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Are you African or African-American? Exploring the Identity Experiences of Female STEM Students Born in Africa Now Living in America

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ABSTRACT
Amongst the participants of a qualitative study of Black female students in Science, Technology, Engineering, and Mathematics (STEM) were two individuals who were born on the African continent. These students moved to the United States at a young age and are now United States citizens—one pursuing a graduate degree and the other an undergraduate degree, both in a STEM field. This brief case study will explore the thoughts of the two students with regard to how they, despite being typically underrepresented in STEM in the United States, (1) describe their experiences as college students; (2) come to view themselves in the African-American community in the United States; and (3) compare to Black students who were born in the United States or are international students from Africa. Using their own words, this article explains how their African heritage has shaped their development as STEM students and solidified their place in a STEM education program in the United States. These students are uniquely positioned to understand both an African and African-American perspective. Their insights can help to illuminate how the United States can attract and retain African as well as African-American students in the fields of STEM, and extend that knowledge to other variations of ethnicity and experience.

Keywords: minorities; STEM; gender; underrepresentation; identity; intersectionality

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INTRODUCTION

In 2016, I conducted a study of Black female students at my university[1]. Five female graduate and undergraduate students studying in a variety of fields related to Science, Technology, Engineering, and Mathematics (STEM) were involved in a research study related to their identities as second generation African immigrants. During this study, participants were asked to write an essay to an imaginary grade school student in STEM with the aim of accessing their prior experiences, followed by face-to-face interviews. "Another research study from this sample of students (Sparks2018) follows the students who are specifically in the teaching field." The majority of the five students preferred to study alone and did not like calling attention to themselves—either inside or outside of class. Although there is only a small number of Black females within the STEM field, they affirmed that this fact served to encourage them to persevere and be successful, and did not result in feelings of intimidation. They appeared to brush off instances of racism and sexism, yet almost all expressed that they experienced more sexism than racism. One important point raised by all five students was the complete lack of role models who were both female and Black in the fields of STEM. As Black females in a STEM culture that is primarily Caucasian and Asian, the women in this research felt the intersections of their race, culture, and gender in profound ways. As intersectionality demonstrates, these variables are intersecting and unique parts of their identity (Crenshaw, 1991).

One of the questions posed to the students was how they would refer to themselves, namely as either (1) a Black female STEM student, (2) a female Black STEM student, or (3) a STEM student who is Black and female. These results showed a number of varied responses. Some considered their female identity to be their most significant personal trait, whilst others felt their race to be most important. Only one of the five original students expressed the opinion that she would like to be remembered more for her college major than for either her sex or her race. This illustrates how identity functions as a "moving target"—one that changes with each situation and encounter, and is thus unique to each individual student (Settles, 2006). The female students above expressed no preference with regard to how they would like to be described (Black or African-American), and all five students stated that they were not offended by the differing nomenclatures.

In the course of the study outlined above, it was revealed that two of the students were immigrants and naturalized citizens of the United States. Maya and Anise (pseudonyms) were born on the African continent and moved to the United States at a young age. Maya is from Nigeria, and Anise is from Liberia. Some subtle differences in their answers led me to consider the possibility that their experiences in STEM varied slightly from those of African-American students who were born in the United States, as well as African students who study at the university as international students. This led me to one primary research question: How do the

backgrounds and culture of two African immigrant students affect their choice for, perceptions of, and success in, a STEM major?

Physical resources for this case study include a portion of the essay written to an imaginary STEM student by both participants, sections of the transcripts of their semi-structured interviews, and portions of a follow-up interview with Maya to examine her decision to pursue a career in academia over one teaching in the public school environment. This concise case study will focus on the unique comments of both students, which reveal how their African culture affected the ways they think about STEM; interact with students and professors; and build their identity as a Black female STEM student in the United States. For much of this paper, I will allow the students' words to speak for themselves. It is important to understand the invisibility that many minority students feel in STEM (Carlone & Johnson, 2007) by examining how they develop their identity, not only as female students, but also as Black female students. Through their essay to a young STEM student and their participation in in-depth discussions about how they navigate the world of STEM as a Black female, these students are able to help define their lived experiences. In turn, their experiences may help to illuminate the path that many students of color navigate in STEM as an underrepresented minority, representing less than 10% of the overall STEM workforce (National Science Foundation, 2009). I would like to start by describing in more detail the two study participants that lie at the heart of this study.

PARTICIPANTS

Anise is a biology major, but she is not seeking a degree. She already has a bachelor's degree in health sciences from another university. She was born in West Africa (Liberia) and moved to the United States with her mother and father when she was eight years old. Anise stated that she has a bit of an accent, and some people notice it occasionally. She went to high school in a large metropolitan area. Her father works for a pharmaceutical company in technical services (IT), and her mother works as a trainer in a call center. In high school, Anise ran track and field, and was part of a dance group (step team). She was not involved in any STEM-related activities while in high school. However, she did complete an internship that was part of her degree in health sciences. She took the basic sciences in high school and recalled that she enjoyed biology very much. Her plan was to be a nurse, but she subsequently decided against this after graduating from college. Instead, she is taking her required sciences and other courses to be able to enter medical school. She is also preparing to take her MCAT medical school admissions test.

