflective memo was written after I read and bracketed each interview transcript to identify preliminary codes. After reading and bracketing all interview transcripts, a codebook was created with definitions to aid the analysis process by setting the parameters of when to apply codes to transcribed passages. The codebook was revised...
several times with two peer-debriefers. Then the transcripts were systematically coded by assigning key statements by the participants from the transcribed interviews to codes using HyperRESEARCH qualitative data management software.

Once the data were coded, code reports were run through HyperRESEARCH, compiling all the key phrases under codes. Then I began a “pattern matching” technique where data from the code reports were compared to previous research and theory to assist in identifying themes (Yin, 2009). I utilized previous research on faculty-student interactions and mentoring, the experiences of white faculty and faculty of color to identify and analyze patterns within the embedded multiple case study presented herein. Table 3 lists descriptive statistics for the coded texts, including the total number of statements made by all 37 participants, the minimum and maximum number of statements made by a participant, the mean, and the standard deviation of the mean. Passages in the transcripts were coded with a minimum of one sentence and a maximum of one paragraph. Codes were not applied to single words or a portion of a sentence. As presented in Table 3, “Faculty of a different race as a positive” was coded the most frequently, with 68 separate instances reported by study participants. On average, participants made 1.62 statements about a faculty member of a different race having a positive impact on their success as an undergraduate student. In contrast, “Faculty of a different race as a negative” had the fewest instances reported by participants, with ten statements being made by six of the 37 participants (16%). As I decided on the themes to include, I paid particular attention to rival explanations and discrepant data (Yin, 2009), which influenced me to report the “Faculty of a different race as a negative” theme. In the final step of my data analysis process, I utilized cross-case analysis to focus on the similarities and differences between Porter State and Baldwin across the themes (Miles and Huberman, 1994).

TABLE 2: Student participants from Baldwin University (n=14)

<table>
<thead>
<tr>
<th>Pseudonym name</th>
<th>Sex</th>
<th>Academic standing</th>
<th>Major</th>
<th>UPG GPA*</th>
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<td>Eli</td>
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<td>Faith</td>
<td>Female</td>
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<td>Jack</td>
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<td>3.35</td>
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* Mean college GPA of 3.4 with a std. dev. of 0.29.
3.6 Trustworthiness and Role of the Researcher

Three main techniques were utilized to enhance internal validity and trustworthiness: 1) member checking, 2) peer examination, and 3) clarifying the researcher’s potential biases (Merriam, 1998). First, four study participants from Porter State (n=2) and Baldwin (n=2), as well as both MEP directors, were asked to review and comment on a case description summarizing the emerging themes for a number of topics, which included but were not limited to the findings presented in this study. This round of member checking yielded an overall consensus on the plausibility of my interpretations, and a few minor technical corrections were made to some aspects of the description of the case context.

Second, this study went through two rounds of peer examination. The first phase was during the creation of the codebook. Two peer-debriefers, a white female and Latina graduate student, provided critical feedback, leading to several revisions for the coding schema to reduce overlapping codes and to clarify code definitions. Once the data were analyzed and findings began to emerge, a drafted manuscript was distributed to seven faculty colleagues, four white men, one white woman, an Asian male, and an Asian American female. The second round of peer examination led to further clarification of the emerging themes and the interpretations and conclusions put forward by the author. In other words, this second round of examination sought to identify the development of unintended biases by examining the data presented and the explanations of these data.

Lastly, I reflected on my role as the researcher through writing a detailed identity memo. Merriam (1998) points out researchers are human and susceptible to mistakes and personal biases. Additionally, Creswell (2009) suggests researchers should identify attributes in their backgrounds, leading to a reader’s “better understanding of the topic, the setting, or the participants and the researcher’s interpretation of the phenomenon” (p. 177). However, Maxwell (2005) contends researchers’ previous experiences related to the topic under study should not be conceived solely through the lens of bias but should also take into consideration the experiential knowledge of the researcher. Therefore, I sought to reduce my personal biases through “critical subjectivity,” which is a term described by Reason (1988) to mean, “a quality of awareness in which we do not suppress our primary experience; nor do we allow ourselves to be swept away and overwhelmed by it; rather we raise consciousness and use it as part of the inquiry process” (p. 12).

