



Sense of Belonging in Undergraduate STEM Majors: How to Foster It and How to Assess It

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California State University, Stanislaus**

Thanks!

- US Dept of Education Title III Part F grants
P031C110082 and P031C160070



HSI STEM
grants



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Overview

- Background
- Sense(s) of belonging
- STEM Success programming at Stanislaus State
- Methods for assessing outcomes
- Methods for sharing outcomes
- Outcomes for STEM Success programs
- Key findings and next steps



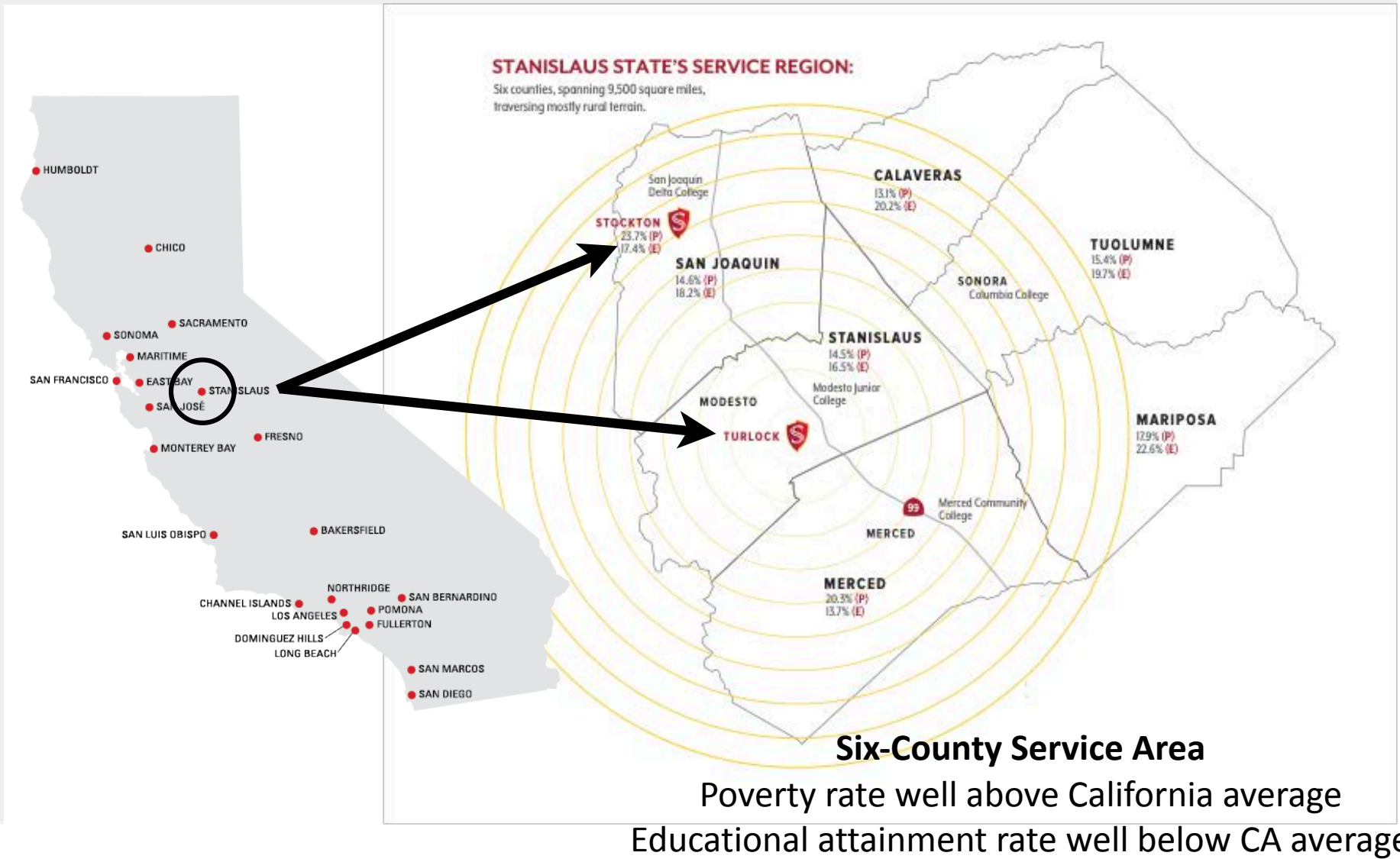
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Background



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Stanislaus State



Stanislaus State students (Fall 2019)



- 9,511 undergrads
- 67% first generation (TRIO definition)
- 63% Pell-eligible
- 60% Hispanic
- 9% Asian (mostly SE Asia)
- 2% African American
- 65% female

HSI-STEM grant at Stanislaus State

- HSI-STEM grants aim to increase the number of students from historically underrepresented groups who graduate with a degree in STEM
- Underrepresented students are STEM majors who are any of these:
 - From an underrepresented ethnic group (African American, Hispanic, Native American, Pacific Islander)
 - Economically disadvantaged
 - First generation
 - Female (in some majors)

