

Calculus classroom instruction linked to inequitable opportunities for classroom participation and STEM retention among Black and Latinx women

SUMMARY

Undergraduate calculus classrooms function as white, patriarchal spaces (Leyva, in press) in mathematics education where exclusionary ideologies and structures thrive and reinforce racialized-gendered inequities, including use of these introductory courses to funnel students ‘not cut out for STEM’ away from more advanced classes. A recent study (Leyva et al., accepted) explored the ways in which historically marginalized students, including Black and Latinx women pursuing computing and engineering degrees, perceived undergraduate calculus instruction as a racialized and gendered experience. During individual and group interviews, the women conveyed how stereotypes of mathematical ability and representation in mathematical spaces collided with seemingly neutral instructional practices, giving rise to racialized and gendered mechanisms of devaluing their contributions and activating ideas of not belonging in STEM. While calculus faculty may be unaware of how their attitudes and seemingly neutral instructional practices reinforce the white and patriarchal culture of mathematics, these classroom environments nevertheless marginalize women of color and contributes to attrition in computing and engineering majors. To bring about more inclusive environments and equitable experiences, mathematics departments must prioritize incentives and supports for faculty to critically examine how their instructional practices are rooted in racialized and gendered ideologies, especially in introductory courses like calculus where decisions of STEM persistence are readily made. Further, a reconsideration of higher education policies embedded with logics of elitism and hierarchal forms of mathematical knowledge that situate calculus as a racialized-gendered filter of STEM majors is warranted.

“Math is supposed to be a White, Asian male type area... You’re **encroaching on a space that doesn’t belong to you** of that society says doesn’t belong to you. And that’s very disheartening in the sense that women are already not going into STEM fields for these exact reasons. **Women and minority STEM applicants just don’t feel supported** in that sense.

~Jasmine, Black woman,
computer science major

Black and Latinx women felt stereotyped, vulnerable, and subject to double standards in undergraduate calculus classes

“I feel like minorities already...It’s already difficult to get through certain classes because **you don’t have the support system**. It’s maybe just you and a couple of other kids. You’re a little bit more isolated. You have a lot more **pressure to succeed** because it’s not typical for...other people of your race to succeed...For me, it’s the whole **‘People said I couldn’t** and, therefore, I’m going to and I’m going to do it well.’ When things like this happen, I’m like, ‘Am I on the level the professor said? If I’m not, what am I doing wrong?’ And again you’re adding stress to your class and you’re making it a lot more difficult for the student to focus on learning...You put pressure on things, it can go one of two ways. **The student can crack or the student gets through it**. More often than not, if you don’t have a support system there, you crack.

~Nadine, Black woman,
engineering major

References

Leyva, L. A. (in press). Black women's counter-stories of resilience and within-group tensions across white, patriarchal spaces of mathematics education. To appear in the Journal for Research in Mathematics Education.

Leyva, L. A., Quea, R., Weber, K., Battey, D., & López, D. (accepted). Detailing racialized and gendered mechanisms of undergraduate precalculus and calculus classroom instruction. To appear in Cognition & Instruction.