

Research-Based, Interdisciplinary Multicultural Scholars Program at Oregon State University Has a High Graduation Rate of Minority and/or First-Generation Students in a STEM Major

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The Program

Goals of our USDA-NIFA Multicultural Scholars Program (MSP) are to recruit, retain, mentor and graduate Multicultural Scholars to meet national needs for STEM scientists and professionals in Agricultural/Natural Resource/Food Sciences. We provide Scholars with four elements critical for retaining minority students in sciences: (1) **an outstanding research experience**, (2) **effective academic and personal mentoring**, (3) **professional development opportunities**, and (4) **significant financial support**.

1. MSP scholars major in **BioResource Research**, an interdisciplinary major in College of Agricultural Sciences with a **required 14-credit research project**.
2. For mentoring, along with **faculty research mentors**, we use Cost-of-Education funds to provide scholarships to upper-division students to act as **Peer Mentors**.
3. Additional **peer mentoring** and **professional development opportunities** come from required membership in **MANRRS** (Minorities in Agriculture, Natural Resources, and Related Sciences), and an internship.
4. **Scholarship support** is provided by **3 USDA-NIFA Multicultural Scholars Grants**.

BioResource Research majors take a challenging biosciences curriculum, choose an option (area of concentration) and research mentor, take upper-division courses in their option, do a research project, and complete a thesis and final seminar.

Options:

- Animal Reproduction and Development
- Applied Genetics
- Bioproducts and Bioenergy
- Biotechnology
- Climate and Biosystems Modeling
- Environmental Chemistry
- Food Quality
- Genomics/Bioinformatics
- Pest Biology and Management
- Plant Growth and Development
- Sustainable Ecosystems
- Toxicology
- Water Resources

Examples of research projects MSP graduates have completed:

Option: Food Quality
Thesis: *The Storage of Grain and Aging of Flour, and Their Effects on Flour Functionality*

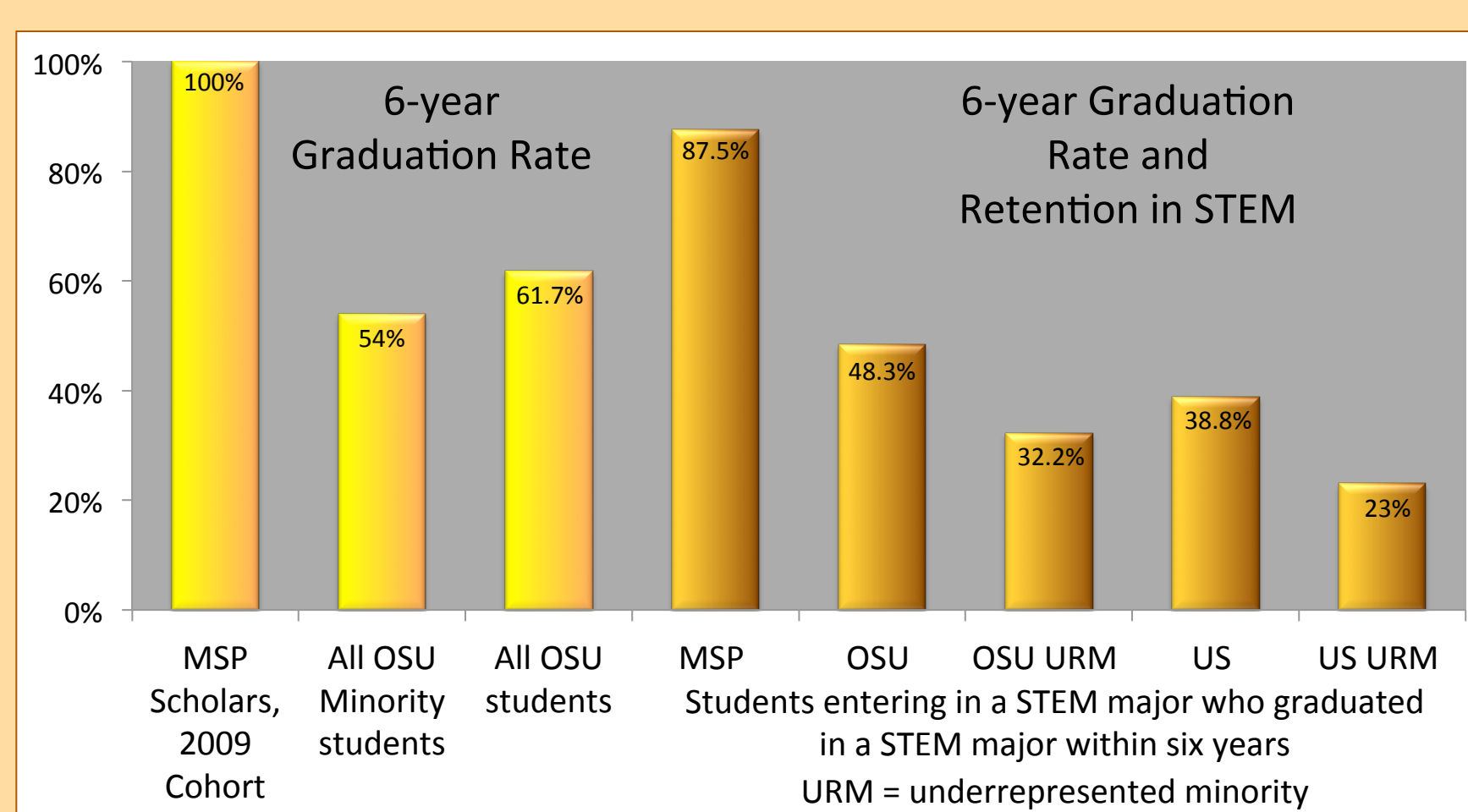
Option: Toxicology
Thesis: *Toxicological Investigations of Two Poisonous Plants, Tansy Ragwort (*Senecio jacobaea*) and Summer Dandelion (*Hypochaeris radicata*)*

