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# Analyzing the Intersectional and Bicultural Experiences of Black Immigrant Women STEM Students at a Diverse Urban University: A Phenomenological Study

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## Abstract

Three 1.5-generation immigrant, Nigerian American, women students attending a diverse urban university participated in face-to-face interviews and a focus group to share their experiences as science, technology, engineering, and mathematics (STEM) majors. Qualitative analysis revealed influences from their African heritage, identities as African immigrant women, stereotypes they face because of their culture, and their need to have peers and role models who match their intersectional identities. Future research should explore the applicability of intersectionality for students with converging racial/ethnic, gender, and career experiences, the unique process of identity construction for African immigrant women in STEM, and the factors necessary for universities to meet the needs of all Black students.

**Keywords** Equity · Intersectionality · Gender · Diversity · Case study

Merriam-Webster defines a monolith (Merriam-Webster, n.d.) as a "single great stone often in the form of an obelisk or column." Describing a population of students as a monolith alludes to sameness, or creates the impression of a mass of individuals that comprise parallel experiences and lack a variety of identity expressions. Universities must realize that the descriptor *Black* is not a monolithic term; Black students comprise a heterogeneous group of individuals representing African international students, African immigrants, Afro-Latino/a, Afro-Caribbean, and Black mixed-race individuals. Understanding heterogeneity within the Black student population is a first step in breaking down bias, stereotyping, racial profiling, and discriminatory policies (Awokoya, 2012). In light of this reality, studies that explicate the unique experiences of identity expression and construction within the Black

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community are greatly needed to highlight the intersectionality and diversity within Black populations.

This descriptive phenomenological study focuses on the experiences of three Nigerian immigrant women university students studying at International State University (ISU), a diverse, urban research university in the southwest United States. The students are 1.5-generation immigrants from Nigeria, a country which contributes the largest number of West African immigrants to the US population (Okpalaoka & Dillard, 2012). This research focuses on the unique positionality of African immigrant women to better understand the effects of racism and sexism and additional obstacles these individuals face, as well as how Black immigrant women are uniquely equipped for success in science, technology, engineering, and mathematics (STEM) fields (Morton & Parsons, 2018). Although a number of studies have used quantitative, survey-based research to understand Black identity development (Cross, 1991; Sellers et al., 1998), qualitative studies that deeply explore the lives of Black students in underrepresented fields are needed to capture the heterogeneous experiences of students with multiple and marginalized intersections. The analyses and findings of this study will focus on one research question:

> How do Nigerian-American women STEM students construct their identity as they navigate their racial/ethnic, cultural, and gender positionalities toward success and recognition in STEM fields?

I strove to center the analyses on Black immigrant women by "conducting research in such a way that the worldviews of those who have suffered a long history of marginalization are given space to communicate from their own frames of reference" (Chilisa, 2012, pp. 13–14). As an author, my goal was to "breathe life into the research participants' personal histories and commentary in ways that emotionally connect the reader to the research subject at hand" (Evans-Winters, 2019, p. 1). As a white male researcher, I sought to cautiously consider the influences of my privileged positionality to increase objectivity and confront biases in my methodology and analyses. As first impressions are sometimes deceiving, further analyses may also point to assumptions that are narrowly-focused surface knowledge. To dig deeper is to understand the societal influences, cultural expectations, and intersectional realities of the participants.

## Literature Review

### Black Womens' Success

As a group, Black women are underrepresented in science, technology, engineering, and mathematics (STEM) fields (NSF, 2017) due to attrition, instances of stereotyping, discrimination, racism, and negotiating hegemonic power structures inherent in a White male STEM culture (Brand et al., 2006). Black women university students face both racism and sexism, sometimes referred to as the *double bind* (Malcom & Malcom, 2011). Black women occupy a unique position in higher education, one

fraught with multiple marginalizations and constraints. Studies show that Black women, more so than White or Asian women, report having to prove themselves, experience bias and gendered stereotyping related to their racial identity and gender, and feel isolated from their colleagues in the workplace (Rice & Alfred, 2014; Rosa & Mensah, 2016). Black university women students also face unwelcoming institutional environments (Carlone & Johnson, 2007; Marlone & Barbino, 2009), issues with representation, and lack faculty, advisors, and role models who uniquely resemble them (Drury et al., 2011; Sparks, 2018). Yet, this is far from the full picture.

In terms of participation in higher education, Black women have been shown to have the same level of interest in STEM fields as White women (Riegle-Crumb & King, 2010), achieve at the same or higher levels than Black males at both the K-12 and university level (Grant & Rong, 2002), and have the highest postsecondary enrollment rates of any race/gender/immigrant group (NCES, 2007). They have also demonstrated the determination to manage and avoid stereotypes (McGee & Martin, 2011) and the fortitude and resilience to persevere and thrive in academic settings (Morton & Parsons, 2018; Rice & Alfred, 2014).

## Intersectionality and Identity

The term *intersectionality* was coined by Kimberle Crenshaw (1991) to illuminate the oppressions of Black women and how their dual nature as both *women* and *Black* has historically marginalized their voice and power in feminism, social justice, and gender equality. She spoke of the importance of viewing the framework with structural, political, and representational lenses. Crenshaw (2016) makes it clear that intersectionality is not just a theory of multiple identities, but that some identities make an individual more vulnerable to exclusion, discrimination, marginalization, and invisibility. It is vital to consider the different intersections that comprise an individual and the role social inequities play in their lived experiences (Cole, 2009). As well, Purdie-Vaughns and Eibach (2008) discuss the concept of *intersectional invisibility*, which means that women of color can hold two marginalized positions but not represent either group; i. e., they can be both hyper-visible and invisible in the same environment.