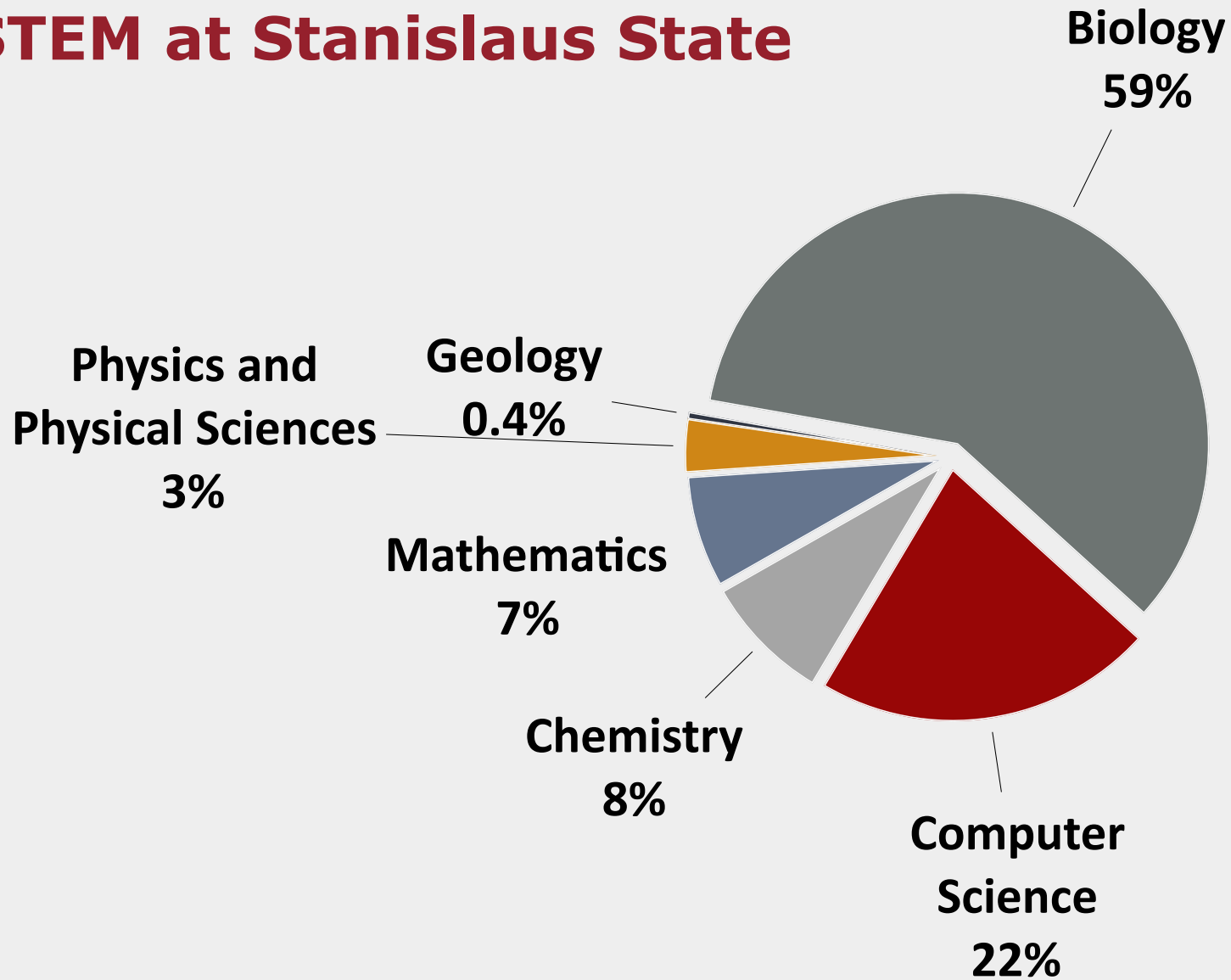


“Target population”