Maya is a mathematics doctoral student who previously went through the teacher preparation program to receive the credentials to become a high school mathematics teacher. She was born in Nigeria and moved to the United States when she was seven years old, where she went to school from elementary grades up until college. She has one brother and one sister, and describes her family as close. Her mother is a nurse and her father is a manager at a fast food restaurant. In high school, she was involved in the step club, student council, and the art club. In college, she was involved in advocacy work with the honors college and also

worked with the mathematics department. She was active in the Association for Women in Mathematics, as well as in a student organization related to pre-service mathematics and science teachers. As far as STEM-related activities are concerned, she was an after-school tutor in calculus, algebra, and geometry, for which she earned extra credit. She remembered taking advanced courses in biology and calculus while attending high school. In pursuing her PhD in mathematics, she hopes to conduct research in biostatistics.

IN THEIR OWN WORDS

In the essay Anise wrote to an imaginary student interested in STEM, she started out with the following narrative:

> Growing up in an under-developed country that had been negatively impacted by civil wars, a better future and life for me was the most important focus of my parents when we migrated from my birth country Monrovia, Liberia into the United States of America.

It was important for Anise to express her gratitude for being given the opportunity to study in another country. With her powerful first statement, Anise sets the tone for students in the United States to understand how grateful she is to have this opportunity. Later in the face-to-face interviews, Anise continues this theme by explaining how she would like to be described:

> I want to describe my race and ethnicity as an African-American woman because I was born in Africa. My whole family, my heritages are in Africa. I have my African heritage, but when I came to America I have a different society and environment. So, I would describe myself as an African-American woman.

In Maya's letter to an imaginary STEM student, she talked about the many obstacles that she had to overcome. This dynamic was instrumental in her ability to overcome her fear of being a researcher during her doctoral program. She states:

> One obstacle that I had to overcome was the mentality of not seeing myself as a researcher. I remember being presented with a research opportunity and thinking that I didn't fit the profile of a researcher and was uncomfortable branching out and seeing if it was something I could handle. I ended up getting out of my comfort zone and doing research. It was there that I learned the many applications of math and came to love the subject even more.

Both students described the conflicts that many African immigrants have after they move to America. Anise said that some of her friends refer to themselves as Africans. Yet others say that they are not African because they were not born there, only their parents. This reflects how many students seek to form their own identity apart from their parents. She also pointed out that some African students refer to themselves as residents of their home country (Nigerians or Kenyans). Many of her friends plan to go back to Africa after they graduate:

> I have a friend who is doing either engineering or medicine. He is from Ghana. And he is trying to get his degree so he can go back to his country. And the reason why, he said that he would make so much more money back in his country than over here. It is going to be less struggle, not really struggle, less stress. So he wants to graduate and then make a name for himself, and then go back to his country.

Both Maya and Anise felt that some of their friends from Africa wanted to return because it was *easier* there, which may bring to light many of the cultural conflicts African immigrant students encounter when adjusting to life in the United States. Anise sheds light on this conflict as she describes some of the bullying she faced at an early age because of her accent:

> I had a lot people that bullied me because of my thick accent. You could hear my voice [accent] and everything but I had these little girls that decided that it was cool to pick on the person that sounded different than them. But I was the kind of person that was very defensive when I was younger [i.e. she stood up for herself]. I can recall getting in their face. After that, they didn't say anything to me.

When asked how she would describe her identity, Anise chose "Black female STEM student." She believed that her skin color was the first thing that people notice, so she wanted to make it clear that she is proud of her ethnicity and her heritage as an African:

> Here at this university and at my other college, some people are not proud of their heritage. They are not proud of where they came from. You cannot go somewhere until you know where you are coming from, you know. That is how I feel. So, if you are not proud of who you are or where you came from, then how can you see yourself journey in this life and going somewhere when you don't know where you came from? So yeah, anybody that asks me, I would tell them "yes, I'm African-American and I was born in Africa."

Both Anise and Maya were adamant that their African heritage was influential in their choice of a STEM major and both shared the important notion of studying in groups, which they both considered a big part of their African culture.

Maya also discussed the conflicts she faced with the terms Black, African, and African-American:

> I would describe myself as African-American. I wouldn't want to just describe myself as Black, right. I don't know, there is this thing with Africans and Black people. Africans love to go by African-American.

> Black people, I mean they don't really mind being called Black. Africans like to distinguish themselves and so they would rather call themselves African-American. I personally again would describe myself right off the bat as being African-American. But I do also consider myself Black.

She had conflicts with people not knowing if she was African-American or African, and many times her (relatively long) African name would give it away:

> They think that I grew up here and I'm in the middle between people just thinking I'm Black and other people thinking I'm African-American. I guess I'm in the middle ground. I don't see myself belonging specifically to African [people] or specifically to just Black people because I don't. I appear not to be African-American right, not straight from Africa, but I am.

Maya likes her professors to call her by her African name, but many students from Africa come up with a shorter name to cause less confusion. She also liked the fact that many professors tried their best to pronounce her real name; the effort was important to her, as well as to many other students.