Option: Animal Reproduction and Development
Thesis: *Serum Haptoglobin as an Indicator for Calving Difficulties and Postpartal Diseases in Transition Dairy Cows*



United States Department of Agriculture National Institute of Food and Agriculture

Figure 1. Six-year Graduation and STEM Retention Rates of 2009 MSP Scholars Compared to OSU and National Rates



The 6-year graduation rate of the 2009 MSP cohort is 100%, and 87.5% graduated in a STEM major. Although numbers are low (n = 8), our students achieved higher 6-year graduation rates than comparator groups.

MSP Student Success. We compared the 6-year graduation rate of the 2009 cohort of MSP scholars with 6-year graduation rates from comparator groups (Figure 1). Both our graduation rate and our rate of retention and graduation in a STEM major compared favorably with rates for OSU students, OSU minority students^a, US, and US URM students^b.

Figure 2: Characteristics of all 3 cohorts of the Multicultural Scholars (n = 20) and MSP Mentors (n = 10): gender, race, ethnicity, family educational background. In comparison, the population in Oregon comprises 2% Black/African Americans, 1.8% Native Americans, 12.2% Latinos, and 4.0% Asians^c.
**estimated **one participant combines Latina/Asian/Pacific Islander*

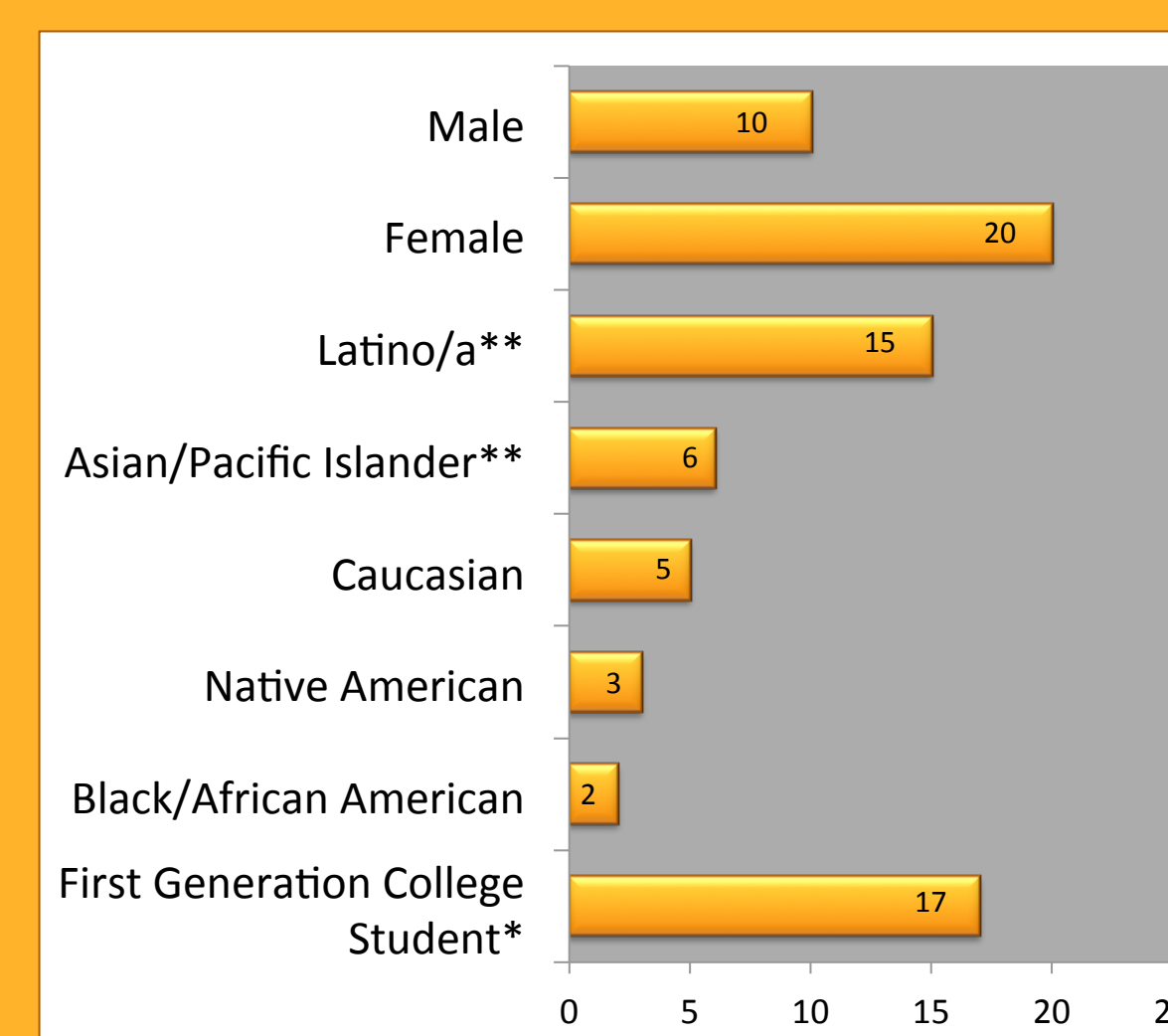


Figure 2. MSP Scholars and Mentors

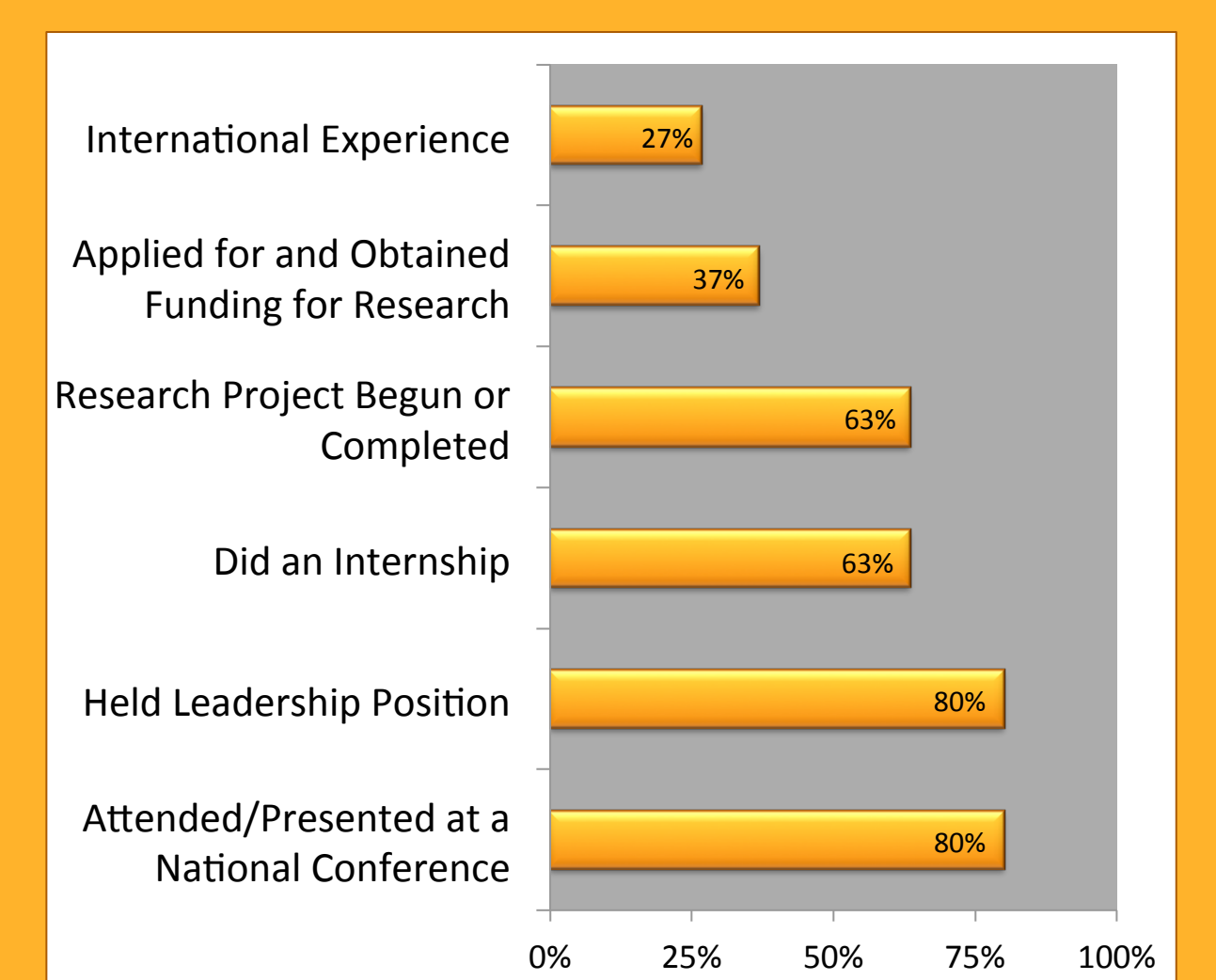


Figure 3. MSP Experiential Learning

Figure 3: Percentage of all MSP Scholars and Mentors (n = 30) to participate in selected Experiential Learning and Professional Development activities. By graduation, all will have completed a significant research project, required in their major.

Sources: a: Oregon State University Office of Institutional Research. Retention/Degree/Graduation Reports: Graduation Summary, 2013. b: Degrees of Success - Bachelor's Degree Completion Rates among Initial STEM Majors. HERI Research Brief, January 2010. c: US Census Bureau, 2012.

Assessment

Our assessment plan documents measurable outcomes in the areas of **personal well-being**, **professional-well-being**, and **programmatic evaluation and support**. Outcomes were chosen based on research relating to the recruitment, retention, support and development of undergraduate minority students, and focused on meeting the ACC STEM metrics^d. Since 2011, MSP scholars have been assessed twice yearly using both a survey, in which they rate a series of statements in each of the areas on a one-to-six scale, and personal interviews. Initial survey results comparing our three cohorts (n = 20) revealed higher mean values in seven research constructs in the more advanced cohorts (Figure 4). Differences in three theme areas, **ethnic identity**, **educational encouragement**, and **undergraduate research**, were also strongly supported by qualitative data.

Ethnic identity showed a steady increase based on amount of time in the MSP program. MSP students are required to participate in MANRRS and attend the national MANRRS conference, excellent opportunities to continue to develop their personal ethnic identities.

Educational encouragement is partially measured by student perceptions of faculty support. Students in the MSP program consistently identified the program advisor as supporting their academic success, personal development and social belonging.

A unique aspect of this MSP program is the strong focus on rigorous **undergraduate research**. Older MSP students were more confident and perceived themselves as more knowledgeable in undergraduate research.

