

Exploring The Role of Undergraduate and Graduate Real Analysis Experiences in the
Mathematical Trajectories of Women Mathematicians from Historically Disenfranchised
Groups: The Cases of Anna and Sasha

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As the population of the United States becomes increasingly diverse, more attention to efforts aimed at understanding ways in which colleges and universities can achieve equity in science, technology, engineering, and mathematics (STEM) education is needed to maintain global competitiveness in STEM (Henthorne, 2023; Office of Science and Technology Policy, 2022). As such, since courses in real analysis (undergraduate and graduate or similar courses)—typically required in the undergraduate and graduate mathematics programs in the US—often pose significant challenges to progressing in mathematics (Lew et al., 2016; Weber, 2004), we explore the cases of Anna and Sasha, part of a larger research study exploring the experiences of women mathematicians who come from groups historically disenfranchised in STEM (HDG), with a focus on undergraduate and graduate real analysis.

To investigate the mathematicians' experiences in real analysis, participants completed a 90-minute interview which included questions about their undergraduate and graduate classroom environments, their recollections of important concepts, and the role of their experiences in the development of their mathematical identity. This poster focuses on the following research questions: (1) What belief structures about how participants think of themselves as mathematicians were evoked by their experiences? (2) To what extent did their courses or experiences in real analysis advance their development as mathematicians? Using CRT as a theoretical base, my conceptual framework also incorporates factors that emerge from research literature associated with graduate school experiences of students from HDG (Borum & Walker, 2012; Johnson-Bailey et al., 2009; McAfee & Ferguson, 2006; McGee & Martin, 2011).

For both Anna and Sasha, interview analysis reveals the classroom environment in their real analysis courses negatively affected their identity as a “strong mathematician” even after completing their doctorate. Sasha had the unique experience of having taken real analysis at the undergraduate level in Latin America as well as in the US. She completed her undergraduate and graduate studies in the US and reported that she did well in the courses. She “loved analysis” and incorporates some of the teaching strategies used by her professors in her current teaching. In contrast, Anna describes undergraduate real analysis as not particularly challenging and that she earned “about a B.” However, she explained that she failed her graduate course in real analysis because of the amount of information she had to “memorize.” Although their performance levels in the courses were distinct, other messages received from their professors and classmates contributed to a similar cost to their identities as mathematicians. Both experienced isolation because of their race or gender throughout their academic career, but Anna experienced it in her analysis class directly. This contributed to Anna's choice to avoid more analysis classes as she “wanted absolutely nothing to do with it,” and this continues in her role as a faculty member. The stories of Anna and Sasha compel mathematicians to re-examine the role of real analysis in the curriculum and to integrate anti-deficit strategies that foster a supportive learning environment.

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