

*What Does Science Tell Us About
Broadening the Participation of
Women of Color in STEM/SBS Fields?*

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**“Building Capacity for Institutional Transformation
in the Twenty-First Century:**

Women of Color in STEM and SBS Fields”

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The Science of Broadening Participation

Research that utilizes the theories, methods and analytical techniques of the social, behavioral and economic sciences to better understand the barriers as well as factors that enhance our ability to broaden participation in STEM.

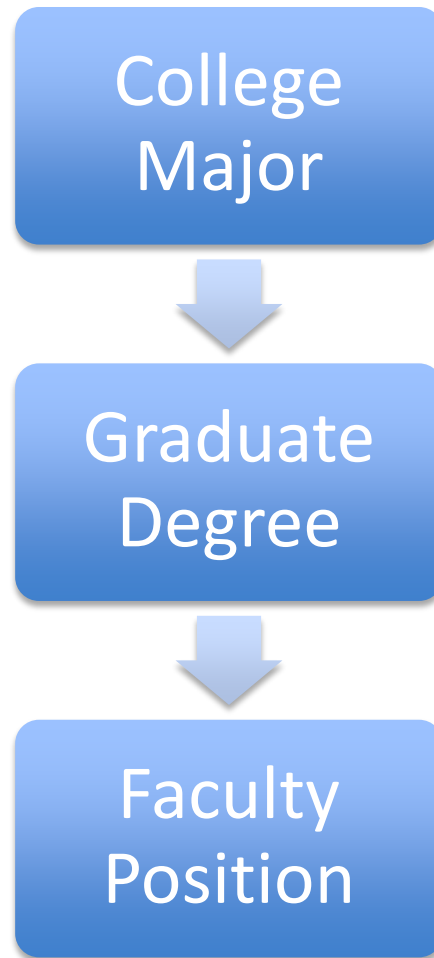
WHY DO WE NEED A SCIENCE OF BROADENING PARTICIPATION?

- To build body of evidence on the factors affecting participation in STEM/SBS
- To inform development of effective intervention strategies
- To evaluate rigorously the outcomes of interventions
- To understand what makes successful strategies successful