Racial and ethnic identity are highly important for many underrepresented students (Marlone & Barbino, 2009; Settles, 2006; Zirkel & Johnson, 2016), and in particular African Americans (Brown et al., 2017; McClain, 2014). For Black women, intersectionality is powerfully intertwined with identity. As these students construct their identity, they grapple with not only racism and sexism, but in the case of these African immigrant students, contend with questions about their country of origin/immigrant status. Ireland et al. (2018) define identity as "a person's internal and evolving sense of self, both as an individual and as a member of various social groups" (p. 230). Identity construction is an iterative process that grows, changes, and develops an individual's identity over time (Hall, 1992). For this study, using identity as a lens helps researchers consider how students come to understand what it means to be a STEM student, how they fit into a STEM community of practice (Wenger, 1998), and how they gain a sense of who they are and want to become.

A focus on intersectionality and identity in combination helps researchers understand how Black women experience racism, sexism, and stereotyping and how those perceptions shape their success as a member of the STEM community.

Cornell and Hartman (2007) define *race* as primarily physical features that set people apart in a society, while *ethnicity* speaks to shared cultural practices and beliefs that are deemed significant, which can also include race. Studies have pointed to the importance of racial and ethnic identity development in Black university students (Stewart, 2015; Zirkel & Johnson, 2016). Although there is not one *Black identity* that all students of African descent exhibit, racial consciousness has been shown to be associated with positive self-expressions and successful educational outcomes (Nasir, 2012). For the purposes of this study, biculturality is defined as how these African immigrant women students experience both past-cultural heritage and present-cultural awareness in complex and sometimes conflicting ways. While models from Cross (1991) and Sellers et al. (1998) speak to the many facets of Black identity development, these models do not stress the intersectionality and varied experiences of bicultural Black African immigrant students, who lean strongly on their *ethnic identity*. It is also problematic that these Black identity models were developed using a uniquely *American* perspective. As well, few research studies have clarified the experiences of African immigrant students and how their ethnic identity development affects their trajectory as a student in a STEM field.

## The Unique Experiences of Black Immigrant Women

As university students negotiate their identity in the STEM world, they learn to identify themselves as both individuals *and* as a part of that community. To fit into their communities of practice (Wenger, 1998), some Black women take on a persona that focuses on their strength, resilience, and agency as a Black woman, which on the surface seem to be a uniquely positive and empowering mindset. Yet those who focus exclusively on Black women' strength, resiliency, and characterizations as *superwomen* must proceed with caution. Nash (2008) believes over-emphasizing their strength and resilience may "ultimately romanticize and idealize positions of social subordination and reinstall conceptions black women's bodies as sites of 'strength' and 'transcendence' rather than complex spaces of multiple meanings" (p. 8). Black immigrant students have also faced anti-black linguistic racism by students, faculty, and others by commenting on their accents or calling them "exotic," considering their heritage language less important than the "King's English," and encouraging cultural hegemony by maintaining the centrality of the English language (Baker-Bell, 2020).

How Black women immigrant students *choose* to identify themselves, in terms of race, ethnicity, gender, and chosen field of study helps researchers understand how Black women navigate these communities as they pursue a STEM degree (Sparks, 2017). Their identity development has lasting implications for their choice to stay in STEM or move to a career that is more accepting (even if it falls outside the STEM arena). Identity expression is unique to each student. Salience (awareness and expression) of their racial/ethnic, culture, and gender identities changes according

to their setting, needs, and priorities, especially when they encounter racist or sexist experiences (Settles, 2006). Using a lens of intersectionality can also help researchers understand how power and belonging imbalances in academic settings precipitate a change of identity salience for Black women STEM students.

### Are Black Immigrant Women Students Perceived as Model Minorities?

African immigrant students are less likely to encounter overtly racialized experiences (Nsangou & Dundes, 2018; Phinney & Onwughalu, 1996), and interpret them as racist, than their African American counterparts. Since African immigrant students have not been exposed to frequent occurrences of racism, discrimination, and marginalization in their country of origin or home environment, they often appear indifferent to racialized events and personal interactions. However, these students can face negative stereotypes about the African continent or their country of origin (Lee & Opio, 2011) and their African accents. Because of their skin color, they have been exposed to similar racialized experiences, microaggressions, and disparaging comments common to African Americans who were born in the United States (Awokoya, 2012; Rong & Brown, 2002).

African immigrant students are constantly negotiating their biculturalism by way of their ethnic and cultural identities (Kim, 2014), including how they learn to function under the influences of both African *and* African American societal norms and traditions. For African immigrants, being bicultural means that they are often pulled by the two opposing forces, which causes many to question their authenticity as *Africans*, and others to undervalue their *American* legitimacy (Awokoya, 2012). These students can experience emotional turmoil by not feeling accepted by *African American* nor *African international* peers, which can lead to isolation and depression (West et al., 2016). Adding to their turmoil is a label that has been applied to some West African university students: model minority (Nsangou & Dundes, 2018; Ukpokodu, 2018; Wu, 2014).