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STEM at Stanislaus State



Sense(s) of Belonging

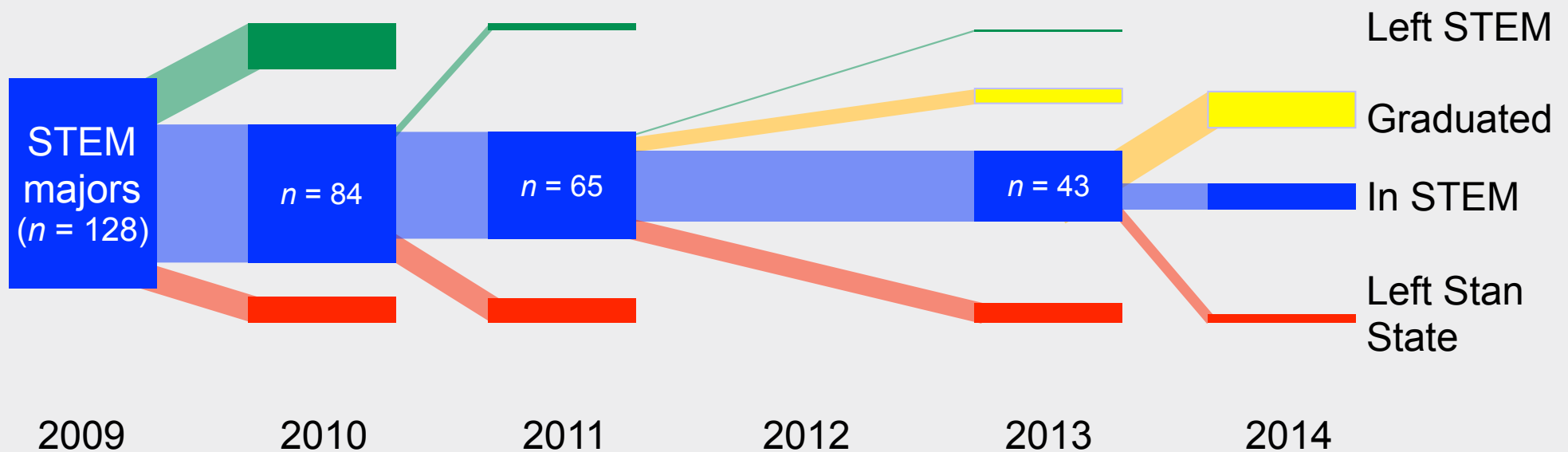


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History of STEM Success

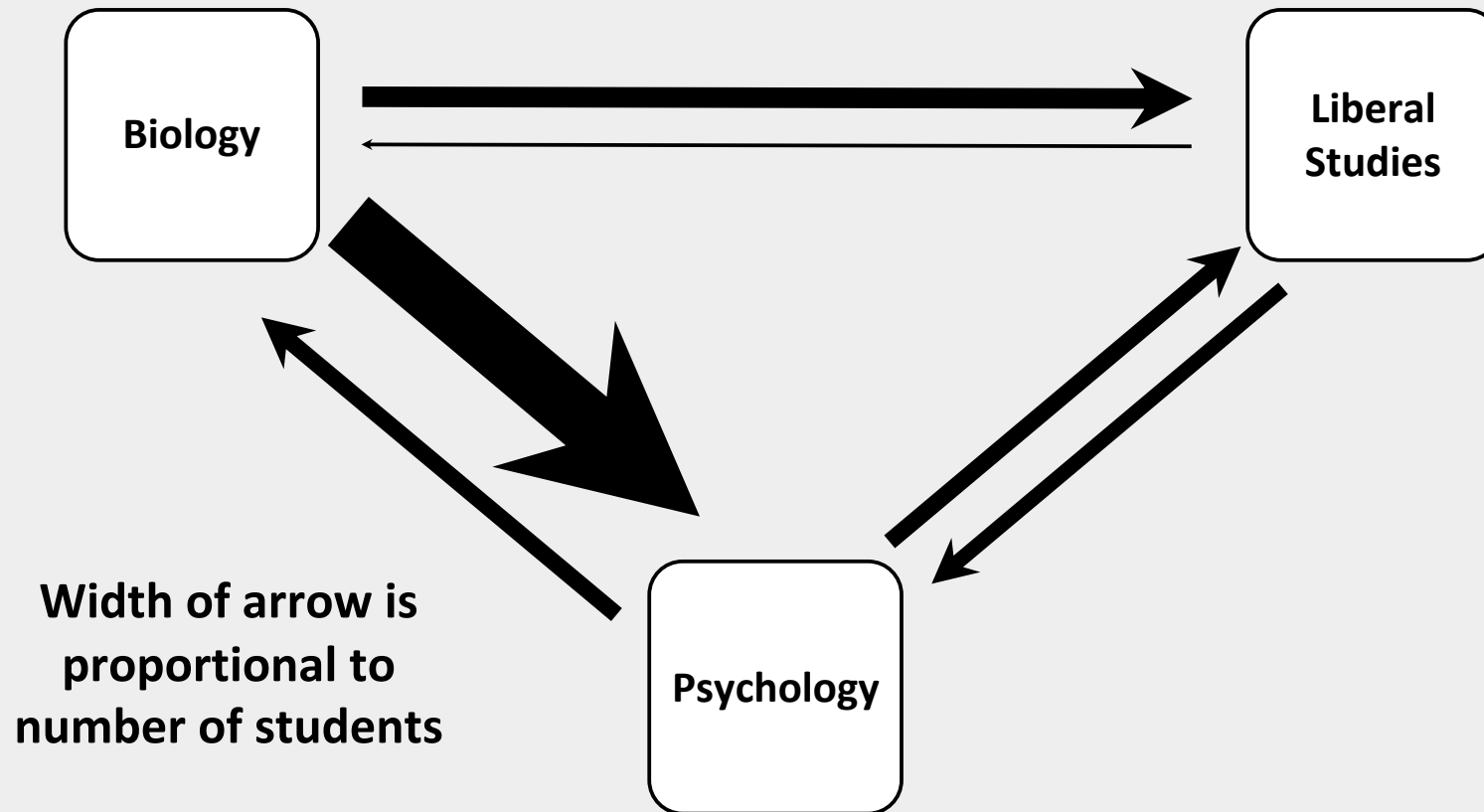
- At start of first HSI-STEM grant, retention within STEM majors was only ~50%

2009 First-Time Freshmen
Who Entered as STEM Majors



History of STEM Success

- More students change out of STEM than into STEM



Why do students leave STEM?

- Students declaring a major or switching a major are invited to complete a survey
- Lists common reasons students might select or change their major
- Students can elect as many or as few reasons as desired
- More than 3,300 responses to date



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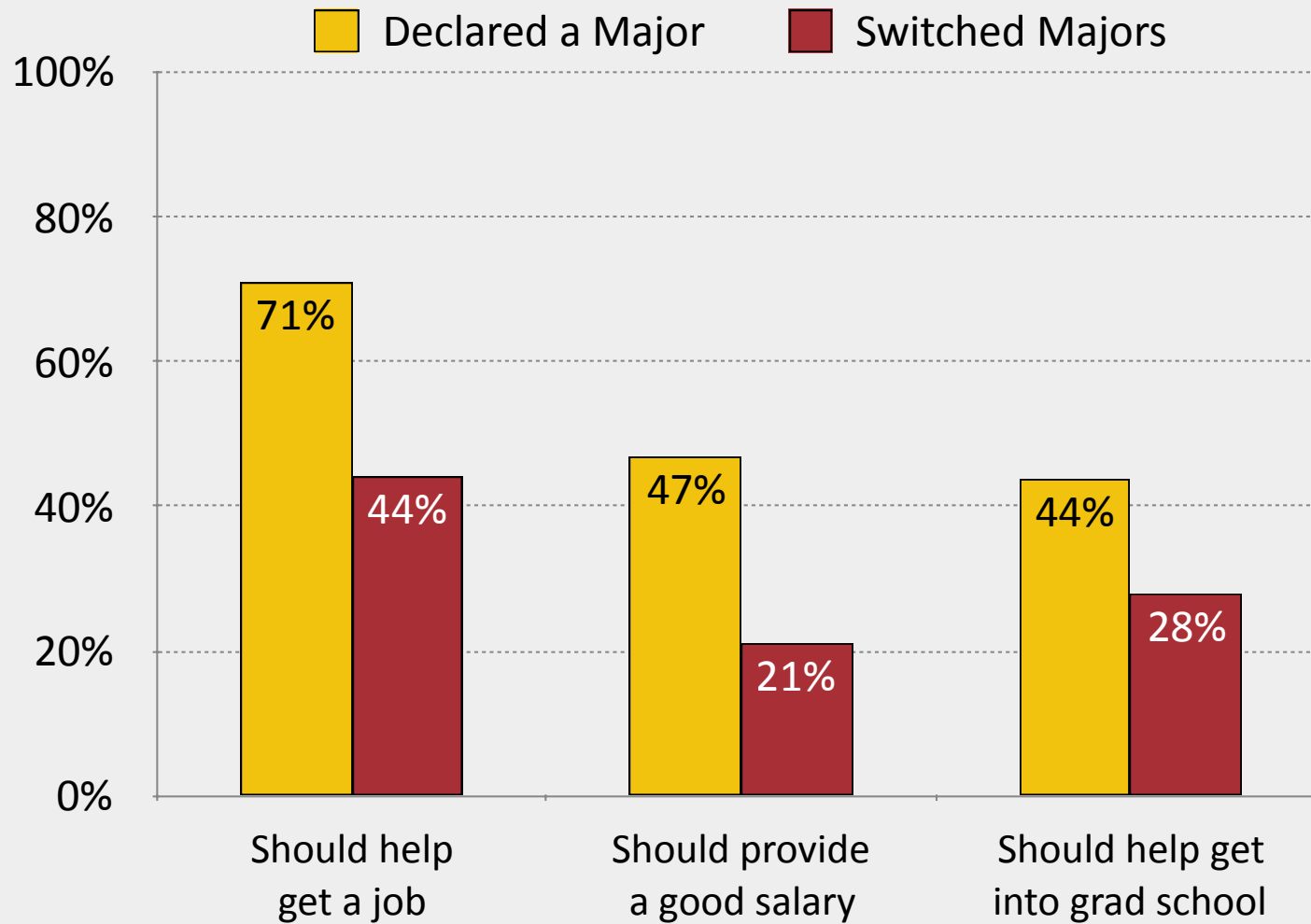
Change of major survey