I am an African American male researcher and I attended a predominantly white public research university with some institutional characteristics similar to the participants’ universities. As a result, I may have had similar experiences as some of the participants. For example, I empathize with feelings of isolation and being one of few if not the only student of color in a college classroom. Also, while I found mentorship from same-race university administrators, I

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<th>Max</th>
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did not find any same-race faculty mentors throughout my undergraduate experience. Even so, as an undergraduate student, I found faculty mentors of different races. As a doctoral student, I found mentorship from both same-race and different-race faculty mentors. While I believe my experiences strengthen the conclusions made in this study, there is a potential for some bias, as is likely the case in most empirical research.

3.7 Limitations

There are two important limitations I paid particular attention to when analyzing the data for this study. First, this study focuses on successful African American engineers and cannot make any conclusions about the experiences of less successful students. In addition, although all eligible African American students were sent a recruitment email, the designated university contact was through the respective campuses’ minority engineering program office. As a result, nearly every participant was a participant in a MEP-sponsored event. While there are varying degrees of MEP participation, students who volunteered to participate in this study may have exhibited some selection bias to participate due to their relationship with his or her respective MEP office. The two MEP offices, through programming efforts, may have directly or indirectly encouraged increased faculty-student interactions, which may not be typical of nonparticipants of MEP.

4. FINDINGS

Porter State had more structured opportunities than did Baldwin to interact with faculty on an ongoing basis by assigning all engineering undergraduates a faculty advisor; this faculty advisor practice is employed across all of the engineering departments. Although study participants from Baldwin did not necessarily cite any specific negative faculty interactions, they tended to cite far fewer faculty interactions. Participants at Porter State tended to cite many more faculty interactions. The key themes emerging from the data analyses were the expectations of same-race faculty members, negative experiences with white faculty members, and faculty-initiated student interactions and mentoring outside the classroom.

4.1 Expectations of Same-Race Faculty Members

Students at both Porter State and Baldwin expressed desires to see more African American professors in their courses. When asked about the racial backgrounds of their engineering instructors, most students I interviewed never had a class with an African American professor in engineering or computer science. This was a key opportunity to get students’ perceptions of how a faculty member’s race makes a difference. The sentiment ranged from a belief an African American faculty could help build confidence in a participant’s ability to be successful to the need for having a personal connection and a role model. For example, Vera, who is a junior civil engineering major at Baldwin, describes the difference an African American professor would make as she stated:

*It would increase my confidence to see a professor in my field who was African American, and I’m not really expecting them to do anything different than what my other professors are doing, but just representation, that is all I need, representation of us being equal.*
Vera stresses the need for a same-race role model because it would help her visualize herself in a similar role in the future, which may shape, in some ways, her future career pathway. While Vera felt a key difference a same-race faculty member would make in her experience was psychological for her personally, other students like Bernard, an industrial engineering major at Baldwin, speculated there would probably be a more tangible difference as he expressed the following:

*What I hear from other students who are in [other departments], they have black professors, and yes, they understand some things about people that other professors may not. Like they wouldn’t be ones to judge you just by the way you dress or act and stuff, but I guess this never affected me personally just because I never had [an African American professor].*

Bernard indicates a same-race faculty member may provide an additional level of comfort for students, who often face prejudice and stereotypes surrounding students’ attire or mischaracterized behavior. Bernard suggests African American students may be able to more fully engage in the academic experience because they may not be distracted by students’ perception of faculty members’ prejudices.

