

Replenishing STEM Pipelines: Factors that Contribute to Undecided Students' Completion of STEM Bachelor's Degrees

Sylvia Hurtado, Bryce E. Hughes, Tanya Figueroa, M. Kevin Eagan, and Ashlee Wilkins

Higher Education Research Institute, UCLA

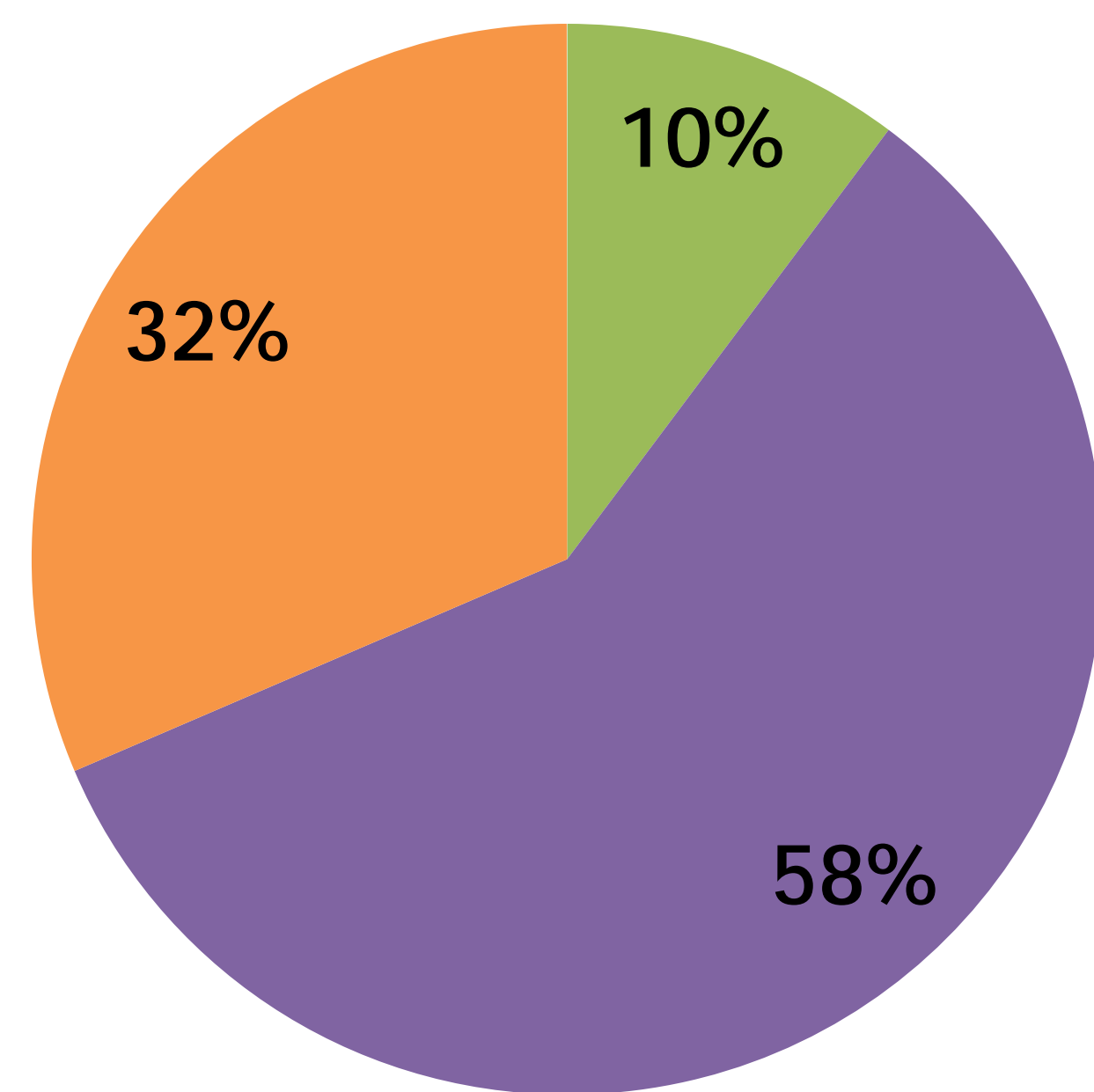
Purpose

Increasing the number of individuals formally trained in STEM is a national priority (PCAST, 2012), given the critical role these individuals play in scientific and technological innovation and contributing to the competitiveness of the U.S. economy (National Academy of Sciences, 2011). One method campuses could employ to reach this goal is through replenishing and expanding the pool of STEM talent by attracting students who enter college undecided about their major into the STEM pipeline.

Little research has examined the factors that contribute to undecided students' decision to pursue and complete STEM degrees. Further, institutional characteristics, such as institutional type, selectivity, minority-serving mission, shared responsibility for student success, and cooperative student peer culture, have been demonstrated to contribute to STEM degree completion (Bowen, Chingos & McPherson, 2009; Hubbard & Stage, 2010; Museus, 2011; Perna, Gasman, Gary, Lundy-Wagner, & Drezner, 2010). However, these environmental influences have only been tested for STEM aspirants.

