“I’m scared to ask for help”: Black Girls’ Voicing of their K-12 Math Experiences

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PRESENTED AT:

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INTRODUCTION

- Theories of intersectionality and Black girlhood posit that Black girls have markedly different experiences and ways of navigating the world including their K-12 math education than their peers (Butler, 2019; Collins, 1990).
- Research has demonstrated, for instance, that math teachers focus more on Black girls' behaviors rather than their mathematics development as learners (e.g. Francis, 2012).
- More research that centers Black girls' voicing of their experiences and needs as math learners is imperative if we are to move towards equitable and socially just math classrooms (Joseph, 2017).
- Little is known about how Black girls connect their experiences in K-12 math classes to their math identity and value of math beyond K-12.
- It is critical that this is better understood given the low enrollment of Black women in STEM-related college majors and the underrepresentation of Black women in STEM fields (NCSES, 2019).

METHOD

- The present study included 48 Black girls from mixed SES backgrounds enrolled in the 11th (n = 39) or 10th grade (n = 9) at 10 urban schools.
- The Black girls participated in one of 12 focus groups in a quiet location at their school and discussed prompts such as “Let’s talk about the last time you enjoyed math. What was it like?”.
- Almost 50% of the focus groups included Black girls who were in advanced math classes while the others were in general math classes.
- Participants were sampled from a larger study which included 55 additional focus groups that were not only composed of Black girls.

FINDINGS: EXPERIENCES

- The Black girls reported some positive experiences in elementary school but predominantly reported negative experiences in their middle and high school math classes.
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- They reported that their middle and high school math teachers were unsupportive, unenthusiastic, and used ineffective pedagogical strategies.
- For instance, many of the Black girls reported that their teachers ignored their request for help or were incapable of providing useful help.
  - "It feel like sometimes our teacher doesn't know what she's teaching. Like she's teaching it because she has to. It's not like she understands what she's doing and she knows what she's doing... sometimes it just feels like she just don't understand. That's why she can't explain it in a better way, because she don't understand it herself." (H-FG #DS00047)
  - "Yeah, she goes too fast. She don't know how to teach... She just -she goes too fast, and then we tell her slow down, she don't... Like I have to go back to her and be like oh, I missed this, what was this, and she'll be like we went over it in class. And I was like I know. You was going too fast. And then she's like you don't ever say anything. I do say stuff. But it is what it is." (NH-FG #DS300131)
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- Additionally, many noted that their teachers predominantly used worksheets and rarely provided opportunities for them to engage in active learning, especially in activities that they considered fun and relevant to life outside of the classroom (e.g. projects and group work).

- "I can’t even remember [what we have been learning]. She give - my teacher give us so many worksheets, I don’t remember half of it." (NH-FG #DS300153)
- "For me, I know I’m good at math because typically, like he’ll teach it, and then I don’t understand it right off the bat. And then when we break up, our classmates teach it to us or we teach our classmates. And typically, I’m always the one that gives out the better understanding of the subject [topic] that he just taught us. So I mean, I feel like I’m good because I can comprehend it better, and I have a good understanding of what’s going on." (H-FG #DS300010)

FINDINGS: VALUE OF MATH

- Students rarely reported that they viewed math as valuable outside of school and were rarely able to discuss how their career interests would utilize math.
  - "I don't get how I'm going to find like GCF in a brain. You know what I mean? Like I don't understand why we're using this or doing this right now when we're not going to use it in the future." (NH FG #DS300153)
  - "I don't think I need math... even though it's real life math, but it's mostly for like jobs that don't require - like I know - I feel like after middle school, that's when math gets done. I feel like you don't need it anymore after that. Like the math we learn, like eighth grade and below was the math we actually needed for the real world, and now the math we're just learning is like just to learn it."
- One student noted that she valued her teacher's efforts to highlight how math content can be applied to life outside of school
  - "I'm in applied math, so in applied math, you do real-world equations... in general like math in his class is the best math I've ever taken, because I know that I'll actually need it in the future... And then people actually do this in the real world. That's like real cool about it." (H-FG #DS300010)