More concretely, Jack, who is an aerospace major at Baldwin, describes how he sought out African American faculty mentorship. Jack stated:

*I specifically targeted [Professor Allen] as my advisor based on other’s feedback and I know the benefit of seeing talent like me in the field, which his why I chose him. It turned out to be a really good choice. Most people just get an advisor. I wanted him, and I targeted him. It is very helpful and motivational when you see he has a company on the side and is in academia and is making money at two different jobs and he is doing it all at once. It makes an impact, even though he is not my teacher, just seeing him in the field helps, which is why I’ve seen pretty much all the black faculty on this campus. I just sought them out.*

Jack was one of few participants to articulate how the desire for black faculty members led to his direct action in seeking out mentorship from a perceived same-race role model. Jack goes on to describe the tangible benefits, including support in seeking funding opportunities, letters of recommendation, and an intangible motivational factor.

Students at Porter State shared similar feelings as those captured by Vera, Bernard, and Jack. For instance, Charlotte, who is a computer engineering major at Porter State, believes African American faculty members would better understand her experiences. Charlotte asserted:

*I’ve only ever had one minority professor and he was from like India. As an African American student it’s somewhat discouraging. It’s kind of like, man, we have all these Caucasian professors, and I mean no one to relate to us, no one that I can go to and be like you got through it, I can get through it too. Just seeing that face would mean a lot to me.*

Charlotte’s example demonstrates a need by some students to have a faculty mentoring relationship with someone who shares a similar racial background. Charlotte believes a same-race faculty member could serve as a role model for her by providing advice and encouragement in making it through difficult situations. More revealing, Charlotte asserts not finding a same-race role model also has a negative impact because it suggests people who look like her do not belong in the computer engineering field of study.
While most participants spoke generally about the role of African American faculty members in STEM, Nathan, an electrical engineering major at Porter State, drew from a specific experience as he contended:

[African American faculty] are able to put things in a certain perspective. For example, the peer mentor program that is mostly for minorities, so the faculty for that were able to help us transition. They were there outside their [normal] jobs and are there for concerns. We had personal relationships, you know, with some of the faculty. I guess you are more to a certain degree, even though like seeing that you love people of all races definitely, but you’re probably more likely to model yourself after someone of your own race. Or you are more likely to look up to, or see that person as a mentor.

Nathan described a specific experience where he received support from same-race faculty members. He describes these faculty members as going above and beyond their normal duties and he attributes this to the faculty members’ commitment to his (and his peers’) success. In many ways, Nathan characterizes, in his own words, the concept of homophily (i.e., a tendency to associate with similar others). He stresses his desire to model himself after someone who shares his racial background.

These five examples provide a clearer understanding of African American students’ perspectives on the role of same-race faculty members. These examples demonstrate a strong desire for same-race role models who may serve as proof that African Americans can become not only a successful engineer, but also a flourishing engineering faculty member. Some students may be discouraged by the racial reality of their academic environment, with a small number of African American engineering or computer science students and even fewer faculty members sharing the same racial background. While this has served as a barrier for some students, the lack of racial representation among faculty members was not an insurmountable obstacle.

4.2 Negative Interactions with White Faculty Members

Some participants at Porter State reported experiences of white faculty members perpetuating racial prejudice and having low expectations for African American students. While a majority of the study participants did not disclose negative experiences with white faculty members, the analyses of data allowed for rival explanations based on the “multiple realities” of African American college students (Stake, 1995). In this section I describe the experiences of students with discrepant experiences in dealing with some white faculty members. Given the difficulty many have discussing race (Quaye, 2012), it is often an avoided topic in higher education settings (Harper and Hurtado, 2007). It is important to capture the views of students who are comfortable articulating experiences around race and racism.

An example of students feeling they were treated differently than their white counterparts comes from Ian, a senior biomedical engineering major at Porter State. He presented data resonating with a small faction of the study participants through citing his feeling of being treated differently by white faculty members. Ian voiced:

_I think the biggest challenge is sometimes I don’t feel like the help from the professors is the same. When I was younger I thought it probably is because of my race, but I was more, I guess, more upset about it. But then as I got older and started thinking, I think sometimes they just probably like to help people who are more like_
themselves, and that’s probably why they help white kids. [long pause] But that was
the major thing like going to office hours I didn’t feel like I got the same quality of
help sometimes from those professors. So, I had to seek different avenues to figure
out how to understand the work to get my work done, so it wasn’t as easy for me to
excel in those classes.