The purpose of this study is to identify the entering characteristics and environmental factors that contribute to STEM bachelor's degree completion among students who enter college undecided about their major.

STEM Completion Undecided Students



■ Completed STEM degree ■ Completed non-STEM degree ■ Did not complete degree

Conclusions & Significance

- Few studies examine factors that lead to undecided students' choosing and completing a STEM degree
- Contexts matter:
 - Peer normative context affects likelihood of undecided students graduating in STEM
 - Institutional investments in STEM scholarships also make a difference
 - However, simply providing undergraduate research opportunities does not appear to encourage undecided students to consider STEM
- Academic preparation influences STEM completion for undecided students the most, especially average high school GPA
- Having a parent employed in STEM also influences undecided students' choice of major
- Undecided students with higher degree aspirations and higher academic self-concept are more likely to complete a STEM degree

Method and Sample

Data Sources:

2004 CIRP Freshman Survey
National Student Clearinghouse
2011 HERI STEM Best Practices Survey
2007, 2011 HERI Faculty Survey
IPEDS

Sample:

14,259 students, 294 institutions

Analyses:

Multinomial Hierarchical Generalized Linear Modeling

Dependent Variable:

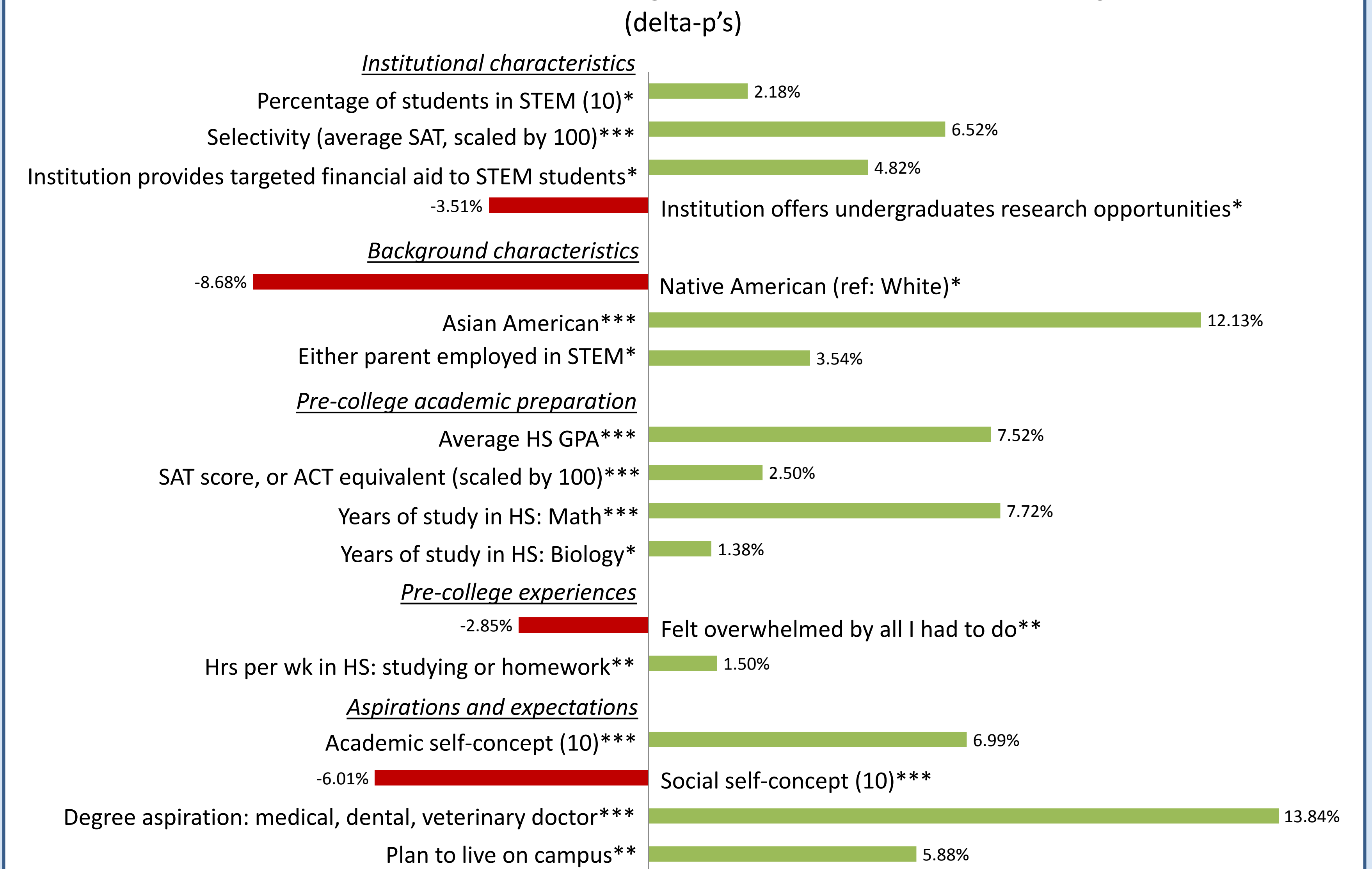
Six-year STEM completion status
➤ STEM degree, non-STEM degree, no degree

