# Factors Influencing the Attitudes of Multilingual Learners in Undergraduate Mathematics Classrooms

Naline Beshay
CSU, Fresno

Jocelyn Hernandez
CSU, Fresno

Ernesto Calleros
CSU, Fresno

*Keywords:* multilingual learners, mathematics attitudes, undergraduate education, identity

As U.S. undergraduate classrooms grow more linguistically diverse, attending to multilingual learners' experiences is vital for equity. From 2009 and 2019, undergraduate enrollment of Latino students, many of whom are multilingual, increased by 48%, even as total enrollment declined by 5% (NCES, 2021a, 2021b). Attending to this growing linguistic diversity is essential for building equitable mathematics learning environments at the undergraduate level. Prior research suggests that language identity influences mathematics engagement (Rios, 2024), yet few studies examine how multilingual students' identities shape their attitudes specifically within undergraduate mathematics contexts. We define mathematics attitudes as a blend of cognitive (value, confidence, self-concept), affects (enjoyment, anxiety), and behavior (willingness to engage with mathematics).

Our research aims to identify key factors influencing multilingual undergraduate students' attitudes toward mathematics, explore the role of language, culture, and identity in shaping these attitudes, and examine how students interpret and respond to instructional practices in mathematics classrooms, highlighting how inclusive, asset-based approaches can enhance mathematics learning experiences for multilingual learners.

We employed a mixed-methods design integrating qualitative interviews and quantitative ranking activities. Participants were purposefully selected multilingual undergraduates who had completed at least one year of education in the United States, ensuring that their reflections were grounded in undergraduate mathematics experiences. Five Hispanic undergraduates (ages 18–23) enrolled in Psychology, Pre-Nursing, and Spanish programs participated. Semi-structured interviews explored personal mathematics learning histories, language use in mathematics classrooms, and attitudes toward mathematics. Participants were also asked explicitly about instructional practices, such as teacher encouragement, use of language, and classroom climate, that shaped their confidence and engagement in mathematics. This was followed by a ranking activity identifying perceived influence factors. Data were analyzed thematically and supported by descriptive statistics from rankings.

Preliminary findings show personal drive and teacher support as the most influential factors shaping attitudes toward mathematics. Participants associated bilingualism with greater confidence and self-perception of ability when instructional environments acknowledged and valued their linguistic resources. Teacher encouragement, or lack thereof, was more influential than familial or peer perspectives. Students' conceptions of 'math people' shifted from focusing on grades to valuing conceptual understanding. Negative attitudes were often linked to deficit-based assumptions about language or identity.

We plan to expand this study by interviewing additional multilingual undergraduates across disciplines who are currently enrolled in, or have recently completed, undergraduate mathematics courses and conducting a deeper thematic analysis using MAXQDA. The goal is to identify specific strategies, drawn from students' reported experiences, that strengthen self-efficacy, value students' linguistic assets, and foster equitable participation in undergraduate mathematics.