Ian described a pattern of receiving a perceived lower caliber of academic support from
his white instructors. The perceived lack of scholastic assistance led Ian to feel academically
isolated and this served as a barrier he had to overcome. The few students who mentioned
feelings like Ian tended to generalize this perception to white faculty members and seemed to
express hesitancy with approaching white faculty for assistance in the future. This example
shows the negative impact a few bad experiences may have for successful African American
engineering students like Ian, who has maintained nearly a 3.4 cumulative undergraduate
GPA.

Although some students like Ian cited only generally negative experience with white faculty,
other students cited very specific examples of mistreatment by white faculty members. Nathan,
Isabella, and Charlotte independently cited Professor Thornton as an example of a “nonsup-
portive” faculty member at Porter State. Professor Thornton is a white female faculty member.
Charlotte, a junior computer engineering major, described how there was a shared belief among
racial minorities about their mistreatment:

I don’t think everyone in the undergrad department gets the same treatment. I don’t
really hear too many Caucasians complaining about [Professor Thornton’s] advis-
ing, or just how she treats them and talks to them. Like I’ve had peers, not even just
African American peers, but from the middle east who say that [Professor Thornton]
has talked down to them, or said they can’t do it. And everyone believes an advisor
should be encouraging. I’ve had a couple of students that [“you can’t do it”] has
been said to them, and as an advisor I feel like if anything, you should be encourag-
ing students to stick to it.

From Charlotte’s perspective, Professor Thornton had a lower expectation for racial minor-
ity students and blatantly discouraged students’ persistence in computer engineering. The ac-
tions of Professor Thornton are further explored through the experiences of Isabella, who is also
a junior computer engineering major. Isabella described a much more personal account of blatant
mistreatment by Professor Thornton and had experiences with this professor in dual roles as a
faculty advisor and course instructor. Isabella described her encounter:

I was taking her course and I ended up getting a D+. I’ve never got a D in my life,
but I did and I went to talk to her about it. [Professor Thornton] never told me how
many points away I was, wouldn’t tell me the details, wouldn’t let me see my test or
anything. I was really upset, and [Thornton] knows I was on scholarship and it was
like she wanted my scholarship to be taken from me. So I was talking to her about it,
and [Thornton] was like, “Well you’re going to lose your scholarship anyways be-
cause you don’t have a 3.5.” I explained to her that me and my father have talked to
the scholarship representatives and they told me as long as I keep a 3.0 I’m fine, but
she was automatically nixing it, “You’re not going to get your scholarship anyway so
it doesn’t really matter.” So I was just like “Wow, this is really knocking me down!”

Isabella does not believe the white professor demonstrated compassion or concern for Isa-
abella’s personal development. Moreover, Professor Thornton was “unsupportive” of three Afri-
can American computer engineering majors with GPAs over a 3.0 (Charlotte, 3.14; Isabella, 3.23 GPA; Nathan, 3.3 GPA). While Professor Thornton was a very specific example independently offered by three participants, the lack of compassion and prejudice from other white faculty members were experienced more generally and less intensely by some participants.

While vocalized by only a smaller group of participants, this theme is important because it expresses the varied experiences of participants. Furthermore, student perspectives on their interactions with some white faculty members captures an ongoing struggle for educational equity. Given the differential power dynamics between faculty members and undergraduate students, a single faculty member can have negative and widespread impact on students. While this may be perceived as an isolated incident that is not a “problem,” the lives of African American undergraduates majoring in engineering were seriously impacted.

4.3 Race is Not a Barrier for Interactions and Mentoring Outside the Classroom

Among students who had meaningful interactions with faculty members, there was an emergent theme of how a faculty member’s race did not serve as a barrier to interactions and mentoring experiences with students outside the classroom. Study participants perceived these interactions with faculty members as supporting their success and encouraging students to achieve more than they ever thought possible.