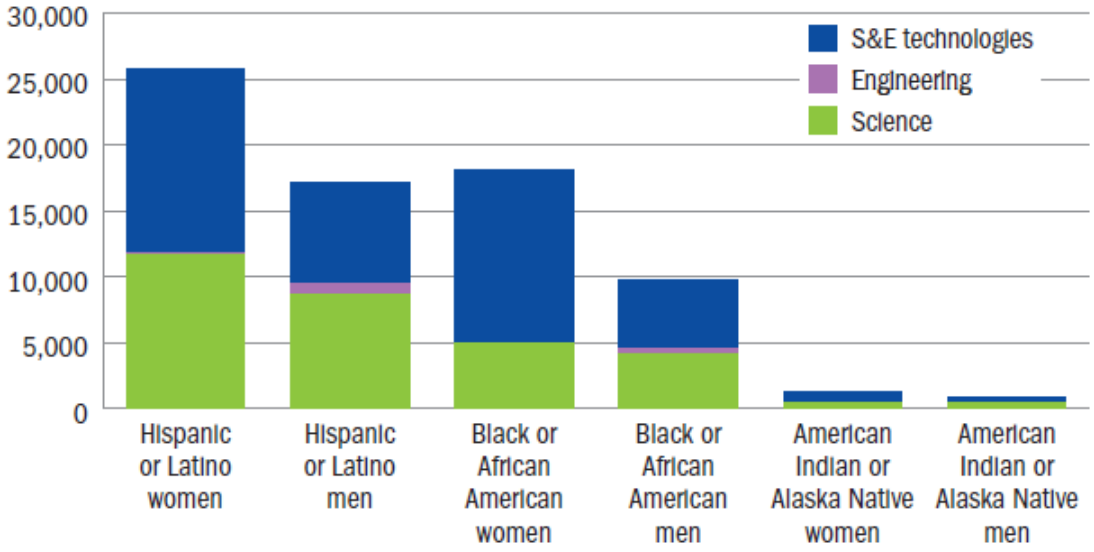
- Importantly, students explicitly stated how their perceptions of the usefulness of math developed due to their largely negative experiences in math classes across K-12.

FINDINGS: MATH IDENTITY

- Most of the Black girls seemed to have a poor math identity as indicated by their discussion of four components of math identity (i.e. recognition, interest, competence, and performance; Cribbs et al., 2015).
- Only a few Black girls reported that they liked or were interested in math.
  - “I like numbers. So, when I actually understand what’s going on [in class], I just like -it’s fun for me.” (H-FG #DS300010)
  - "I enjoyed sixth-grade math because of the concept, and I actually indulged myself in math, even though I really don’t like math. But that was the last time I just like really enjoyed the concept of math. I enjoyed how I could apply it to real life. I think it was more like the teacher explaining what the concept was going to help me -Format would be in real life with career choices and if I wanted to go." (H-FG #DS00047)
- The participating Black girls including those in advanced math classes rarely recognized themselves as being good at math and rarely discussed others recognizing them as good at math.
  - "I think I know how to pass math. I’m not good at math. I just know how to pass a class. I think that’s - I think it’s kind of been like that for the last couple years within like the school systems anyways. It’s just the fact of like it’s no longer like learning. It’s can you pass? I think that’s the main target now. It appears to not be about learning, but how to pass." (H-FG #DS00047)
  - "It just depends… there are some people that are good at math, and then there’s some people that just understand math and can do it, and I think I’m the second person. Like I can understand it and do it, but I’m just not good at it. Like I don’t know." (H-FG #DS300149)
- Most of the Black girls reported that they internalized their grades and used them as a marker of whether they were good at math.
  - “No. I’ll tell you straight up, I suck at math. I fail math every year. I’m surprised I passed math last year.” (NH-FG #DS000152)
- Importantly, students explicitly stated how their perceptions of their math identity developed due to their largely negative experiences in math classes across K-12.

Associate's degrees in science, engineering, and S&E technologies, by sex, ethnicity, and selected race: 2016

Number

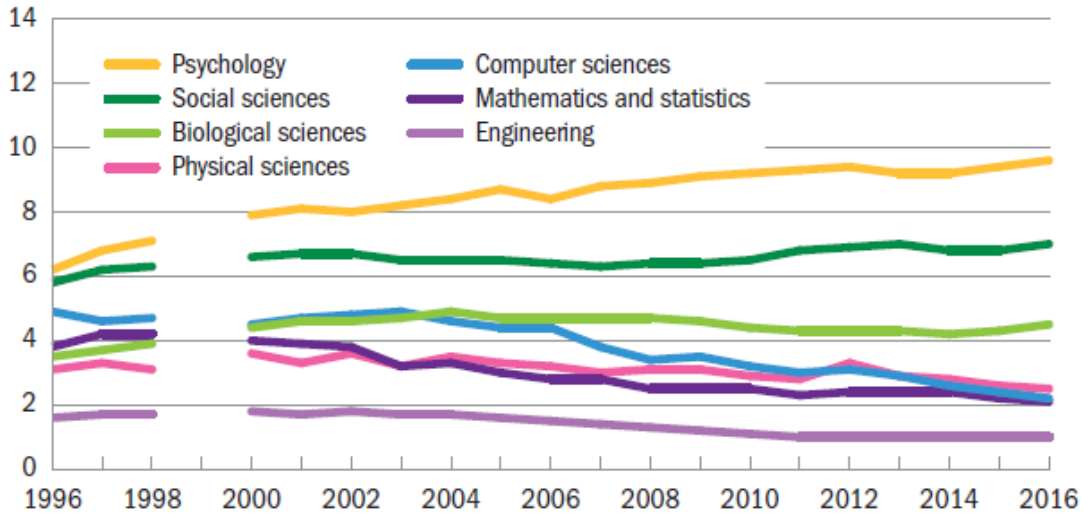


NOTE: Hispanic or Latino may be any race.

