

Attributions of Mathematical Excellence from the Perspective of (Pre)Calculus Instructors.

Elizabeth Roan
Indiana University

Krystal Brand
Indiana University

Erik Jacobson
Indiana University

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Deficit discourses are socially constructed narratives that circulate and reinforce negative perceptions about marginalized students (Adiredia, 2019; Adiredja & Louie, 2020). Deficit discourses make claims about “students’ academic and intellectual shortcomings” (Adiredia & Louis, 2020, p. 42) and attribute those shortcomings to defects of the student or their community. They claim, for example, that Black and Latinx students are responsible for their own underachievement (Nasir & Shah, 2011), that “women and Latinos are not good at mathematics” (Leyva, 2016, p. 109), or that Mexican and Black families and cultures do not value school work (Solórzano & Yosso, 2002; Adiredia & Louie, 2020). Classroom environments that reinforce deficit discourses overlook the existing knowledge of students, denying them meaningful opportunities to engage in mathematics (Adiredja & Louis, 2020). This approach also perpetuates false hierarchies that portray “Black, Latinx and indigenous people as mathematically inferior to white and some Asians and consequently as less deserving of meaningful, prestigious and lucrative learning opportunities and careers” (Adiredja & Louis, 2020, p. 43). In a recent study, Leyva et al. (2021) found that even “seemingly neutral behaviors and comments ... reinforced whiteness and patriarchy” (p.28). They call for the future research to scrutinize “precalculus and calculus instructors’ consciousness of whiteness and patriarchy embedded in undergraduate mathematics education” (p. 28). Inspired by this call, we propose investigating precalculus and calculus instructors’ beliefs about the source of racial and gender differences in mathematics achievement outcomes and investigate links with “seemingly neutral behaviors and comments” (Leyva et al., 2021). We approach this work using a perspective that draws on the attributions of mathematical excellence (AME) framework (Jacobson et al., 2022) which uses theory from social psychology to characterize deficit (and anti-deficit) discourses in mathematics education as genetic, personal, social, or educational. The goal the AME framework is to examine how teachers’ understanding of the origins of unequal mathematics education outcomes might be significant for instruction. Some beliefs may reinforce racist and sexist disparities, while others may help to challenge and change them. Importantly, the theory highlights how apparently identity-neutral attributional beliefs about mathematical excellence align with negative racial and gender stereotypes that correspond to deficit discourses in mathematics education. For example, the explanation that succeeding in mathematics requires sufficient effort (personal) is aligned with the discourse that Black and Latino students are underachievers. Building on the Leyva et al. (2021) work on examining racialized and gendered mechanisms in undergraduate mathematics courses, we plan to apply AME in a university context, testing its generalizability in a new environment. Specifically, we see the theory as promising to illuminate the causal factors that mathematicians use to explain students’ mathematical success (and struggle), including explanations that seem to be neutral but nevertheless align with negative stereotypes. In this poster, we describe the theoretical framework and outline a study design to address the research question: How does the AME framework capture university mathematicians’ attributional beliefs of mathematical excellence?

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