With African American engineering and computer science faculty making up small percentages of the overall College of Engineering faculty at both Porter State and Baldwin, there were only a few cases of study participants who developed meaningful relationships with African American faculty members. Key examples from participants at Baldwin come from the experiences of Eli and Vera, who both cited the support they received from Professor Eaton, an African American female faculty member. Eli is a senior civil engineering major and is a participant in a program allowing him to receive a master’s degree in addition to the bachelor’s with additional course work. Eli describes how he developed his relationship with Professor Eaton:

[Professor Eaton] was a really good professor, kind of one of those professors that go, you know, above and beyond. You can stop by [Eaton’s] office outside of office hour times to get help with stuff, and just talk. So, she is one of those really good professors, who seemed like they really care, and I think after a course I took with [Eaton] our relationship kind of sparked and that is when we were talking more and more.

After developing a positive relationship, Eli explains how Professor Eaton approached him about the opportunity to complete a master’s degree in civil engineering:

[Professor Eaton] actually, at one of our award ceremonies for grades, she pulled me aside and said, “Hey, what are you planning on for grad school?” That was the first time someone ever talked to me about [postgraduate plans] or about me doing grad school, so yeah from there I said, “Yeah, ok sure. I’ll apply.”

I followed up this statement by asking Eli whether or not he previously planned to apply to graduate school and he said, “No, I honestly think I would have got a job.” Professor Eaton’s recognition of Eli’s talent and encouragement of graduate studies provides a solid example of how African American faculty may be able to push African Americans to expand their horizons and to prompt students to achieve even more than they think may be possible for themselves.

There were relatively fewer examples of same-race faculty mentoring, and I found consid-
erably more examples of faculty-student interactions/mentoring derived from faculty members with different racial backgrounds. Similar to Professor Eaton, white and Asian faculty members initiated the interaction with African American study participants. A key example is Professor Yang, a foreign-born Asian male professor at Porter State, who was cited by Gabriel, Damien, and Ethan as being very supportive of their respective academic careers. Even more interesting was that Professor Yang reached out to these students, who did not necessarily take one of his courses. Gabriel explains, “Yeah [Professor Yang] actually reaches out to a lot of the minority engineers and asks them to come do research in his lab. I see [Professor Yang] as a mentor for minority engineers, and he helped me out a lot.” Gabriel shared a story of receiving a Facebook message from Professor Yang asking him if he was interested in working in Professor Yang’s research laboratory. Gabriel explained how shocked he was to receive a message from this professor because he never took a course with this faculty member, so Gabriel called his mother to get her opinion on whether or not he should even reply to the professor; Gabriel’s mother strongly encouraged him to reply to the Facebook message. When probed about specifics of Professor Yang’s support, Gabriel stated:

\[
\text{I’ve gone to a workshop at the [Food Drug Administration] with [Professor Yang]. There was a workshop on medical devices and [Professor Yang] just asked me if I wanted to go, so I went there with him. He helped me write my statement of purpose for graduate school. [Professor Yang] has written recommendations for research programs and for grad school.}
\]

Gabriel described how Professor Yang initiated the faculty-student interaction and proceeded to transform his interaction into a mentoring relationship. Professor Yang served as a valuable resource, who helped expand Gabriel’s social network by taking him to professional conferences. Additionally, Professor Yang provided academic support through assisting with graduate school applications and through writing letters of recommendation for Gabriel.

In another example, Ethan had similarly high praise for Professor Yang, who helped Ethan get a summer internship. In addition to helping Ethan with his academic development, Professor Yang demonstrated an interest in Ethan’s personal development. Ethan revealed:

\[
[Professor Yang] just wants everybody to succeed, and he really acts on it. When I first got here he took me out to eat and asked me about my background, my experiences, where I saw myself in the near future and distant future. Then he mentally writes everything down, and is like ‘Okay, he said he wanted to do this as a freshman, so how close is he to his goal?’ He is just accessible. I have his house number and his mobile number.
\]

Similar to the example of the African American faculty member (i.e., Professor Eaton), Professor Yang ensured the success of Gabriel, Damien, and Ethan by providing support in setting goals and navigating potential career paths. Also, it is clear Professor Yang provided psychological and/or emotional support for these students, given the students had his mobile and home phone number.