- Which reasons are cited most often?
 - Like the instructors
 - Enjoy the classes
 - Like the subject matter
 - Feel like belong more
 - Expect to get good grades
 - Like the class schedule
 - Easy to get into classes
 - Few courses needed
 - Workload is reasonable
 - Affordability
 - Helps get into grad school
 - Helps get a job
 - Helps get a higher salary
 - Other students suggested
 - Faculty suggested
 - Advisors suggested
 - Family suggested
 - Employer suggested

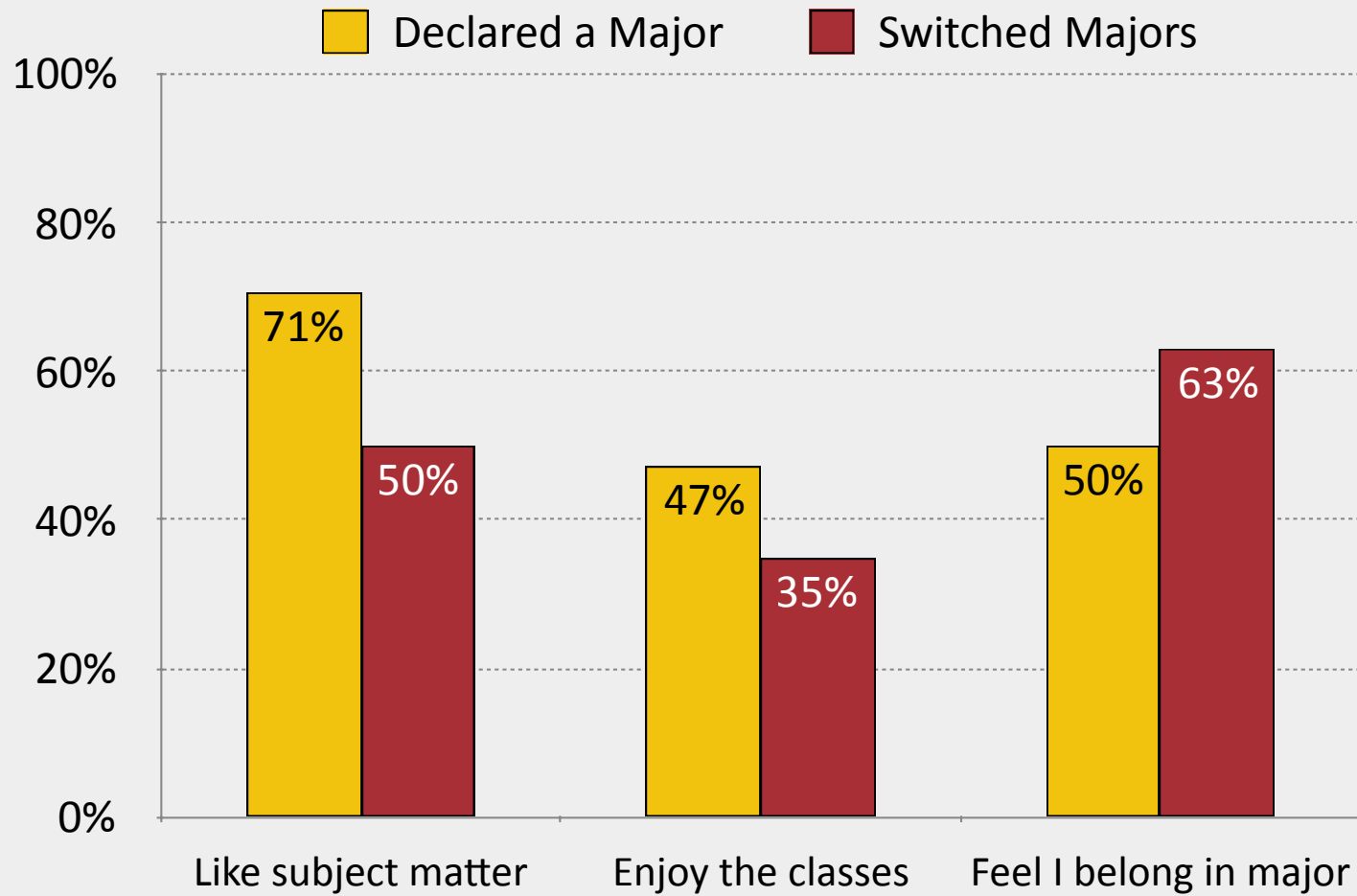


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Change of major survey



Change of major survey