National Center for Science And Engineering Statistics, 2019

Science and engineering bachelor's degrees earned by black or African American women, as a percentage of degree field, by field: 1996–2016

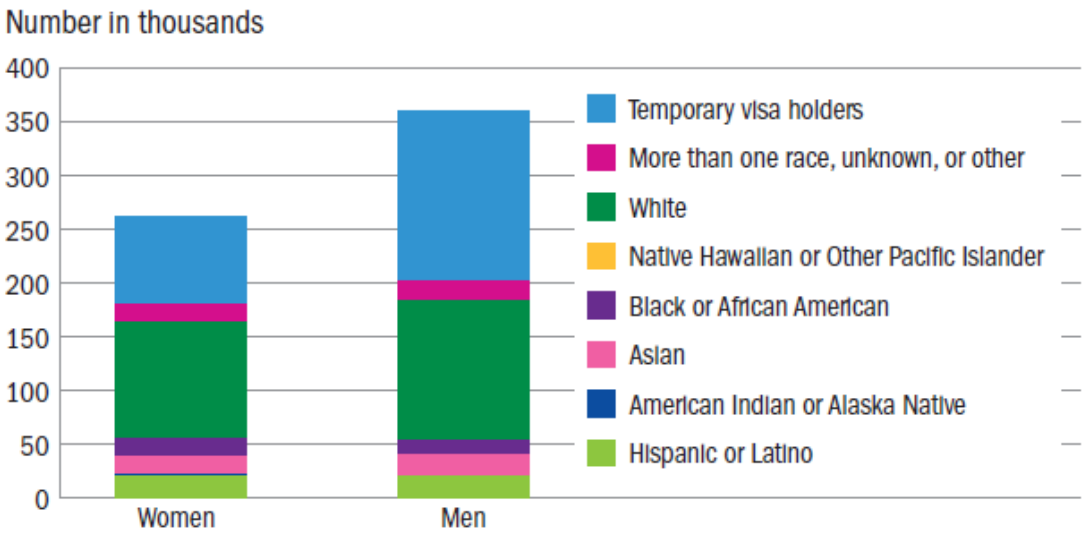
Percent



NOTE: Data not available for 1999.

National Center for Science And Engineering Statistics, 2019

Graduate students in science and engineering, by ethnicity, race, citizenship, and sex: 2016



NOTES: Hispanic or Latino may be any race. Graduate students includes both master's and doctoral students.

National Center for Science And Engineering Statistics, 2019

CONCLUSION

- The findings highlight the critical need to identify pedagogical strategies and classroom environments that are effective and engaging for Black girls.
- The findings also highlight the need to strengthen the sociopolitical and pedagogical content knowledge of middle and high school teachers.
- The study also highlights the need for math classes where a culture of care and inclusive pedagogy are normative.
- Finally, this study highlights the value of research that centers Black girls' voices about their experiences and visions for their math classes.

ABSTRACT

Theories of intersectionality and Black girlhood posit that Black girls have markedly different experiences and ways of navigating the world including their K-12 math education than their peers (Butler, 2019; Collins, 1990). Research has demonstrated, for instance, that math teachers focus more on Black girls' behaviors rather than their mathematics development as learners (e.g. Francis, 2012). If we are to move towards equitable and socially just math classrooms, more research that centers Black girls' voicing of their math experiences and needs is imperative (Joseph, 2017). Additionally, little is known about how Black girls connect their experiences in K-12 math classes to their math identity and value of math beyond K-12. It is critical that this is better understood given the low enrollment of Black women in STEM-related college majors and the underrepresentation of Black women in STEM fields (NCSES, 2019).

The present study included 48 Black girls from mixed SES backgrounds enrolled in the 11th (n = 39) or 10th grade (n = 9) at 10 urban schools.The Black girls participated in one of 12 focus groups in a quiet location at their school and discussed prompts such as "Let's talk about the last time you enjoyed math. What was it like?". Fifty percent of the focus groups included Black girls who were in advanced math classes while the others were in general math classes. Participants were sampled from a larger study which included 55 additional focus groups that were not only composed of Black girls.

The Black girls reported some positive experiences in elementary school but predominantly reported negative experiences in their middle and high school math classes. They reported that their middle and high school math teachers were unsupportive, unenthusiastic, and used ineffective pedagogical strategies. For instance, their teachers predominantly used worksheets and rarely provided opportunities for them to engage in active learning especially in activities that they considered fun and relevant to life outside of the classroom (e.g. projects and group work). Notably, students rarely reported that they viewed math as valuable outside of school and were rarely able to discuss how their career interests would utilize math. Additionally, most of the Black girls seemed to have a poor math identity as indicated by their discussion of four components of math identity (i.e. recognition, interest, competence and performance; Cribbs et al., 2015). Importantly, students explicitly stated how their perceptions of their math identity and the usefulness of math developed due to their largely negative experiences in math classes across K-12.

The findings highlight the critical need to identify pedagogical strategies and classroom environments that are effective and engaging for Black girls and to strengthen the political and pedagogical content knowledge of middle and high school teachers. The study also highlights the need for math classes where a culture of care and inclusive pedagogy are normative. Finally, this study highlights the value in research that centers Black girls' voices about their experiences and visions for their math classes.

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