Multiple study participants cited Professor Conway as being very supportive of their academic success. Chloe, Jayden, and Olivia all described how Professor Conway, a white woman, knew them by name and often gave them words of encouragement. Olivia is a recent alumna of Porter State and at the time of the interview worked for an engineering consulting firm. Olivia described her interactions with Professor Conway by stating:
She would email me anytime there was a new job opening, and she would really be there. She really wanted what was best for the students and she would just go out of her way to just really try and like, “Oh there is this interview on campus.” That is how I got my job now.

In this example, Olivia described the many ways Professor Conway provided support for her career path. Chloe and Jayden both shared similar stories about Professor Conway initiating support to help them find internships and how they felt a personal connection to her. Professor Conway impressed Chloe and Jayden by learning their names and taking an interest in their success. By being a resource for students, Professor Conway provided indirect psychological and emotional support by helping students through very stressful times like the internship and job search processes. Professor Conway helped students achieve their career goals and objectives.

The final example comes from Kaleb, who described receiving support from a white male faculty member. Kaleb is a recent alum of Porter State and received a bachelor’s degree in civil engineering. At the time of the interview, he was a third-year PhD student in civil engineering at Porter State; he partially attributed the motivation to pursue a doctoral degree from the inspirational speeches of an older white male faculty member, Professor McCoy. Kaleb described his interaction as he exclaimed:

I would go to him with a question about a problem and he would always end up giving me these speeches about my potential, you know you have potential to do this. He found out eventually I was interested in graduate school and he was like, “Well there are not a lot of minority professors,” and he would always give me these speeches about the impact that [I] can have if [I] were to go into this. I respected him because I know his heart was in the right place. That was something that I hadn’t thought about. It wasn’t something that coming into college I said, “You know, I’m going to get a PhD.” I was like, “I’m going to get my 4-year degree and I’m going to go get a job,” kind of going down the path everybody usually takes.

As a true testament to Professor McCoy’s determination to get Kaleb on the tenure track faculty path, the professor continued to motivate Kaleb once he began his doctoral studies. Kaleb describes McCoy’s continued motivation by stating:

I saw him two or three weeks ago, and he told me about this program Bridge to the Professoriate, and he was just the same in the hallway. He stopped me in the hallway and asked me, “Well, are you in the Bridge to the Professoriate program yet?” and I was like “No, I don’t know about that,” and he was like, “Well let me get your information.” And you know I think in his case, it’s one thing to give someone a message, but he’s good about following up, and over the course of the years he has kind of shown that interest. Over time, I started to understand the intent of it, and he is a pretty cool guy and he is good at that, not just the kind of guy that I thought would ever mentor me.

Although not sharing a similar racial background as Kaleb, Professor McCoy took the time to encourage Kaleb to not only go to graduate school, but to obtain a PhD degree. In addition, the white male professor recognized the unique contribution Kaleb could make in inspiring younger African American students to pursue engineering and/or an academic career path. Professor McCoy’s persistent interest in Kaleb’s success allowed Kaleb to raise his academic and career aspirations. Kaleb’s experience gives a deeper insight into the lasting impact faculty from different races may have on African Americans in engineering students, because only one of the nearly 50 tenure track faculty members in Kaleb’s undergraduate engineering department were African American.
5. DISCUSSION

A number of studies have found positive academic outcomes associated with the interactions between faculty and students (e.g., Kim and Sax, 2009; Sax et al., 2005). However, these studies did not disentangle the racial background of the faculty members that students are considering when they respond to survey items on faculty interactions. In this study, I decipher findings of large-scale quantitative studies by documenting specific ways faculty members with the same and different racial backgrounds contribute to African American students’ successes. Similar to Guiffrida (2005), I found students expected African American faculty members to be “student-centered,” with an interest in not only the academic success of students, but also their personal and emotional well-being. As noted in the findings section, some of the student participants were projecting these positive attributes of an African American faculty member because many had not had one within their major. This finding also resonates with scholars who have demonstrated the potential for service overload for African American and other faculty of color (Fries-Britt et al., 2010; Griffin, 2012a, 2012b; Harper, 2013; Jayakumar et al., 2009). The expectation for faculty of color to support students of color may take time away from scholarly productivity, which may lead to faculty of color having more difficulty in the tenure and promotion process and may perpetuate a cycle of underrepresentation.