The term *model minority* is a trope typically associated with Asian American students (Wu, 2014) that paints them as exceptional in the area of academics and normative social behavior. The *model minority* trope is conceived as a mechanism and weapon of White supremacy used to divide intra-racial groups and create division where it does not exist (Ifatjuni, 2016). In other words, it is easier to create dissention in groups that share cultural resources and heritage than to elevate their status and power in the White male-dominated STEM culture, thus preserving the existing hegemonic power structure (Ifatjuni, 2016). Researchers have pushed back against using this descriptor for African immigrant populations (Ifatunji, 2016; Lindsay, 2015). Narratives that label immigrant Black students as model minorities perpetuate a false dichotomy of *good Blacks* and *bad Blacks* (Rogers, 2006) and resist collective community success (Okonofua, 2013). These assertions create racial hierarchies and drive competition between similarly racialized groups and strengthen biased assumptions that Black immigrants are exclusively *exceptional* in academic fields such as STEM (Bashi Treitler, 2015).

### Intersectionality and Role Models

Black students many times seek individuals that match their ethnic/cultural, gender, and career identities. McGee (2016) found that Black students at both Minority Serving Institutions (MSIs) and Predominantly White Institutions (PWIs) desired courses with professors who matched their racial background. However, she found that this proved problematic due to the lack of Black professors. Buck et al. (2008) determined many Black women students prefer science role models be persons of color, which suggests that race may be a salient feature when considering their mentors. I previously (Sparks, 2018) analyzed the experiences of a group of African American women pre-service teachers to explore how they sought out peers and mentors who matched their unique intersectional identities, a paradigm I call *intersectional adaptation theory (I-ADAPT)*. I-ADAPT has also been applied to the experiences of African international STEM students (Sparks et al., 2019) and a group of Latina high school STEM-intended summer camp participants (Sparks et al., 2021). This paradigm seeks to understand how, and under what circumstances, students of color prefer peers, mentors, faculty, and role models who look like them.

Kim (2014), in a study of African immigrant college students, found that because of their biculturality and a home environment closely tied to their African heritage, many African immigrant university students rely on peer networks and institutional agents of African-descent as they adapt to their college environments, and tend to forge relationships with academic advisors and career counselors with ties to Africa who could relate to their struggles. Nebedum-Ezeh (1997) also found that African international students felt it important to connect to an empathetic African university staff member to help with administrative affairs and cope with acculturation as they began their studies at a US university. Importantly, research related to same-race mentoring of university students has highlighted its importance for African-American students (Oyserman et al., 1995; Syed et al., 2012) in strengthening a student's STEM identity.

### Additional Considerations from Recent Research

Recent intersectionality research has revealed ways in which this study can build on earlier foundations, including both positive and negative ways that the construct has been adapted. Some post-Crenshaw studies, particularly in the social sciences, have moved intersectionality research away from its original focus on the multiple-marginalized lived experiences of African-American women, and have focused more on intersecting identities (Cole, 2020). Nair and Vollhardt (2020) propose that researchers must acknowledge power and privilege when conducting intersectionality research as well as recognize the distinct differences found in similarly-represented cultural groups to assist in the formation of legitimate policy changes. They also found that solidarity between similarly intersecting social groups (such as African Americans and African immigrants) is possible and helpful given the right perspective. Rice et al. (2019) cautioned again using additive approaches to intersectionality research, called for a return to the paradigm's research roots to focus

on African American females, and encouraged researchers to use intersectionality to "critically engage social problems" (p. 410). Alexander-Floyd (2012) believes the research must maintain its focus on women of color, including the politics that impact their experiences, while de-centering the voices of the privileged. Heberle et al. (2020) and Bullock et al. (2020) also recognize that intersectionality research has the power to reveal populations not previously served by policies. Ferguson (2010) reminds researchers that intersectionality research is inherently coalitional; it can help similarly marginalized groups come together to resist oppressive forces. This study focuses on intersectionality research's original underpinnings in Black feminist scholarship, while adding to the research base regarding the intersecting role of cultural and ethnic identity for a group of 1.5-generation African immigrant women STEM students.

## Methods

### Methodology

This descriptive phenomenological study (Creswell & Poth, 2018; Vagle, 2018) focuses on the lived experiences of three African immigrant women university STEM students and seeks to parse out their thought processes and identity experiences to better understand how they form their racial, ethnic, gender, and career identities in STEM while studying at a diverse urban university. I use a post-structuralist theoretical lens (Savin-Badin & Major, 2013) that seeks to "deconstruct and question the nature of taken-for-granted concepts such as the body, the self, and issues such as gender, power, and resistance" (p. 28). I also apply a social constructionist perspective, which posits that it is impossible for a researcher to be completely unbiased and subjective, but researchers should strive to actively collaborate and co-create meaning along with the participants (Savin-Badin & Major, 2013). Qualitative research is useful in this case to assist in understanding individual and group identity development and social dynamics involved in the bicultural experiences of university students who are immigrants of African descent. I used intersectionality as the lens and theoretical framework for this study because it centers the experience on the intersections of the African women immigrant students, helps to clarify the processes of individual and group identity construction, analyzes power indifferences that affect the students' lived experiences, and has a clear connection to practice and praxis for Black women in STEM fields (Hunting, 2014).