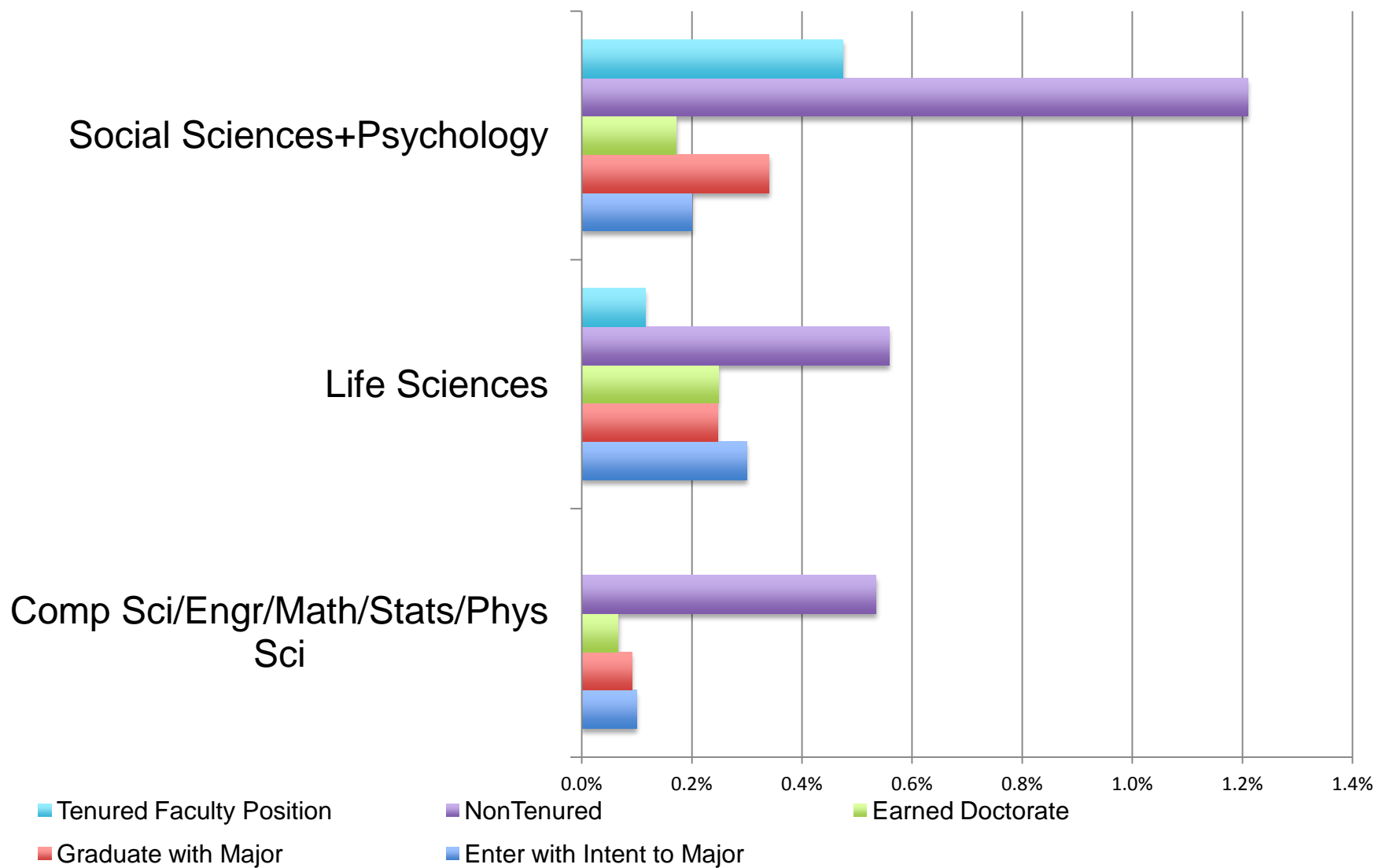
Science of Broadening Participation

- Research and Theory on Processes Affecting Performance
- Longitudinal Studies of Academic Choices and Outcomes
- Diversity, Organizational and Institutional Change
- Evaluation and Metrics of Success
- Identity, Stereotypes, Bias and Intervention Research