In describing faculty members of different racial backgrounds, student participants cited both positive and to a lesser extent negative interactions with faculty members from different racial backgrounds. Similar to an extensive body of literature on the adverse impact of some white faculty members (Feagin et al., 1996; Fries-Britt and Griffin, 2007; Harper, 2013; McGee and Martin, 2011; Newman, 2011; Seymour and Hewitt, 1997), a white female faculty member, Professor Thornton, was cited by multiple study participants as negatively impacting and impeding the success of students through racial prejudice and lower expectations. The case of Professor Thornton was one of a few specific cases inconsistent with the experiences of most participants. Nonetheless, negative encounters with faculty members like Professor Thornton may cause students to retreat and close themselves off from faculty who would like to be supportive. Students who face faculty members similar to Professor Thornton may cause students to retreat and close themselves off from faculty who would like to be supportive. Students who face faculty members similar to Professor Thornton must take action. It is important for students in this situation to reach out to MEP offices for support and advice on how to navigate this relationship with faculty members. Too often, students suffer in silence and no one knows they are having a difficult time until the student changes majors or withdraws from the university.

In contrast, the powerful stories of Professors Yang, Conway, and McCoy underscore the impact faculty from different racial backgrounds may have on successful African American undergraduate engineering and computer science students. These white and Asian faculty members served as surrogate mentors and role models. In other words, students cited the many ways these white and Asian faculty members served in capacities similar to a same-race faculty member. Most importantly, the racial background of faculty members was not a perceived barrier for most study participants, which is a diverging viewpoint from the principle of homophily (Cole and Griffin, 2013).

This study contributes to the literature because it provides a counterpoint to the unwritten expectation of African American faculty members as the sole supporters of African American students (e.g., Brown et al., 1999; Cole and Griffin, 2013; Loo and Rolison, 1986; Umbach, 2006; Williams and Williams, 2006). This study has demonstrated the ways a caring and compassionate person from a same-race or different-race background may serve as a mentor to students by providing emotional support, encouraging goal setting, assisting in navigating career pathways, and serving as a role model (Crisp and Cruz, 2009). This is not to say African American faculty
members are not needed; faculty of different races should not relinquish their advising and mentoring duties for African American students just because African American professors are not on the respective campuses’ engineering faculty. There is a strong possibility African American engineering and computer science majors will be receptive to faculty members of different races who show an interest in supporting all students.

While the benefits of same-race faculty members has been well documented by a number of researchers, utilizing the recruitment of faculty of color as the only strategy for creating an equitable campus environment will not transform the institutional paradigm (Bensimon, 2005; Brown et al., 1999; Chang, 2002; Smith, 2009). Senior administrators must emphasize all faculty members, regardless of racial background, and should support all students. A well-intended status quo has been established that faculty of color are/should be the sole caretakers for students of color. This thinking perpetuates inequity by not disrupting the institutional culture of some white faculty members’ disinterest in supporting students of color (Chang, 2002).