### Reflexivity

I am a White, cis-gender, heterosexual male professor. I am also a United States citizen and a non-immigrant. Therefore, it is highly important that I focus on minimizing the impact of my privilege and position as an authority figure in higher education by being attentive to critically reflexive practices. Early in the interviews, I am honest about my positionality and the possibility that my characteristics can perpetuate biases in my

thinking and analysis. I follow Rice et al. (2019) and their advice to self-interrogate these biases by asking "What do I recognize, and not recognize, because of the positions I occupy?" (p. 415). After publishing a dissertation related to stereotype threat in Black male engineering students, I moved on to the complex interactions provided by the construct of intersectionality early in my career as an assistant professor. From a larger study, I began exploring the experiences of African American students in STEM. Part of the participant pool expressed their background as immigrant and international students, which made up the participants for this particular research. From the original study, I have explored intersectionality for African-American HBCU students transferring to a predominantly White institution (Sparks et al., 2020); African international students (Sparks et al., 2019; Sparks, 2018), and African-American female pre-service teachers (Sparks & Pole, 2019). This research is a natural extension of my previous studies, and I am always open to learn and grow in my knowledge of the experiences of minoritized groups in STEM fields.

Using an anti-deficit approach (Harper, 2010), I seek to focus on how the strengths and persistence of the Black women university students, including how their converging identities are an asset that empowers them toward success in the field of STEM. As many women students of color have historically been made to feel invisible, silenced, subjected to stereotyping, disrespected, and marginalized, it was of utmost importance to gain their trust before *and* during face-to-face interactions (Reinharz & Chase, 2002). Using Banks' (1998) classifications, I place myself as an external-insider in the research community. He defines an external-insider as one who is.

> socialized within another culture and acquires its beliefs, values, behaviors, attitudes, and knowledge. However, because of his or her unique experiences, the individual rejects many of the values, beliefs, and knowledge claims within his or her indigenous community and endorses those of the studied community. The external-insider is viewed by the new community as an "adopted" insider (p. 8).

Because of the color of my skin, my social position as a professor, and my privileged intersectionality as both White and male, I will never be an indigenous-insider (Banks, 1998) in this research community. In this reality, it is even more important that I approach this work with humility and reverence as I collaborate with insiders in the community to better understand their perspectives, beliefs, and values (Banks, 1998). I strive to critically examine influences of bias, hegemony, White privilege, and White supremacy that might influence my perceptions of the participants' actions and words. I seek to co-create knowledge, which includes *research with* and *research for* the population under study (Kwame, 2017). My priority is to always mitigate the influences of my outsider knowledge on the analysis of the data.

## Study Site, Recruitment, and Participants

International State University (ISU) is a large, urban/suburban university with an extensive undergraduate and graduate student population of over 60,000 students. It features a number of STEM programs, with majors in the biological sciences, computer science, and engineering, and science and mathematics education. As a

Research 1 institution, the university has been named one of the most diverse campuses in the United States, and is classified as a Hispanic-Serving Institution (HSI). The university as a whole is 13.9% Black, with an additional 5% classified as international students (College Results Online, 2019). For the purposes of this study, the students are classified as 1.5-generation African immigrants, which reflects that they were born in Africa, moved to the US at a young age with their parents, and are now US citizens. This classification differs from second-generation African immigrants who were born in the United States from a family of African immigrants, and African international students, who reside temporarily in the US for the purposes of attaining their degrees and usually plan on returning to their home countries after completing their education. The three students all describe their heritage as *Nigerian.* Refer to Table 1 for a summary of the students' attributes.

## Data Collection

I used purposeful sampling methods to recruit the study population, including convenience and snowball/chain sampling (Collins et al., 2007). Recruitment emails were distributed through university listservs, multicultural organizations, and an on-campus center devoted to the study of African Americans, who then forwarded the email to approximately 10,000 students. These included face-to-face, online, graduate, and undergraduate students in the colleges of science and engineering and student organizations devoted to minorities in STEM. The study population was narrowed to 25 African American, African immigrant, and African international students. From that group, 14 students agreed to participate in the larger study which explored the experiences of Black students in STEM majors within the university. Three students, a defined subgroup of the 14 Black students, identified themselves as African immigrant women and agreed to participate in separate, one-hour, face-to-face interviews, one focus group, and follow-up emails for the purpose of member checking.

For the face-to-face interviews and focus group, I followed a modified augmented life-story approach (McAdams, 2008) to understand the life narratives of the students throughout secondary school and university life, which included explicating (1) critical details in their development as an African immigrant and STEM major, (2) how their experiences guided their identity journey as they progressed toward completing their STEM degree, and (3) how these experiences might affect their future career trajectories (McGee, 2016). The life-story approach emphasizes

**Table 1** Research participants

| Name | Major/classification | Identity self-description | Age entered US |
|---|---|---|---|
| Faith | Mechanical engineering (senior) | African American STEM Student | 2 |
| Chonda | Biology major/pre-med (sophomore) | African STEM student | 6 |
| Aya | Mathematics (doctoral student) | STEM student who is Black and female | 7 |

the "narrative and storied nature of human conduct (McAdams, 2008, p.1)," and includes searching for significant events in which to frame the participants view of life. Using a lens of social constructivist epistemology, I focused on the emergence of *complex* and *multiple* perspectives (Manning & Stage, 2003) in their stories and lived experiences.