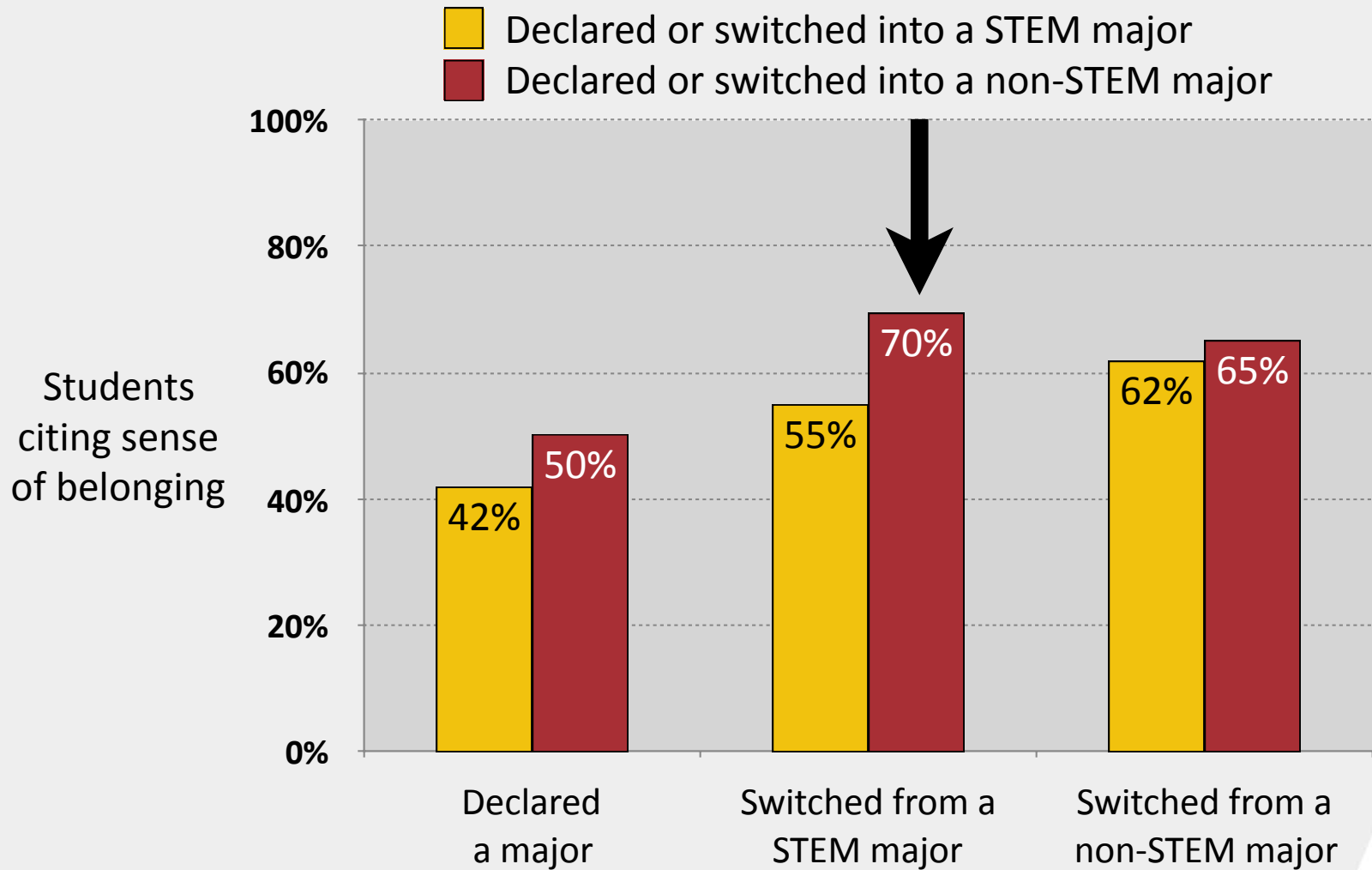
Change of major survey

- Most common reasons for declaring a major are job prospects and enjoyment of subject matter
- Most common reason cited for leaving a major is students feel they belong more in their new major
- Sense of belonging is especially likely to be cited by students who leave STEM
 - 70% of STEM leavers feel they belong more in a non-STEM major

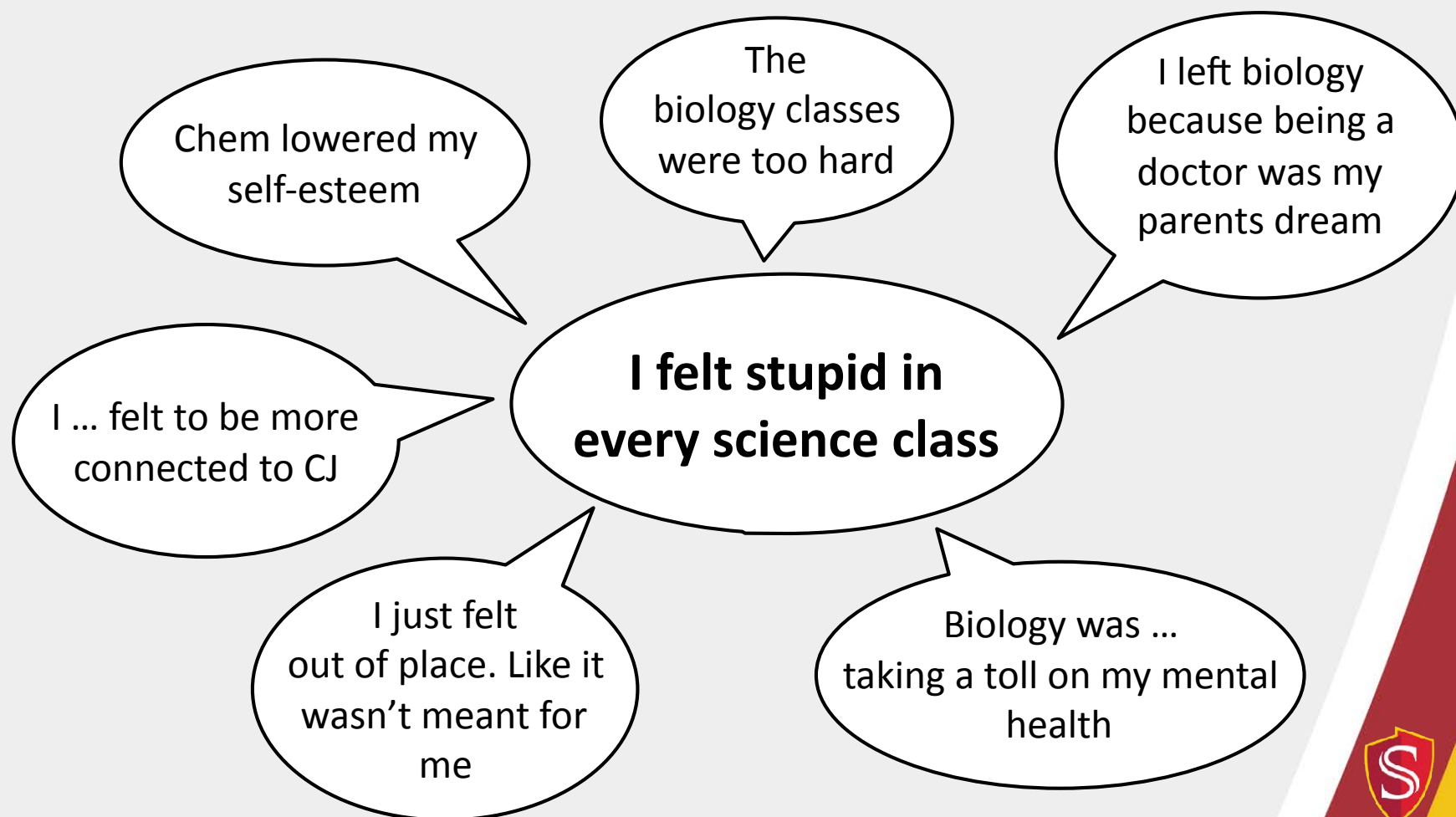


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Change of major survey



Comments from students who left STEM and felt they belonged more in a non-STEM major