6. IMPLICATIONS FOR POLICY, PRACTICE, AND FUTURE RESEARCH

Deans of colleges of engineering and department chairs should make sure they are not putting faculty of color in untenable positions where they are expected to serve as the principal or sole resource for students of color. Academic administrators may begin to alleviate any additional service load encumbering faculty of color by providing clear rewards and incentives for faculty-student interactions, which may include appropriate consideration in the promotion and tenure review process and funding for undergraduate research assistantships to name a few. Moreover, in utilizing Bensimon’s (2005) institutional transformation approach, it is clear senior administrators also need to dedicate appropriate resources to ensure all faculty members have the desire and capacity to support all students. Institutional transformation is no easy task, because the culture of an institution has been well established over a number of decades through internal influences like the process of shared faculty governance and through external forces including professional associations and accrediting bodies. Deans have considerable influence in selecting the faculty members hired at the institution; during the search process, deans should provide leadership by setting an expectation for faculty members to support all students. Furthermore, during the hiring process deans and search committees should investigate the desire and capacity for faculty members to serve diverse populations. The perception of faculty of color being the sole outlet for supporting students of color will be reduced, creating a more inclusive culture in the respective College of Engineering. Although deans have some authority in faculty hiring, they do not have direct influence on promotion and tenure positions. Promotion and tenure policies are among the most entrenched policies in the university. It will be no easy task to provide proper incentives and rewards for faculty members to support undergraduate students.

In addition to hiring faculty members with interest and ability in supporting students from diverse racial and ethnic backgrounds, colleges of engineering need to make efforts to diversify their faculty. A possible strategy may be to create a postdoctoral fellowship to recruit promising scholars of color. These postdoctoral fellows should be paired with a supportive faculty mentor. Clear expectations and goals should be created for the mentoring relationship. If the postdoctoral fellow has success in teaching and research activities, the College of Engineering should create a targeted hire for this candidate(s). A postdoctoral fellowship program may be a wonderful way
for colleges of engineering to purposefully transform their faculty.

Minority Engineering Programs may help to broker the relationships of students with faculty by including faculty members “known” for supporting students of color in programmatic efforts. MEP offices should have occasions for informal networking and structured opportunities to engage with faculty through undergraduate research. Given that funding for students of color flows through MEP programs and rarely to faculty members, MEP programs and faculty members should work closer together to ensure the overall student experience. In addition to the tangible retention activities, like summer transitional programs, peer mentoring programs, tutoring services, and professional development, MEP offices should consider commissioning lectures from faculty members on topics directly relevant to students of color. This might include highlighting the contributions of engineers and computer scientists of color, or presenting current research demonstrating how engineers and computer scientists make a positive impact within communities of color.

In addition to bringing supportive faculty into cocurricular involvement opportunities, MEP offices must serve as advocates for students of color when presented with faculty like Professor Thornton. The MEP staff should coach students on how to cope with negative feedback from faculty members and potentially future employers. In addition, MEP staff should ensure that students are aware of and feel supported in completing existing grievance procedures. A level of support may include reviewing grievance paperwork to ensure that students maintain professionalism in all communications.

In future research, scholars should further investigate how the combination of race and gender influences the connection of faculty members and students. The intersectionality of race, gender, or other social identities has not been well documented in the literature. Additionally, in this research study, I have begun to challenge the often black-versus-white dichotomy prevalent in research on predominantly white campuses (Cole and Griffin, 2013). Given the increasingly international diversity of faculty members and student bodies, especially in STEM fields, future research should focus on the changing landscape of race and gender relationships within this context. Lastly, researchers should focus more attention toward the specific context of the faculty-student interactions. Scholars should be sure to document, report, and take into account the institutional type, academic discipline(s), and to the best of their ability, the campus racial climate for faculty and students. This specific context will help researchers, practitioners, and policy makers more appropriately interpret the findings and the setting(s).

7. CONCLUSION

This study has demonstrated the significance of understanding the experiences of these 37 successful African American undergraduate engineering and computer science majors. The study participants presented evocative narratives of how their interactions with faculty members shaped their undergraduate academic experiences. Participants described some faculty members, from different racial backgrounds, who provided a more student-centered approach that contributed to participants’ academic success. In sharp contrast, the experiences of a relative few participants poignantly captures the consequential negative impact a single faculty member, like Professor Thornton, may have on the academic trajectories of students of color. This study has contributed to the rethinking of race in faculty-student interactions by presenting data that highlights how
faculty from different racial backgrounds could serve in roles similar to their African American counterparts through supporting African American students. Given the harsh realities of the challenges associate with diversifying engineering faculty, more attention needs to be paid to other ways colleges of engineering and minority engineering programs may increase the representation of people of color and women through other avenues like the curriculum and cocurriculum.

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