Of the two research participants, Maya gave the greatest insight into how her African heritage has affected her choice of, and persistence in, a STEM major. Many of the reasons for her choosing STEM were instilled in her by her parents:

> I'm not physically in Nigeria; my parents grew up there. They worked there and they have family there you know and I still have a lot of family in Nigeria and so the culture really hasn't left my parents (even though sometimes we [me and my siblings] hoped it would). But they really instilled in me and my siblings [the desire] to pick a major coming into college that'll in a sense make us money so that we can take care of them when they're older. So that is where the culture comes in and I know Nigerians are very big on STEM, like "be a doctor and be an engineer do something." I guess in their eyes that's profitable; something that challenges you.

When asked how she felt Black students born in the United States differed from African immigrant students, both Maya and Anise responded that African-American students are less likely to work in groups and ask for help. Maya also stated that many American-born students make excuses for not being successful:

> I don't approach it with excuses because I was brought up with "do what you need to do regardless of whatever hurdle comes your way." Once you know your goal, you know what you want to do, so get there.

Maya felt that these strong empowering beliefs were part of her African culture—more specifically, parts of her parents' culture that were subsequently also part of

her culture now. As with Anise, she talked about her parents' desire to return to Africa:

> They do want to go back. They are like "we came just for you guys and once you guys make it that's great; we did our job and we're going to go back." Because for them Nigeria's is like no-stress. In Nigeria, they really don't have to work so hard, so they would really like to go back.

Maya also described how many African students have problems adjusting to university life and American university culture more generally:

> They don't have a hard time adjusting to the academic aspect of it but more of the social aspect, that's where a lot of them have a difficult time. They're not involved in organizations and they don't see the need to be involved in organizations.

She believed that many females, especially female mathematics doctoral students, would prefer to stay in the US after graduation:

> I know one in particular wants to stay here because she's doing math as well. She feels it will be more valued here because back home people would not really respect or take her seriously as a woman professor in mathematics because that's not the norm. So, for her she wants to stay where her major, her career, would be appreciated.

Although Maya had the opportunity to work as a K-12 mathematics teacher in the public school sector, she chose to pursue her doctorate in mathematics instead, and to conduct research in biostatistics:

> I decided to pursue a doctorate in math for two reasons. The first is that I desire to attain the highest degree in my field so that I am not limited in any way when it comes to job opportunities. Secondly, student teaching at the high school level during my last semester of undergrad [i.e. undergraduate degree] solidified my decision to pursue graduate studies. Through my experience, I realized that I would prefer teaching college-aged students and in order to do this [I] needed to continue on with my education. However, I am open to teaching special topics courses for students at the high school level, primarily at a STEM-focused school or collegiate prep school.

Maya's final question had to do with the effect of her Nigerian heritage on her STEM career choice, resilience, and career aspirations, including what influenced her the most.

> The first thing that comes to mind is respect, because the culture is very big on respect and so respecting your professors, respecting other students. It does come a long way and so I feel like it's definitely

> helped me in STEM. It's opened doors of opportunity that I guess if I wasn't so respectful I wouldn't have gotten. So, I think definitely respect has played a major role in helping me through so far.

It was clear that Maya equally respected both her American and Nigerian cultures, even though she moved to the United States at a young age. This is reflected in the ways she talked about the rewards of growing up with African parents, who taught her the value of respect in all things related to education.

CONCLUSIONS

Black students who study in the field of STEM—whether they are African-American citizens who have always lived in the US, African immigrants who moved here at a young age, or those temporarily resident here as international students from the African continent—have unique experiences and perspectives in education and in the field of STEM. Female students also have the added pressure of their gender and being an even smaller population in STEM (McGee & Martin, 2011). The salience of both their race and gender, and the intersections resulting from their cultural experiences help to shape their identity as underrepresented STEM students (Crenshaw, 1991). All three cultural groups can learn from each other. In many respects, the group that has the most challenges to overcome is the group of immigrants from the African continent, because they are caught in the middle of conflicting cultural experiences that have shaped their past and continue to shape their future in STEM. The main struggles this middle group faces are issues created by the lingering cultural influences of their former countries, as well as the process of adapting to the education culture of the United States. I believe more research should focus on this middle group.

A third study has just been completed and is currently being analyzed, comparing the experiences of immigrants, United-States born, and international Black students—including how they adapt to the United States education culture in general, and the culture of STEM in particular. These issues were explored via face-to-face interviews and focus groups with all three subgroups of the Black student STEM population at an urban, ethnically diverse university. Insights from future studies may shed light on issues that deter groups of Black students from reaching their potential in STEM and from adapting to the primarily White male culture. Insights from these studies may also help all three cultural groups to share strategies for success as they mold their unique perspectives as students of color in STEM education. Related studies might also focus on STEM students who represent three variations of other ethnic groups—for example, students of Mexican heritage born in the United States versus students who moved here at a young age versus international students from Mexico studying in the United States.

ENDNOTES

1. Black is the general term used refer to both African and African-American students within this study. The term is capitalized to designate the intersections of the cultures shared by both ethnicities.

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