Since all the students were women, I felt it prudent to have at least one female research assistant present during the meetings. Every attempt was made to create an atmosphere where students felt comfortable with an interviewer who represented a different race and gender than their own (Cannon et al., 1988). Of utmost concern was that the researcher followed interview procedures that modeled active listening and afforded voice to the research participants free of biases or judgment (Reinharz & Chase, 2002). I met with the research assistant after each interview to quality check these sensitive protocols and to assure that an atmosphere of *focused listening* and *quiet respect* were evident in every student interaction.

## Analysis

I conducted face-to-face, semi-structured interviews with each student, one focus group with all three participants, and member-checking using follow-up questions by email (Krueger & Casey, 2015). The interview format was semi-structured, meaning that a list of questions was pre-prepared and students were encouraged to ask for clarification and elaborate on reflections that required more detailed explanations. After preliminary first-level pre-analysis of the face-to-face interviews, the focus group questions were developed for the purpose of illuminating the experiences described during the interviews (Onwuegbuzie et al., 2009). Although the focus group was small, it fits the parameters of a mini-focus group (Kreuger & Casey, 2015), whereby participants "have specialized knowledge and/or experiences to discuss in the group" (Krueger, 1994, p. 17). The audio recordings of both the face-to-face interviews and the focus group were transcribed by a research assistant, quality checked by a second research assistant, and lastly reviewed by myself for accuracy. I used an inductive approach in analyzing the transcripts to identify categories and patterns by allowing the data to speak for itself to reveal emerging themes (Manning & Stage, 2003). I used analytical descriptions and notetaking to focus on significant events in the students' journey and reflect on their experiences using thick, rich descriptions (Krefting, 1991). After in-depth study of interview and focus group transcripts, I used follow-up questions to incorporate analyses that were emergent and flexible (Merriam, 2009).

My primary-level analysis included a combination of *values coding* (Rubin & Rubin, 2012) to understand the values, attitudes and beliefs of the participants, and in vivo *coding* (Stringer, 1999) to directly analyze the experiences of the students' own words. The codes I developed were negotiated and cross-checked with two research assistants to ensure trustworthiness of the data analyses (Miles et al., 2013). The major themes that were observed in the primary analysis included: African heritage and STEM, Bicultural awareness, being singled out because of race, gender stereotypes, culture at home, and the need for research opportunities. A

secondary-level analysis illuminated issues that spoke directly to their intersectionality as Black African immigrant women as STEM students, including the following themes: rather be called African, stereotypes about Africa, the intersectionality of being African American and female, and positive qualities of biculturality. As well, the secondary analyses led me to the formation of follow-up questions, which were sent to all three participants by email for member-checking (Krueger & Casey, 2015). The follow-up answers the students supplied were crucial in my tertiary analysis, which opened my mind to the heterogeneity of the Black community, the strength and resiliency of these students, and forced me to interrogate my own assumptions and biases. When their follow-up answers were triangulated with the previous interviews and the focus group, additional themes were uncovered, including: importance of African role models and mentors, importance of female models and mentors, collective cultural experiences, and anti-Blackness. These themes and related quotes are summarized in Table 2.

## Findings

Four themes emerged from the analyses, which included the students' (1) attributions of success in STEM ascribed to influences from their African heritage, (2) importance of their intersectional identities as African immigrants, women, and STEM majors, (3) cultural and identity conundrums faced by African immigrant students, and (4) the need to have peers, advisors, faculty, and role models who match their intersectional identities.

### Attributions of Success in STEM Ascribed to African Heritage

The students believe their African heritage was extremely beneficial in their decision to choose, and continue in, their STEM career plans. Aya felt that her Nigerian heritage instilled in her a sense of the value of education: "My parents [taught] me, 'You have to get an education.

and as much of it as you can. And that doesn't change just because you're in a new country.'" The students also expressed that their parents were adamant that they pursue a STEM-related career. Chonda spoke about the cultural importance to complete her degree and choose a successful career, and also to take care of her family as they age:

> Being from an African family, it's very [important] to be able to say that you have an education. Back in Nigeria, it's very important that if you do come to America, you get a really good education and you succeed.

Faith learned the importance of perseverance from her mother: "I guess my mom always said, 'If someone else can do it, why can't you?' She pushed me to be the best that I can be." Faith was encouraged by other Nigerians to be studious in high school, and was never ridiculed by African immigrants for her commitment to education. The students did not see the expectations of their parents as a burden, but