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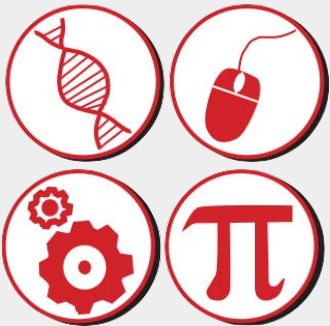
Levels of belonging



- Belonging to Stanislaus State
 - Weak sense of belonging may result in leaving Stanislaus State



- Belonging to STEM
 - Weak sense of belonging may result in leaving STEM, or leaving Stanislaus State



- Belonging to the major
 - Weak sense of belonging may result in switching majors (possible out of STEM), or leaving Stanislaus State

Levels of belonging

- Students may not know about or feel comfortable switching majors
- At Stanislaus State, retention is higher for Hispanic students who switch majors than for Hispanic students who do not



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STEM Success at Stanislaus State



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STEM Success at Stanislaus State



Students Transitioning to Engaged and Motivated Success

FALL 2019

We had a successful third year of our STEM Discovery Academy in Summer 2019. A total of 47 incoming students (29 Freshmen and 18 Transfer) participated in our SDA Session 1 and Session 2. Our students became more familiar with our campus, developed a relationship with faculty and connected with other



Students race their rafts during our boat building activity

STEM major students. The STEM Success staff, 8 student peer mentors and 20 faculty from College of Science worked hard to ensure our students were able to have an educational and exciting STEM Discovery Academy experience. We are so proud of each and every one of our SDA students and are confident they will continue to thrive in their respective STEM majors here at Stanislaus State.



Students programming and interacting with Cozmo robots during our Computer Science activity

[More about SDA on back page]

"SDA helped me to not feel so lost and helped get me excited about my 1st day of college"

- Moira Mendoza, Biology | Freshman



"SDA helped me get to know campus better and be more comfortable with faculty"

- Alex Labra, Computer Science | Transfer



A Message from Dean Evans From the College of Science

For over eight year the STEM Success program is a signature support program for students in the College of Science. This program engages historically underserved students with year round support to persist and success in some of the most challenging majors in the university. Faculty and staff collaborate to help students become immersed

in their disciplines, understand the requirements of their majors, and transfer seamlessly to Stan State. Community college faculty and counselors are critical partners in these efforts, and we appreciate their participation and collaboration.

- Dr. David G. Evans



WOW 2 STEM

Warriors on the Way to STEM (WOW 2 STEM) is the transfer component of STEM Success Grant. Stanislaus State is seeking to expand and improve transfer articulation practices across top 10 regional feeder community colleges to promote STEM transfer pathways.

WOW 2 STEM Peer Mentors

We have two amazing WOW 2 STEM Peer Mentors, Ruben (Physics Major) and Paola (Biology Major), that assist our Transfer Specialist with outreach and student mentoring needs. They also help out with our STEM Discovery Academy in the summer. If you see their friendly faces around campus, we hope you'll wave and say "hello".

"My experience as a WOW 2 STEM Peer Mentor has been so rewarding! I really enjoy connecting with fellow students and discussing career ambitions. In addition, I also enjoy giving advice to students within my majors as well. Being a Peer Mentor has also helped me academically by realizing that a Peer Mentor is also a role model for other students. . ."

- Ruben Hernandez, Physics | Senior



"...I've come to learn and know-how community colleges, its staff, faculty, advisors, and articulators work to ensure educational quality and satisfactory transferring requirements are met."

- Paola Pelayo, Biology | Junior



Meet Our Transfer Specialist

Elizabeth Monroe is a central valley native with a passion for helping students navigate higher education. As a transfer student herself, Elizabeth understands the unique challenges faced by our valley students. She began her educational journey at Modesto Junior College and went on to receive a Bachelor's Degree in Psychology from UC Santa Barbara. She then attended CSU Stanislaus to earn a Pupil Personnel Services Credential. If you are a transfer student in the Biology, Chemistry, Computer Physics majors, please feel free to reach exciting opportunities and services we offer through the STEM Success Program.



Contact our Transfer Specialist to schedule an appointment: emonroe@csustan.edu.

The Commons & STEM Collaboratory

The Commons is a resource center and study space for students. Students can use the tables and whiteboards for study sessions and group work. It also contains



a wide variety of STEM textbooks and professional and academic exam preparation materials such as GRE, MCAT, etc. that are available for students to use. The Commons is located in Naraghi Hall room 124.

STEM Collaboratory provides an environment to support collaboration and cooperation among STEM students and faculty in pursuit of STEM education and research through interaction, communication, and knowledge-sharing. Students

are welcome to use the tables, chairs and whiteboard for study sessions and group work. The STEM Collaboratory space is located on the first floor of Naraghi Hall outside of the Commons (Naraghi Hall room 124).



Say Hello...



Mauricio Miranda
Computer Science | Senior

Mauricio is our STEM Success Peer Mentor and will be available as a resource for STEM students interested in learning more about navigating campus resources and learning about study strategies. He is available in the Commons (Naraghi Hall room 124) on Mondays and Wednesdays from 11:45am-1:45am and on Fridays from 3:15pm to 5:15pm.



STEM Success at Stanislaus State

- Current HSI STEM grant is called Students Transitioning to Engaged and Motivated Success
- STEM Success funds four types of programming to help students develop a sense of belonging to Stanislaus State, to science, and to their STEM major



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Warriors on the Way to STEM (WOW 2 STEM)

Biology

Warriors on the Way to STEM
WOW2STEM

Merced College

The Department of Biological Sciences attracts students who want to study life in all its grandeur. Questions of how living organisms function and evolve are some of the areas of inquiry pursued. Some students pursue a degree in biology in order to conduct basic or applied research. Other students complete coursework required for health professional schools, such as medical school.

