

The MAJORWISE Survey Study: Why Students Leave and Stay in the Mathematics Major

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An overwhelming 52% of declared mathematics majors nationwide change their major in the course of their college career (Leu, 2017). To better understand retention and attrition in the mathematics major, our research team launched the **Mathematics Journeys of Retention: Why Individuals Shift Educational Paths (MAJORWISE)** project. In this poster, we will address the question: Why do students choose to stay in and leave the mathematics major?

Background

Although several studies have investigated patterns of retention and attrition using quantitative measures (e.g., Rask, 2010; Rasmussen & Ellis, 2013), qualitative studies provide a deeper look into the reasons students provide for leaving mathematics. International qualitative studies have indicated students become disaffected with mathematics at the undergraduate level because they dislike lecture-based instruction and feel their courses place a strong emphasis on memorization (Hall et al., 2022; Rodd & Bartholomew, 2006; Ward-Penny et al., 2011).

Methods

During October 2023, we carried out a nationwide survey in the United States with free-response items of students who have been enrolled in a mathematics major during the years 2013-2023. In addition to demographic information, this survey solicited information such as reasons for enrolling in a mathematics major and timing of and reasons for deciding to either leave or stay in the mathematics major. We recruited participants through professional networks, social media, and snowball recruitment (requesting participants share the survey with others).

We analyzed free-response survey items using a predetermined coding scheme framed by Self-Determination Theory (Ryan & Deci, 2000), with codes for *autonomy*, *relatedness*, and *competency*. We then conducted an inductive analysis of responses in each category to describe specific experiences relevant to choosing to leave or stay in the mathematics major.

Presentation of Findings and Implications

The MAJORWISE online survey received 147 applicable responses. In our poster, we will report detailed findings from our analysis. For example, out of 40 responses to the question, “Why did you consider leaving the mathematics major?” 22 (55%) were related to autonomy (or a lack thereof), 7 (17.5%) indicated a lack of relatedness, 15 (37.5%) concerned competence, and 13 (32.5%) cited sources of extrinsic motivation (e.g., job opportunities). These findings, along with our in-depth inductive analysis, provide insight into how relevant stakeholders can best promote the motivation and retention of mathematics majors.

Acknowledgements

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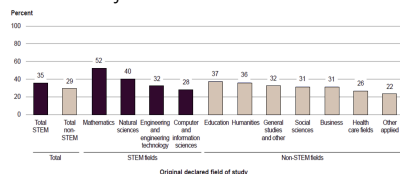
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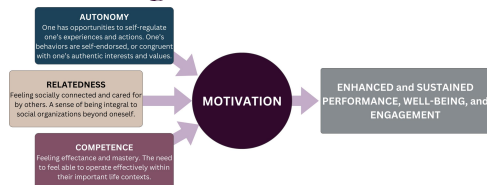
Background

An overwhelming 52% of declared mathematics majors nationwide change their major in the course of their college career (Leu, 2017). In this study, we report results of the MAJORWISE nationwide survey study investigating the reasons students give for choosing to major in mathematics, leave the mathematics major, consider leaving the mathematics major, and ultimately stay in the mathematics major.



Adapted from "Beginning College Students Who Change Their Majors within 3 Years of Enrollment," by Leu, K., 2017, in Data Point. NCES 2018-434. Copyright 2017 by National Center for Education Statistics.

Framing & Methods



The Survey

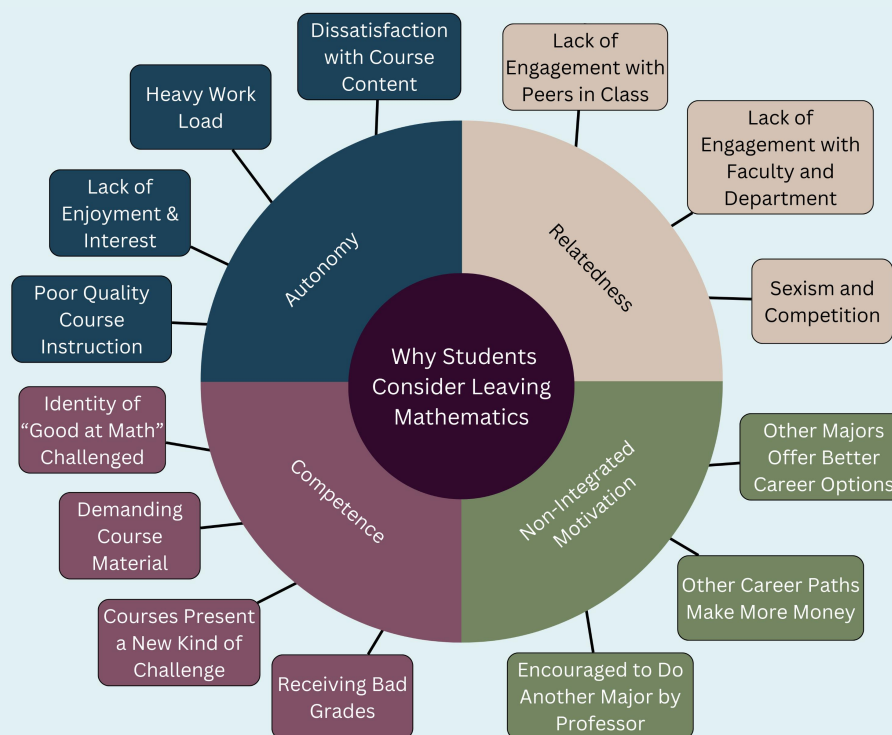
- Demographic Information: Race/Ethnicity, Gender, Institution Type
- Basic Major Information: Years enrolled as a mathematics major, mathematics courses taken at the undergraduate level, time of major declaration, title of degree program, status with major (completed, still completing, considered switching, switched), current occupation
- Open-Response Questions for Applicable Participants

Recruitment & Participants

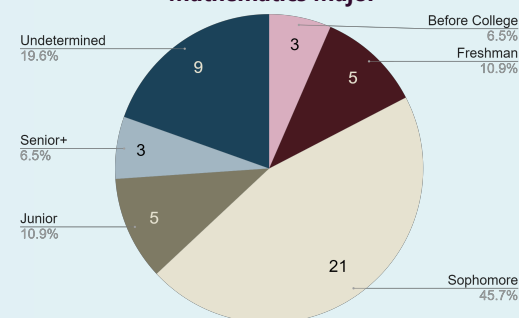
- Recruited participants through professional networks (e.g., RUME, EDGE, Jerry Becker ListServ), social media (e.g., Twitter/X, Facebook), and snowball recruitment.
- The survey received 147 applicable responses out of 176 total responses across 23 states.

Students leave mathematics for more reasons than you think.

The MAJORWISE Project
Mathematics Journeys of Retention: Why Individuals Shift Educational Paths



When Participants Considered Leaving the Mathematics Major



Conference Paper,
Contact Information,
References,
and Other Resources