**Table 2** Coding and themes at each level of analysis

| Coding level | Themes | Sample quo tes |
|---|---|---|
| Primary | African heritage and STEM | ...Because they want. in our culture, you usually take care of your parents after they get older... So if I am not financially stable, I can't help [my sister] and then the burden is on her. (Faith) |
| | Bicultural awareness | I would rather be called African American because I am African and I did not come here to America. (Faith) |
| | Being singled out because of race | He was still looking at me like [IL]I do n't really know-" that you belong in this class" until he read the roll and Pm like "vup, that's me. right here." (Faith) |
| | Gender stereotypes | I do fee] like society plays a huge role. Because without society telling you [Il]oh. you are a woman and too emotional to be in [technical! fields/' then women would do it because they like building stuff. (Chonda) |
| | Culture at home | When I am joking around with my parents or when I do get angry at my sister, I do get the accent. And everybody will just look like "oh my gosh, are you really speaking in Yoruba?" (Faith) |
| | Need for research opportunities | This university has a lot of research, undergraduate research. It brings you into what it really means to be in STEM firsthand. Support from the university goes a long way. (Aya) |
| Secondary | Rather be called African | Because I feel like the culture of my African culture, I resonate with more. In my household, we incorporate the culture into e^ierylhing, lite the food. So I feel like I am with that culture more. (Chonda) |
| | Stereotypes about Africa | I had a roommate last semester I never told her I was Nigerian, but instantly she knew. She would assume so many things and say really hurtful things about my culture. (Chonda) |
| | Anti-B lackness | [Being called African] makes me feel like I'm a little more respectful. A little more home ttaining from what I" ve seen from American-bom black people." (Faith) |
| | Positive qualities of biculturality | The best thing about being bicultural is that I can flow back and forth between both cultures very easily...1 am able to view Ihin^s from both perspectives. (Aya) |
| Tertiary | Importance of African role models and m enters | It is important that I have mentors of African heritage, because they have trekked a similar path and can provide insight into what did not work through their own cultural lenses. (Aya) |
| | Inipcitaiice cf female rele models ar.d m enters | I think it is important to have at least one female mentor, advisor, or professor because there are experiences that females face educationally and professionally that a male would not know how to address or even be comfortable addressing them. (Aya) |

**Table 2** (continued)

| Coding level | Themes | Sample quo tes |
|---|---|---|
| | Collective cultural experiences | [Discussing an event where Africans and African-Americans came together] At first there were arguments because a lot of people think that African and African American students are very different. And in some v,-a.\s. we are, but there are. but because of the color of our skin, there are people who see us from afar and because of the color of our skin, do n't really say, who do n't know our culture that well, ca n't say "oh, she's. African, oh, she's African American." They kind of lump us into one tiling.. finally w^e would realize, like oh wow. We have a lot of similarities. We're in one boat together. So let's not make this so divided … (Chonda) |
| | Inters ecti on ality of being African American, and female | I guess being an African American and also being a women is. you know, I guess it's kind of hard for people to really think that w^e can do amazing tilings. (Chonda) |

a normal part of their cultural heritage and upbringing. They also understood that their parents wanted the best for them, and majoring in a STEM field was one of the ways they prioritized the importance of job security and economic stability for the next generation. It important to note, as Valenzuela (1999) points out, that many other immigrant groups believe their culture places a high priority on education and consider their language and cultural influences as assets instead of liabilities; it is not unique to African immigrant students.

### Importance of Intersectional Identities for African Immigrant Women

Faith preferred not to use the descriptor *Black* because of negative connotations of the term in US culture. While she acknowledged the stereotype associated with African Americans as "loud and obnoxious," she immediately stated that she did not believe the stereotype. Faith also recognized that both African immigrant women and African American women face collective struggles (Archer et al., 2015) as underrepresented students in STEM that lack role models when she said, "Just not seeing enough of *us* is the biggest thing [emphasis added]."

The students were asked how their gender has influenced their STEM experiences, in either positive or negative ways. Faith agreed that there are many opportunities for women students, including grants, scholarships, and employment opportunities from employers looking for a diverse workforce. On the negative side, she expressed that many employers have low expectations of their women employees, and life changes like pregnancy can derail their career; issues most men in STEM do not have to consider. Chonda focused on the fact that women are now empowered to be successful, which has motivated her to succeed in her major and future career. Chonda also shared the realization that her intersectionality includes socialized experiences of being female *and* Black: "I guess being African American and also being a woman…it's kind of hard for people to really think you can do amazing things."

The students were asked their opinions on why there is an underrepresentation of women in STEM. Chonda believes that women's underrepresentation relates to messages that young girls receive when growing up:

> [It's good] if you grow up with your parents telling you 'Do whatever you want. You can be an engineer, you can be a construction worker, you can be whatever.' It all depends on who's feeding you what kind of information and what you're allowing your mind to take [in].

Faith, as well as believing that STEM is a male-dominated field and bias exists toward women in STEM fields, expressed that role models who are Black, women, and in STEM are extremely rare. She never remembered hearing about Black women engineers or Black mathematicians while in high school, even in her science and mathematics courses. She expressed that there are many stereotypes about African American women in STEM, and she felt obligated to break those stereotypes by demonstrating success.

### Cultural and Identity Conundrums for African Immigrants

The students were cognizant of similarities and differences between African immigrant students and native-born African American students, including different experiences of living in the United States. The US has a history of racism, slavery, and marginalizing African Americans, yet these African immigrant students have been less exposed to this history and all of its contexts. However, many of the students agreed that they had faced microaggressions related to their African heritage, including being ridiculed for their *African* names and *foreign* accents. This is further explained by Lippi-Green (2012) who describes how immigrant students whose first language is not English are racialized by language bias and may come to see their language expression and dialects as "ugly, unacceptable, incoherent, and illogical" (p. 69). However, these students see their multi-lingual skills and dialects as an asset and part of their complex identities.

Faith shared that both groups have to contend with racism and sexism, as well as the burden of feeling like they have to serve as a representative of their entire racial and/or ethnic group. Chonda believes that both groups are discriminated against, but in different contexts:

> Stereotyping plays a huge role in putting all Africans and African Americans in one box. So, when it comes to similarities, I think *all* [emphasis added] groups have been racially profiled, or have had racist remarks, or [experienced] discrimination. All of the stereotypes that come with being African American (i.e. not capable of being self-sufficient, being unintelligent) are also placed on African international students.