How can I participate in WOW2STEM?

- Meet with a STEM counselor each semester at your community college.
- Follow a student educational plan (SEP) as outlined by a STEM counselor.
- Attend presentations and workshops throughout the year.
- Follow application dates and deadlines as directed by the Transfer Advisor and Stanislaus State.

For more information you may contact:
Iqbal Atwal, Transfer Specialist
209.667.3164
iatwal@csustan.edu
www.csustan.edu/STEM-success

What can I do with a degree in Biology?

Where can a Biological Sciences degree take you? Physicians, dentists, pharmacists, nurses, clinical laboratory scientists and physician's assistants all need solid biology backgrounds, as do teachers, veterinarians, plant geneticists, ecologists, podiatrists, horticulturists and entomologists.



Dr. Terry Jones is a professor in the Biological Sciences department at Stanislaus State. His current research consists of studying modern animals to discover the biology of extinct animals.

Biology B.S. Roadmap

Prerequisites to Lower-Division Courses	Lower-Division Courses at Merced College	Major Course Requirements at Stanislaus State
CHEM-04A & MATH-C	BIOL-04A* (The Cell & Evolution)	BIOL 3310—Cellular and Molecular Biology (3 units)
BIOL-04A	BIOL-04B* (Morphology & Physiology)	BIOL 3350—Introductory Genetics (3 units)
CHEM-02A & MATH-C	CHEM-04A** (General Chem I)	BIOL 3680—Ecology (4 units)
CHEM-04A	CHEM-04B** (General Chem II)	BIOL 4400—Evolution (3 units)
CHEM-04B	CHEM-12A*** (Organic Chem I)	Genetics and Biotechnology course (2 units)
MATH-C	MATH-10 (Statistics) or MATH-04A (Calculus I)	Structure and Function course (4 units)
MATH-02 or MATH-2H		Diversity and Systematics courses (8 units)
MATH-02 or (MATH-25 & MATH-26)	PHYS-02A (Gen. Physics I) & PHYS-02B (Gen. Physics II) or PHYS-04A (Basic Physics I) & PHYS-04B (Basic Physics II)	Elective courses (18 units)
MATH-04A PHYS-04A		Or may choose one OPTIONAL concentration: • Organismal, Ecological, and Environmental Biology • Molecular, Cellular, and Microbial Biology

* Approved course articulation with Biology 1050/1150 (BIOL-04A/04B) is accepted as a series only. The Lecture and Lab must be completed at Merced College to receive credit at Stanislaus State.
** CHEM-04A/-04B must be completed at Merced College before transferring to Stanislaus State to ensure timely progress.
*** While CHEM-12A satisfies the Organic Chemistry requirement, it does not count as upper-division units. Upon transfer, an additional four units of upper-division elective units will be required to complete the major.

Last Updated 11/14/2018

Biology B.A. Roadmap

Prerequisites to Lower-Division Courses	Lower-Division Courses at Merced College	Major Course Requirements at Stanislaus State
CHEM-04A & MATH-C	BIOL-04A*	BIOL 3310—Cellular and Molecular Biology (3 units)
BIOL-04A	BIOL-04B*	BIOL 3350 - Introductory Genetics (3 units)
CHEM-02A & MATH-C	CHEM-04A** (General Chem I)	BIOL 3680—Ecology (4 units)
CHEM-04A	CHEM-04B ** (General Chem II)	BIOL 4400—Evolution (3 units)
MATH-02 or (MATH-25 & MATH-026)		Genetics and Biotechnology course (2 units)
PHYS-02A	Complete one sequence: PHYS-02A (Gen. Physics I) & PHYS-02B (Gen. Physics II) or PHYS-04A (Basic Physics I) & PHYS-04B (Basic Physics II) or CHEM-12A*** (Organic Chem I)	Structure and Function course (4 units)
MATH-04A PHYS-04A		Diversity and Systematics courses (8 units)
CHEM-04B		Elective courses (10 units)

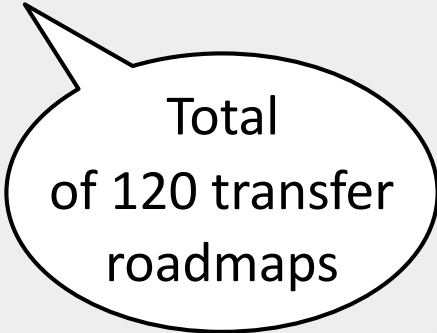
* Approved course articulation with Biology 1050/1150 (BIOL-04A/04B) is accepted as a series only. Both Lecture and Lab must be completed at Merced College to receive credit at Stanislaus State.
** CHEM-04A/04B must be completed at Merced before transferring to Stanislaus State to ensure timely progress.
*** While CHEM-12A satisfies the Organic Chemistry requirement, it does not count as upper-division units. Upon transfer, an additional four units of upper-division elective units will be required to complete the major.

For all degree requirements, visit www.csustan.edu/roadmaps

Last Updated 11/14/2018

Warriors on the Way to STEM (WOW 2 STEM)

- Outreach to potential STEM transfer students at 10 community college partners
- Course articulation agreements and transfer course roadmaps for all 12 STEM degree majors offered at Stanislaus State
- Pre-matriculation degree audits



Total
of 120 transfer
roadmaps



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Natural Sciences 1000 (NSCI 1000)



NATURAL SCIENCES

Schedule of Classes

2019 Fall

Biological Sciences

Census Date is September 19, 2019

Do you want to plan your ideal schedule? Click [here](#) for STAN Scheduler!