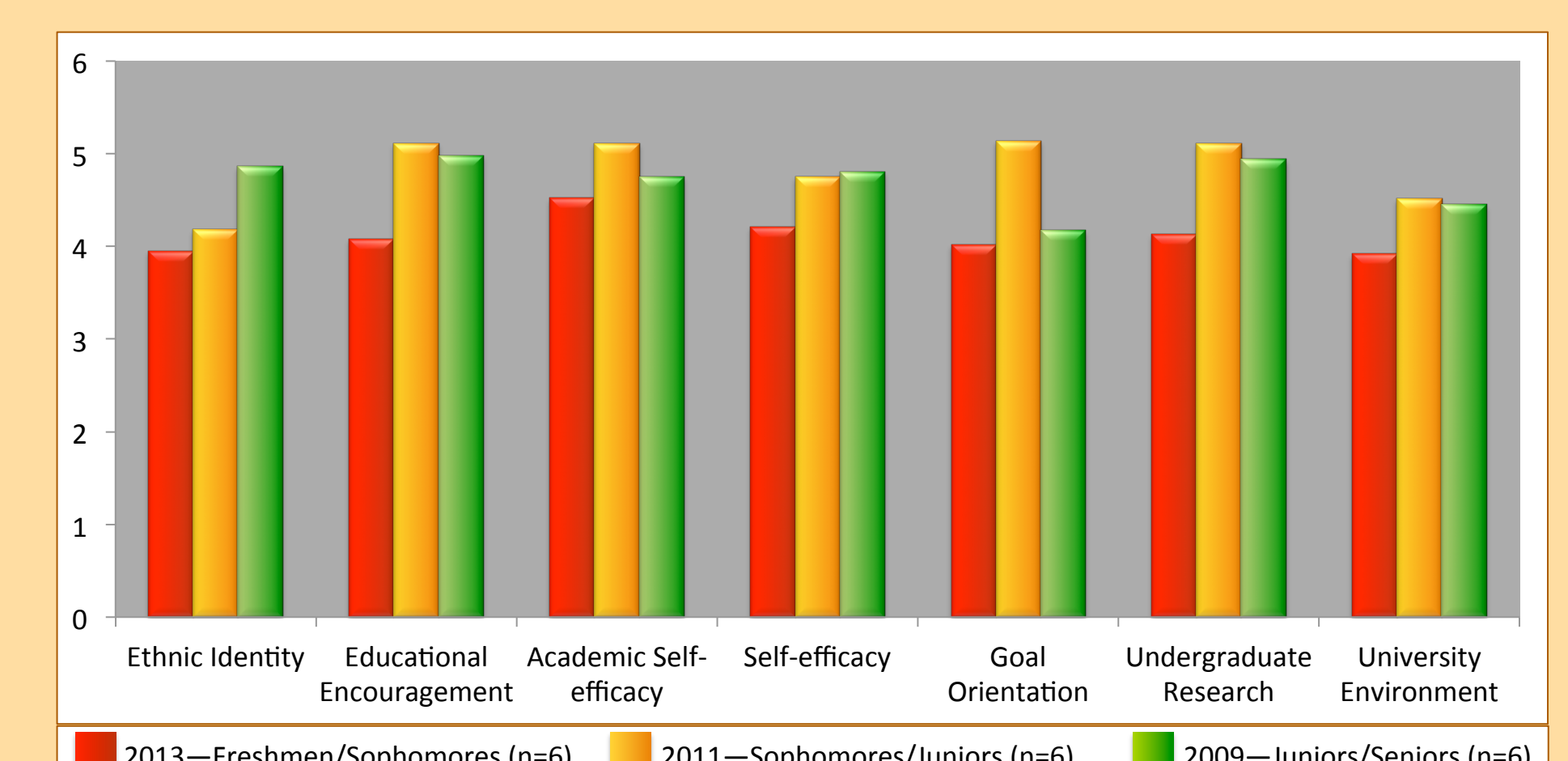
Educational Encouragement: *"I didn't give up...because [my advisor] didn't give up on me...and after that I just felt like this person didn't let me quit so why should I quit on myself?...I really feel like there was definitely a lot of support and a lot of faculty that were willing to help out."*

Undergraduate Research: *"It was the human component in research that most attracted me to it and what also drew me into my science courses." "I really didn't understand the impact of how cool it was to be an MSP scholar, like I just knew it was a scholarship but I had no idea that it was going to get me involved with a research mentor and funding for trip to convention and then funding for a research internship experience. It really kind of made me love OSU."*

d: U.S. Department of Education, Report of the Academic Competitiveness Council, Washington, D.C., 2007.

Ethnic Identity Development: *"MANRRS just opens up your eyes... and allows you to think in so many different ways to expand your mind."*

Figure 4. MSP Cohort Comparison of Evaluation Constructs



Bars represent the three cohorts (2013, 2011, 2009) at the same point in time. The scale on the Y-axis is based on a six-point scale used in the survey, from "Strongly disagree" to "Strongly agree". Longitudinal comparisons of individual cohorts over time are in progress, and will help reveal the extent to which differences are due to developmental changes versus differences among individual cohorts.