Many times, the students felt that they did not belong in either culture, and there were forces that pulled them in opposite directions. This *pull* may come from many sources, such as having to explain about their proficiency in English or their African accent, their willingness to study long hours and forego social activities, and the pressure from both Africans and African.

Americans to act, think, and dress in certain ways. They have distinct expectations at home about behavior, ways of thinking, and protecting their cultural heritage. When they are around African Americans, they are encouraged to accept *Americanized* ways of thinking and be less *African*.

The students were asked to explain how they would describe their identity. All three students described a slightly different salient identity, each one focusing on a separate component of their identity and starting with the one they deemed most important at that time. Faith chose *African American STEM student* because as she explains, "it puts her race and ethnicity in the forefront and shows that she is in one of the top categories of professions." Chonda described herself as an *African STEM student* and stressed the importance of her heritage and African culture. Aya described herself as a *STEM student who is Black and female*, because, "I feel like seeing the word *Black* and *female* first would, in a sense, overpower the fact that you are a STEM student; identify me as a STEM student who just happens to be Black and female." While this question is worthwhile to better understand the students' identity concerns at one point in time, it might not reflect the whole picture. As

Vacarro (2015) points out, students form "an integrated identity that encompassed their complex and intersecting social locations" (p. 45). It is crucial to note that all of the Black women Nigerian American students, when asked how they would describe themselves if their face were hidden, focused on some external variable (that excluded any mention of skin color), such as *female* or *STEM student*.

To further explore their racial and cultural identities, they were also asked if they would call themselves *African* or *African American*. Faith was unclear when she transitioned from always being referred to as *African* to being comfortable describing herself as *African American.* Chonda preferred being called *African* instead of *African American*. She considers the African culture a huge part of her life, such as food, music, and languages. However, she would not be offended if someone called her *African American* because she has been in the country for many years. She is also aware that she does not always completely understand the American culture, as she explains: "Growing up most of my life in America, I can relate to African American students. But [for me] there are aspects that resonate more with international students, including expectations from parents and family in Nigeria."

### Need for Mentors and Role Models Matching Their Intersectional Identities

The students were asked to rank their peers, mentors, faculty and role models by how important it is that these individuals match their unique intersectional identities (Black, women, and in a STEM field). Overall, they ranked them in the following hierarchy of preference: peers, advisors, role models, and faculty. All expressed the importance of having peers and friends that are of African heritage, mainly because of the peers' positionality as African immigrant university students. For advisors, Aya considers African heritage of utmost importance: "It is very important for me to have mentors [advisors] of African heritage. These individuals have trekked a similar path as I have and can provide insight on what worked and what did not through [a] cultural lenses."

Speaking about STEM professional role models, Chonda feels it is highly important that her role models have some African heritage: "It can be discouraging being a minority and not seeing a lot of people who grew up like you in those areas you strive to be in. Representation is key." Aya, however, believes African heritage is not as significant. She is more concerned with the aptitude and achievements of the individuals she admires. Most of the students were not particularly concerned that *faculty* matched their intersectional identities. Their most important concern was that the instructor be knowledgeable in their subject matter and able to answer questions without embarrassing or belittling the students. Chonda believes it is important to have *some* African professors: "…They can understand my goals pretty easily."

Faith stressed the importance of having specifically African American *women* STEM faculty: "That really helps students to see somebody in a position that they would want to be in; somebody that has [completed] a full-out STEM degree and is now teaching or in academia." All three students agreed that having a woman advisor or faculty member is helpful. Faith believes there are some things that a woman

student would not feel comfortable sharing with a male mentor, including struggles that are unique to women STEM students, such as sexism.

## Discussion

### Unique Experiences

The Nigerian American women students in this study are proud of their African cultural heritage and feel that it has contributed to their success in the field of STEM in positive and meaningful ways. They are thankful for their family's strict adherence to having them seek a career in a STEM field, as well as thankful that they have been able to view Black culture from both an African *and* African American perspective. However, this biculturality causes them to experience a pull from both sides of their racial and ethnic identities, including expectations from their parents to succeed, from their African friends and peers to act more African, and appeals from their African American peers to act more American (and shed their ethnic and cultural identities). Like their fellow African American students, they have experienced similar instances of racism, feel the burden to represent an entire culture (and in their case, an entire country and/or continent) and have been singled out as one of only a few Black students in STEM courses. They have also experienced instances of racism and stereotyping that occurred on college campuses, although the way African immigrant students interpret the incidents can be quite different from their African American peers (George Mwangi, et al., 2016).

The experiences and testimonies of these students reveal that African immigrant women are complex individuals that struggle with what is needed to be successful, including how to build the skills necessary for a future STEM career and be recognized as legitimate representatives of their particular STEM fields. The microaggressions they face related to their culture and country of origin are much more than distractions. The continuous battle to prove themselves to be genuinely African *and* American can contribute to anger, isolation, and depression. However, they recognize the strength and resilience they must exhibit in this unique space. Their biculturality is seen as an asset, not as a hindrance or distraction. This includes their linguistic skills, their African accents, and the way they code-switch when expressing themselves at home vs at their university (Valenzuela, 1999).