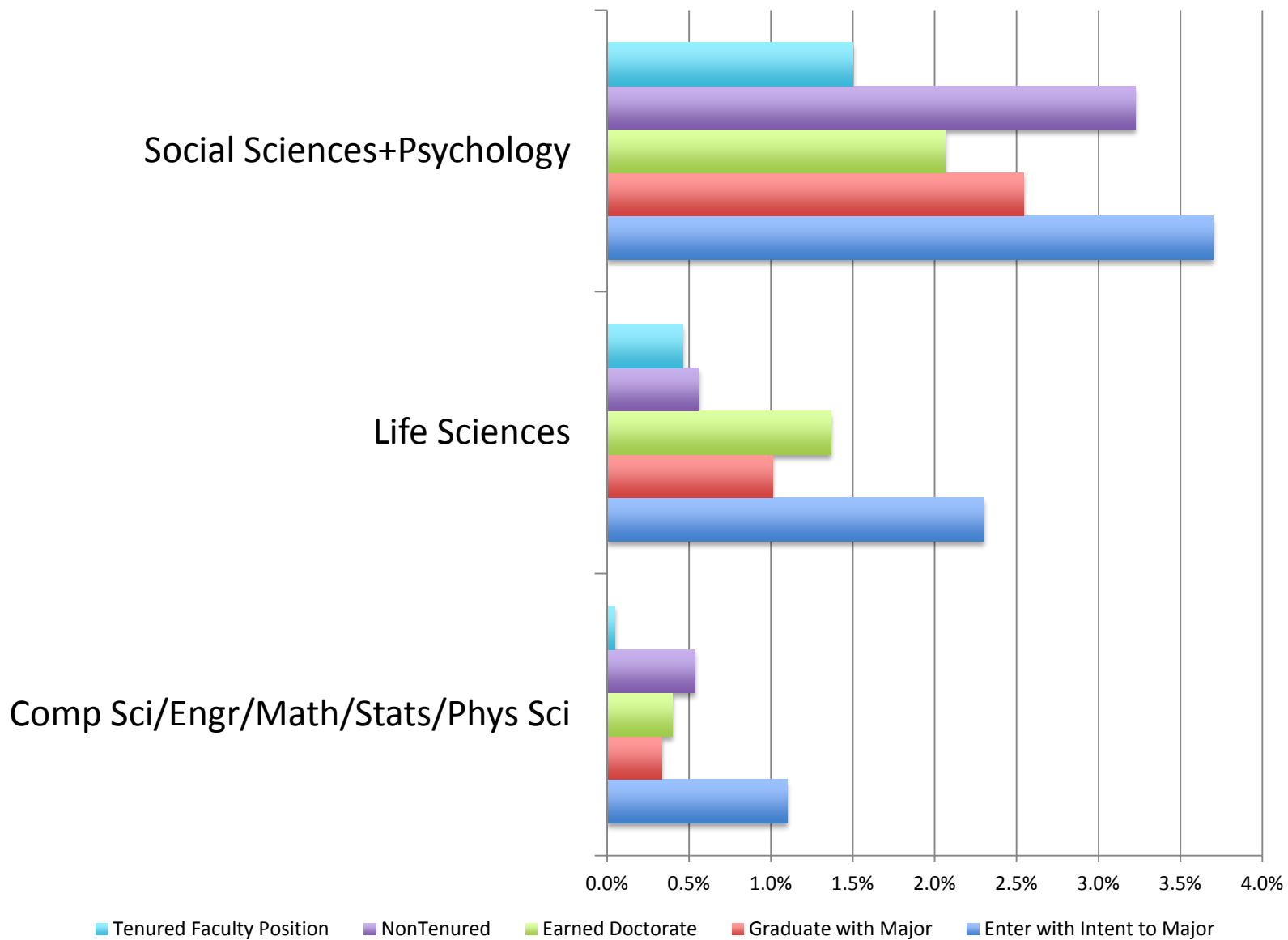
CRITICAL TRANSITIONS



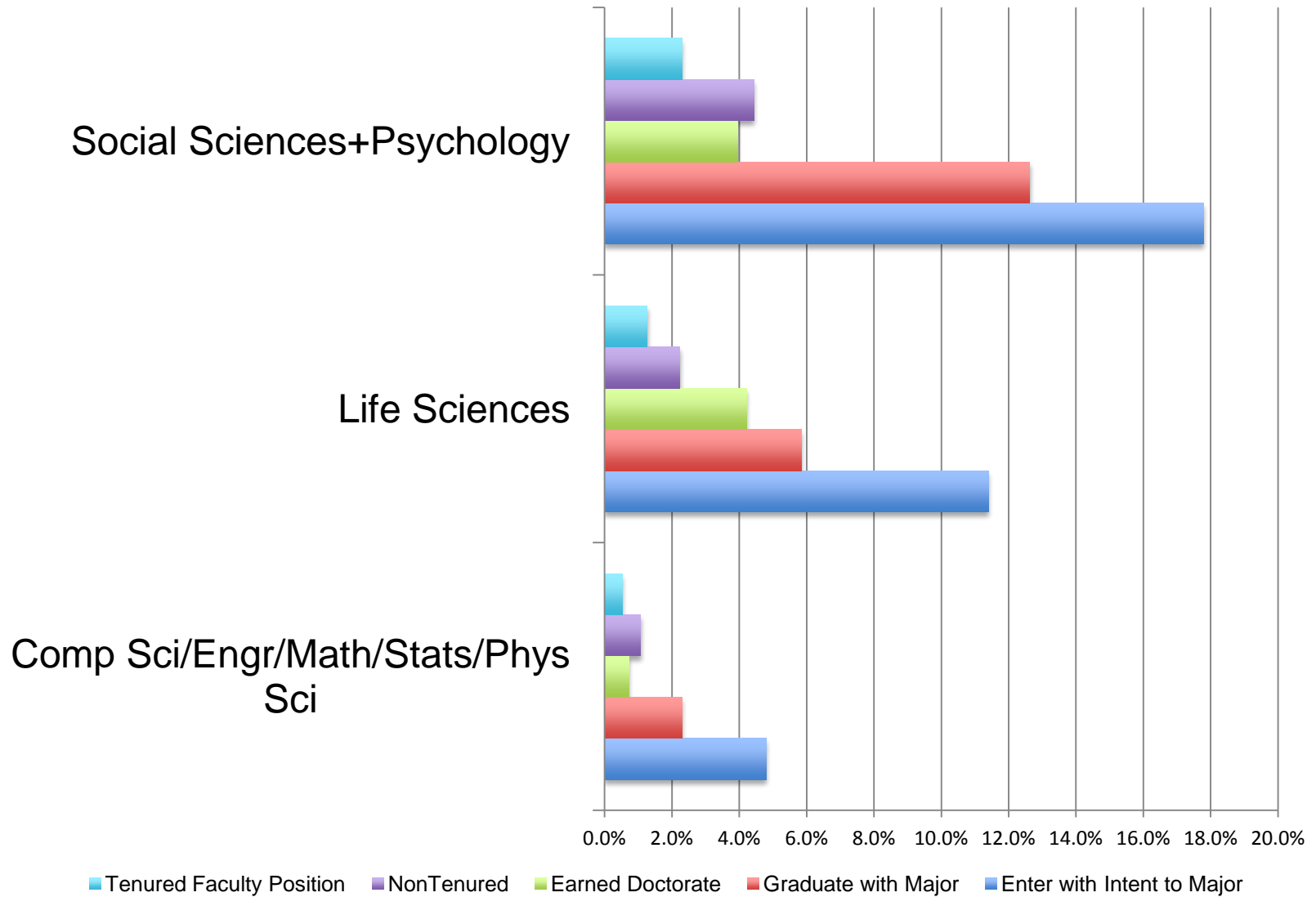
AMERICAN INDIAN WOMEN



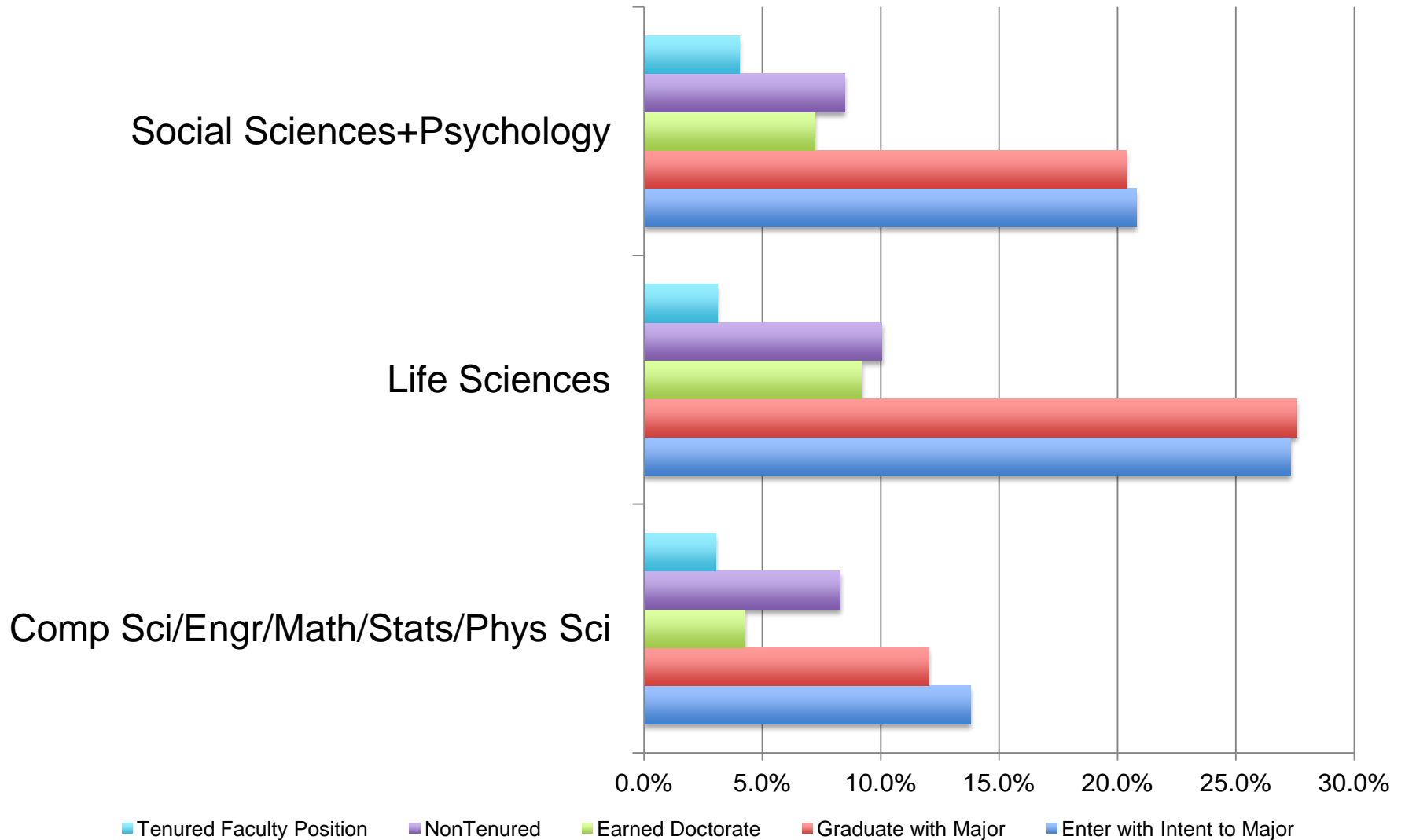
AFRICAN AMERICAN WOMEN



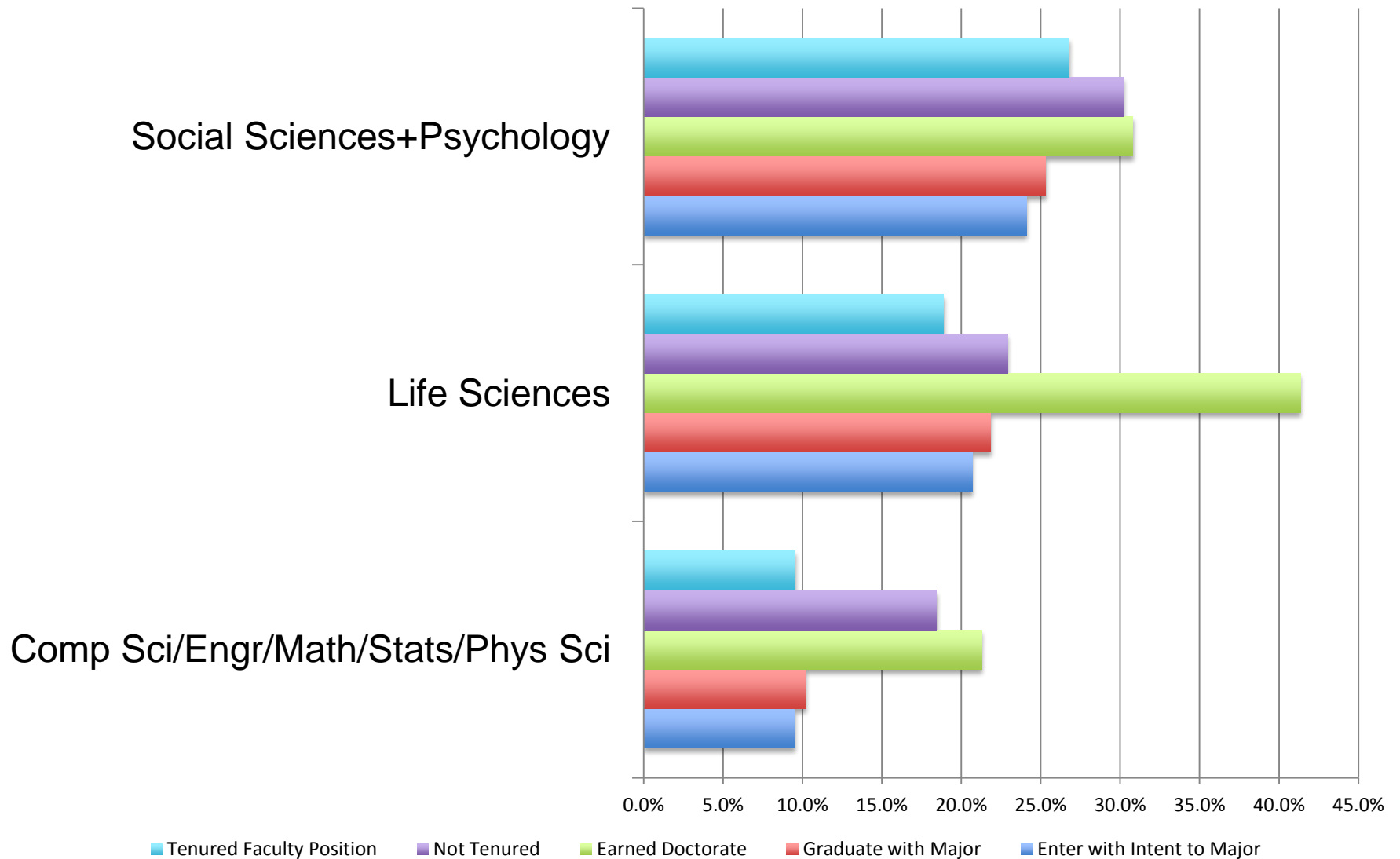
CHICANA/LATINA



ASIAN AMERICAN WOMEN



WHITE AND OTHER WOMEN



Data Sources

- Intent to Major, Fall 2008– University of California StatFinder, <http://statfinder.ucop.edu>
- Bachelor Degrees Conferred and Doctoral Degrees Conferred, 2010-11– Data Portfolio Prepared by UCOP Office of Institutional Research
- Ladder and Equivalent Rank Faculty Headcounts, 2011-12 - Data Portfolio Prepared by UCOP Office of Institutional Research

ECONOMIST'S MODEL

- Individual agent(s) make choices among opportunities given constraints on time, the financial and psychic cost, and assessments of the relative utilities of opportunities
- Market mechanisms, other than consumers, tend to be “color blind”.