Sample Demographics

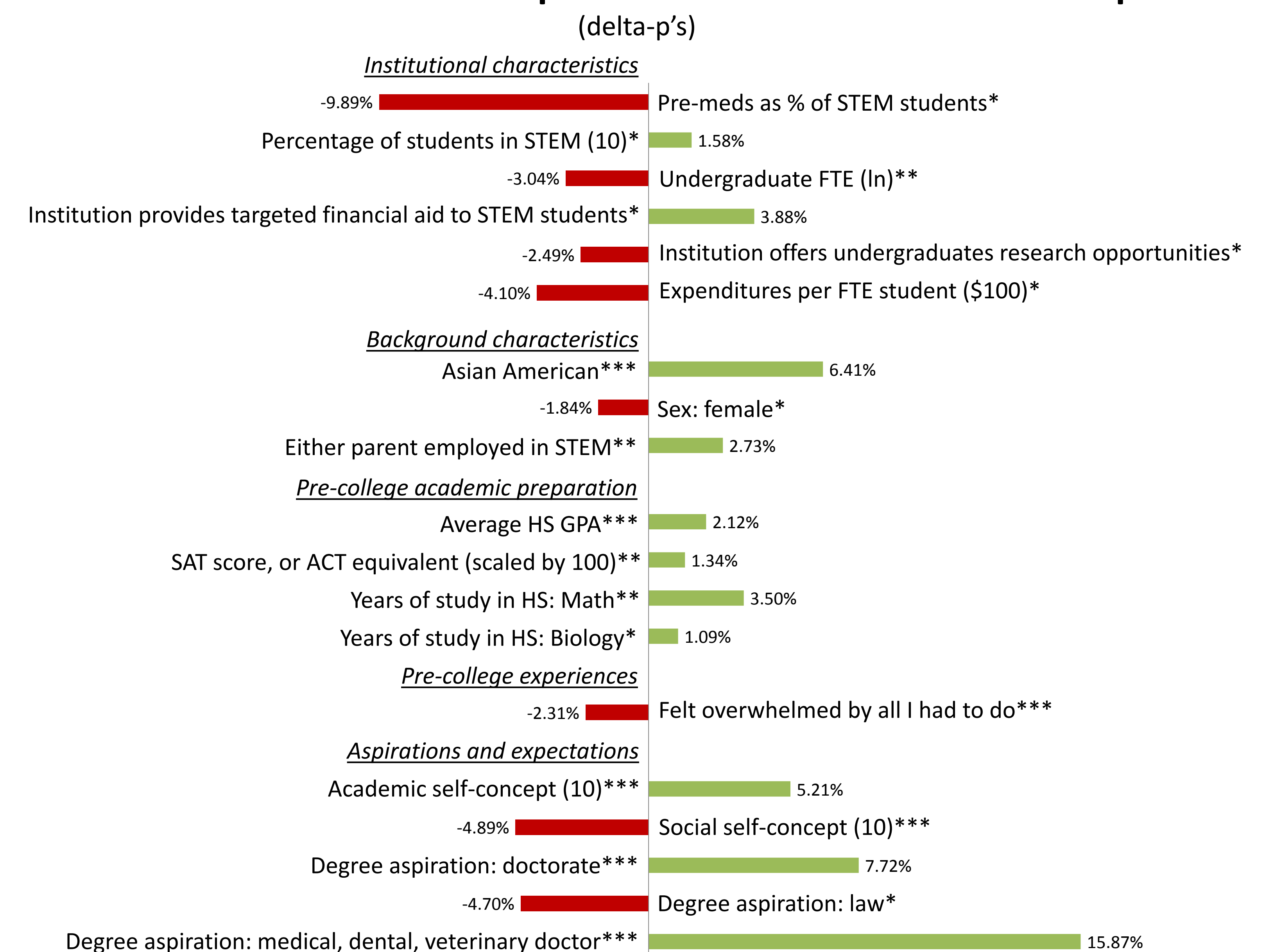
Race/Ethnicity	
Native American	2%
Black	4%
Latina/o	6%
Asian American/Pacific Islander	8%
White	78%
Other race	2%
Sex	
Female	64%
Male	36%
Background	
Either parent employed in STEM	22%



Factors that affect STEM completion relative to no completion (delta-p's)



Factors that affect STEM completion relative to non-STEM completion (delta-p's)



Contact Info Website: www.heri.ucla.edu
E-mail: heri@ucla.edu



Faculty/Co-PIs: Graduate Research Assistants:
Sylvia Hurtado Tanya Figueroa
Kevin Eagan Bryce Hughes
Ashlee Wilkins

Post-Bacc Research Analyst: Administrative Staff:
Robert Paul Dominique Harrison

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