The students recognize that their Nigerian heritage is highly influential in their decision to choose a STEM field, but they also recognize that they are not exceptional. The majority of their formative years were spent in the United States, so they have seen first-hand the marginalization of African American students. They also recognize the importance of *all* Black women students facing these struggles in solidarity as they grow up together in a society that continues to contend with sexism and racial inequality. It is also important to point out that they are not perfect; they harbor biases just like any human being. A few of the comments revealed anti-Blackness (specifically anti-African American) sentiments and stereotypes regarding the differences between themselves and other African American STEM students. These comments are deeply troubling and must not be dismissed. If the focus on

solidarity in intersectionality research is to be realized and anti-Black ideologies stamped out, these concerns should be addressed and analyzed. Further studies are likely to tease out the sources of theses biases and explore ways to confront them.

In the light of a post-structuralist lens, relationships of power and privilege come to light by illuminating the cultural space occupied by these students. Although applying a label of model minority may at first glance appear to reveal some semblance of privilege, it is an illusion. Power is only rendered to those whom the majority decides hold some sort of advantage over similarly minoritized groups; it is not a legitimate power (Prasad, 2018). Their social position, like the position of African American females, is one highlighted by being highly *visible* and highly *invisible* at the same time. (Convertino, 2020). These African immigrant females will continue to be *policed* by hegemonic powers because of their bodies, identity, gender, and immigrant status. Post-structuralism also speaks to the presence of shifting identities and hidden struggles that permeate the lives of these students as they navigate language barriers, accent discrimination, and racist microaggressions about their countries of origin (Poststructuralism, 2008).

## Recommendations

International State University (ISU) is a diverse campus with international students from all over the world, including those from the African continent. Although the overall culture of the university advertises support for students of color, some *micro-cultures* in STEM departments lack diversity, particularly in the area of Black and Latino/a STEM faculty. Being a diverse campus does not automatically translate into meeting the needs of *all* students. Specific attention must be paid to students that represent unique and specific populations including, in this case, bicultural Black STEM students. As well, attention must also be given to helping students interact with not only peers that match their unique intersectional identities, but also expose them to a variety of role models in their particular fields of study.

While recognizing that there are cultural differences among similarly racialized groups, I would remiss if I did not mention the importance of building coalitions of strength between African immigrant and African American women students. Research has shown the importance of Black women organizing, creating safe spaces, and working toward collective action for issues such as reproductive health and social justice (Bashi Treitler, 2015; Evans-Winters, 2019). Collins (2009) also points to the "interconnectedness of Black women's experiences" (p. 251) and encourages them to work across boundaries of nation and place by re-focusing Black feminism in a transnational context. Black women students who represent different intersectional experiences should come together for social justice and activist concerns to "forge coalitions that are simultaneously anti-racist, feminist, and anti-nativist" (Lindsay, 2015, p. 20).

I also recognize the tendency of some researchers to discount the magnitude of these findings because they only comprise the experiences of three unique individuals at one US urban university. Phenomenologies are powerful for the insights they cast on the life-stories of a group of expert witnesses of a phenomenon. This isolated

storytelling should serve as a springboard for more detailed studies of the unique experiences of bicultural students of color in STEM fields, including studies that incorporate quantitative, mixed methods, and large-scale studies to see if many of these assertions and experiences hold true in diverse populations at different types of universities (i e., public, private, large, small, and Historically Black). While I recognize that the applicability of the students' experiences is limited to the small subgroup they represent, these stories are no-less powerful or revealing.

Using the knowledge from this study and others that incorporate a lens of identity and intersectionality, I encourage institutions of higher learning to develop new and innovative ways to support the academic success and emotional and psychological well-being of *all* intersectional representations of Black students to contribute to a confident, vibrant, and diverse population of future STEM professionals (Ireland, et al., 2018). As well, by attending to pitfalls based on faulty assumptions (intersectional traps), external-insider researchers with privileged positionalities such as myself, who conduct research *with* and *for* communities of color, might comprehend the vital importance of interrogating their biases, motives, and recommendations through a critical lens.

## Limitations

The experiences of these three African immigrant STEM students are limited to their location within the university, experiences in the unique STEM culture at ISU, and the ethnic influences of their Nigerian culture in particular (Awokoya, 2012). The conclusions reached by analyzing those experiences are not intended to apply to all 1.5- generation African immigrants studying at the university; nor do they attempt to represent the experiences of all 1.5-generation students with Nigerian heritage. It is also worthy to note that the study focused on a population of students who identified as *women*. Additional research should explore the experiences of Black students who are non-binary, transgender, queer, or non-gender conforming to elucidate how they navigate racial/ethnic and gender expectations in the field of STEM.

As a White male researcher, I was also limited by my own lack of first-hand knowledge in the experiences of African-American students, which led to assumptions about the African immigrants lived experiences. In an article in 2017, I defined these assumptions as intersectional traps, which I described as "the act of saying blanket statements to describe a race or group of individuals without considering variations of experience within the population" (Sparks, 2017, p. 165). Intersectional traps are faulty assumptions that disregard the intersectional experiences of a particular sub-group of minoritized and/or marginalized populations (in this case African immigrant women university STEM students), or assume that their experiences are monolithic. These intersectional traps initially led me to believe that African immigrant women have an advantage over African-American women in the academy because of their perceptions as a model minority. Through a tertiary-level analysis of the transcripts and conversations, I came to realize that the differences between African immigrant and African American students are less a matter of social constructions and cultural differences and more a matter of hegemonic, White

supremacist, structurally-imposed roadblocks that strive to keep the groups perpetually separated.

## Declarations

**Conflict of interest** There are no conflicts of interest in this research, at either the university or personal level.

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