- Low participation in STEM should be explained by differences in utilities or differences in costs or in access to financial resources

Some Lessons Learned from Other Disciplines

- Assessment of utility or the perceived reward from a career path affected both directly and indirectly by context and subtle cues.
- Psychic costs – role of social identity, climate, self-efficacy, biases – matter not only directly but indirectly through impact on performance.

Intent to
Major



Bachelor's
Degree

- Interest in science
- High school preparation
- Self-Efficacy
- Peer network
- Faculty relationships
- Pedagogy,
- Social Identity
- Climate
- Social support
- Gender Bias

Bachelor's Degree



Doctorate Degree

- College GPA
- Research Experience
- Solo status
- Funding issues

- Mentorship and Role Models
- STEM climate
- Biases in performance assessment

Doctorate Degree



Faculty Position

- Family responsibilities
- Faculty relationships

- Finances
- Climate
- Biases in the Hiring Process

Faculty Position



Tenure

- Gender & Racial Bias in evaluations of teaching
- Climate
- Family Responsibility

- Racial Bias in grant making
- Gender Bias in some fields but not others

CLASSROOM EXPERIENCE

	Black Men	Black Women	White Men	White Women
Students Question Authority	94%	54	6	8
Must prove competence	56	54	6	15
Inappropriate student challenges	44	23	0	15

“On my first day of teaching, I walked into the large auditorium-style classroom and sensed the surprise of the students in seeing that I was a black female. The male students sometimes would try to show that I did not know my material. For example, after I had explained a point in class, a male student would attempt to explain the point again in a manner that suggested my explanation was incorrect.”

African American, female full professor, electrical engineering quoted in Stanley, 2006

"When you are one of three or four Latinos and being a woman, almost every committee wants you to be on it. It gives you opportunities, at the same time, I think, you are expected to do a lot of things not expected of other faculty."

Take-Away Lessons

- Black and Latino women exit between first year and graduation; Asian American women exit at promotion to tenure.
- “Solo Status” matters (Surprise?) especially for women of color. SBP increases understanding of the mechanisms through which being the “only one” affects performance, self-efficacy and persistence

TAKE AWAY LESSONS

- Interventions that reduce self doubt and increase sense of belonging show promise.
- Mentoring programs shown to be effective for women in randomized trial.

TAKE AWAY LESSONS

- Establishing responsibility for organizational diversity has an impact; diversity training does not.
- Evidence of family responsibilities having an impact on women, but no specific work on women of color.

TAKE AWAY LESSONS

- Relatively little work exploring differences in promotion rates for women of color.
 - Can the classroom experience be modeled and manipulated?
 - How is time allocated and why?