

# Factors influencing Biology majors' persistence in their degrees

Jenn L. Idema<sup>1</sup>, Kristy L. Daniel<sup>1</sup>, Shetay Ashford-Hanserd<sup>2</sup>, Dana M. Garcia<sup>1</sup>

College of Science and Engineering | Department of Biology<sup>1</sup>, College of Applied Arts | Department of Organization, Workforce, and Leadership Studies<sup>2</sup>



## BACKGROUND

- The number of STEM degrees awarded to members of underrepresented minority (URM) groups (i.e., African Americans/Blacks, Hispanic/Latinos, Asian, American Indian/Alaska Native, Native Hawaiian or Pacific Islander) account for less than 32% of undergraduate STEM degrees awarded in the U.S.<sup>1</sup>
- Prior research has identified key factors that impact URM students' persistence in STEM programs: Discrimination,<sup>2</sup> Lack of self-efficacy,<sup>3-4</sup> Financial costs of higher education,<sup>3</sup> Interactions with peers,<sup>2</sup> Lack of support and role models,<sup>2</sup> Race/ethnicity<sup>2</sup> and gender<sup>5</sup> stereotypes, Sense of belonging,<sup>5</sup> Commitment to diversity,<sup>6</sup> Family influence.<sup>7</sup>
- Few studies focus on contributing factors that influence students' decisions to persist in STEM majors.<sup>6,8</sup>
- Knowing what factors influence undergraduate STEM majors' decisions to persist in STEM degrees is essential for the development of strategies and programs that keep URM in STEM.

## Research Questions

- Which factors identified from the literature do students identify as affecting their decision to persist in a STEM major?
- What differences exist between White and URM students in their perception of the importance of these factors?

## FRAMEWORK

### MODIFIED SOCIAL COGNITIVE THEORY

For this pilot study we focus on choice actions (factors that influence students' decisions to persist in their Biology major).<sup>9-10</sup>

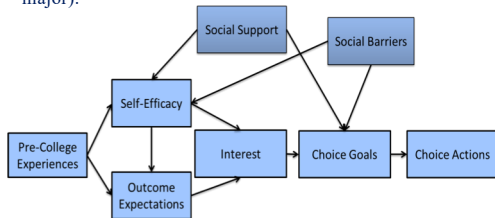


Figure 1. Modified Social Cognitive Career Theory – Model of Career Choice.<sup>9-10</sup>

## METHODOLOGY

This pilot study is part of a larger NSF-funded study aimed at evaluating factors that influence students to pursue and persist in STEM degrees.<sup>11</sup>

### Data Sources

- Convenience sampling of undergraduate biology majors at a Hispanic Serving Institution (n = 137) in Texas.
- Questionnaire
  - Demographics,
  - 14-item Likert scale with factors that might influence students' decisions to remain enrolled in biology.

### Data Analysis

- Cronbach's alpha score to measure instrument reliability ( $\alpha = 0.78$ ).
- Descriptive statistics of item responses.
- Mann-Whitney U test to identify significant differences between white (n = 65) and underrepresented (n = 72) students responses.

## RESULTS

- Strongest factors influencing students' decisions to remain enrolled: *Personal Motivation*, 67.2% agree or strongly agree; *Potential Learning Experiences*, 65.7% agree or strongly agree; and *Job Opportunities*, 62.0% agree or strongly agree.
- Least influential factors on students' decisions to remain enrolled: *Family and/or Peer Pressure* and *Stereotypes about Gender*. For both, 24.8% say they disagree or strongly disagree these factors influenced their decision to stay enrolled in biology major.

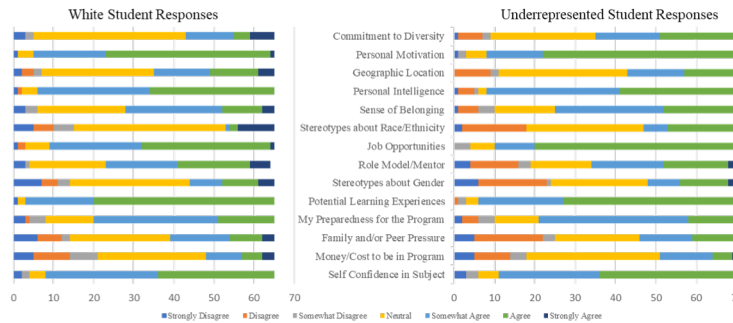
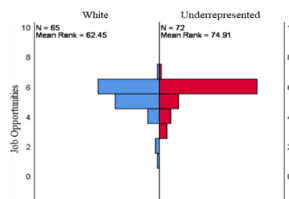


Figure 2. Student responses about influences on remaining in biology major, divided by race/ethnicity.



- Regarding race/ethnicity, only *Job Opportunities* was significantly different in reported influences.
- Mean rank for White students was 62.45 and URM students was 74.91.
- The distributions in the two groups differed significantly (Mann-Whitney U = 2764.5,  $n_1 = n_2 = 12.46$ ,  $P = 0.036$  two-tailed).

Figure 3. Independent-Samples Mann-Whitney U Test Race/Ethnicity for Job Opportunities Factor

## DISCUSSION

- Regarding our framework,<sup>9-10</sup> all students' persistence in STEM majors was most affected by personal drive, potential learning experiences, and potential job opportunities, influencing student choice actions to remain enrolled or persist in undergraduate programs.
- Among factors influencing persistence, URM and White students differed only in the importance they placed on expected job opportunities.
- Prior research<sup>2, 5-6</sup> suggests that URM students often encounter negative statements by professors and peers questioning the suitability of their decision to pursue STEM majors and careers.
- Given the importance that URM students place on enhancing their job prospects through the pursuit of a STEM major, institutions should increase professional development opportunities for students, as well as highlight successful alumni from diverse backgrounds and with diverse trajectories.<sup>11</sup>

## FUTURE DIRECTIONS

- The questionnaire will be distributed to all STEM undergraduate majors.
- In-depth interviews will be conducted to understand participants' lived experiences throughout the K-16 STEM education.

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