CLS NBR	SUBJ	CAT NBR	SEC	COURSE TITLE	UNITS	DAYS	TIME	ROOM	INSTRUCTOR	OPEN SEATS	GRD OPT	MATERIALS	CONSENT	COURSE FEES
41773	NSCI	1000	001	Information Investigation	3	TR	8:00A - 9:15A	N 124	An J	8	OPT	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<i>This class will be held in S 120.</i>														
41774	NSCI	4961	001	Teaching Secondary Science	3	W	6:00P - 8:30P	N 229	Fleming M	11	L	<input type="checkbox"/>	<input type="checkbox"/>	



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Natural Sciences 1000 (NSCI 1000)

- First-year, 3-unit General Education course
- Content was originally similar to a first-year seminar
- Becoming more of a foundational science skills course
 - Students conduct literature reviews and research
 - Findings presented in a poster at end of semester



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STEM Discovery Academy (SDA)



ENGAGING · EMPOWERING · TRANSFORMING

STEM Discovery Academy (SDA)

- 2-week summer immersion program for entering freshmen and transfer students
- Residential for freshmen
- Multiple activity types
 - Discipline-specific (e.g., genetic testing; robot programming)
 - Campus resource introduction (e.g., scavenger hunt)
 - Social (e.g., field trips; boat building; bowling)



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STEM Discovery Academy (SDA)

- Includes psychosocial activities
 - Values affirmation game
 - Hero's journey skit
 - Difference education game
- Students conduct research
- Culminates in poster session



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Research and Immersion for STEM Excellence (RISE)



Using Machine Learning to predict the Quality of Wines

By Giancarlo Garcia Deleon

Method

- #Step 1: Data preparation, transforms and splitting
- #Step 2: Training
- #Step 3: Testing and Validation

Trees and utilizing J48 - a classification algorithm that uses tree-like data structures to model classes and their possible outcomes.

Methods

- Traditional cloning to create new plasmids
- Introduce new plasmid into E.Coli
- Selecting the colonies with antibiotic resistance

Challenge

- How do they maintain a species boundary?

...tion of tree in herbarium.

- ❑ Begin DNA extraction and PCR analysis.
- ❑ Analyze our datasets and construct phylog

• 23 species native to CA (% of species)

Method

future

- Collect more species pairs that are co-occurring, and independent.
- Take more photos
- See if the pattern is consistent

Methods

- ❖ Location
- ❖ Processing/Morphometrics
- ❖ Laboratory processing

By Paola Pelton, The McClellan and Jessica Pacheco-Cardone

Julien Alfaro



Research and Immersion for STEM Excellence (RISE)

- Students in their first two years on campus help faculty conduct research
- Students receive \$14 per hour
- Faculty serve as mentors
- Students can attend and present at professional conferences
- Monthly RISE student meetings include lightning talks, conference debriefs, etc.



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Assessment Methods



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Institutional Records

- Retention at Stanislaus State
- Retention within the major
- GPA
- Major prerequisite courses completed
 - For transfer students only; computed manually
- Total units completed



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Social network analysis survey

- Administered to participants in each STEM Success activity
- Ask how students regard other STEM Success participants:
 - Not a friend
 - Casual friend
 - Good friend
- Ask how often students consult with other STEM Success participants about class material or assignments:
 - Not at all
 - Sometimes
 - Often



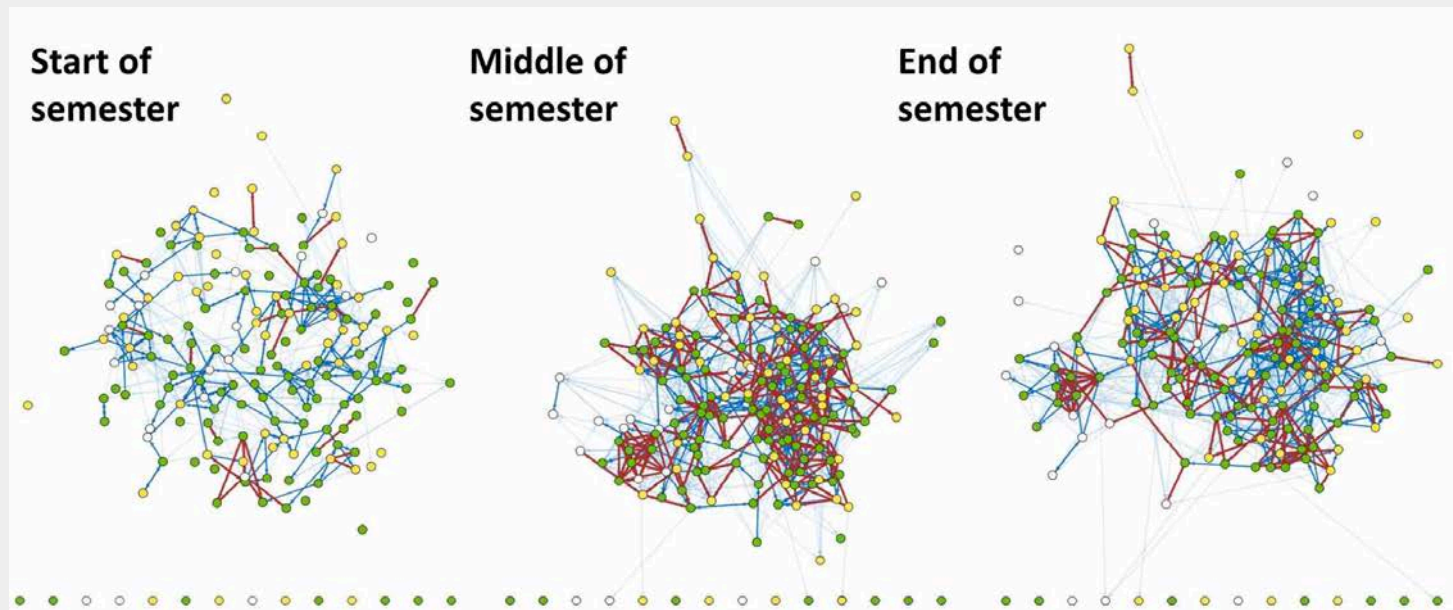
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Social network analysis survey

- Stadtfeld, C., Vörös, A., Elmer, T., Boda, Z., & Raabe, I. J. (2019). Integration in emerging social networks explains academic failure and success. PNAS, 116, 792-797. doi: 10.1073/pnas.1811388115

CAUTION

**AREA UNDER
CONSTRUCTION**



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Start-of-Semester (SoS) survey

- Course-specific questions
- 28 questions about psychosocial factors relevant to academic success and each sense of belonging
 - 12 questions about Stanislaus State
 - 4 questions about STEM
 - 12 questions about the major



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Stanislaus State psychosocial questions

- I'm glad I'm a student at Stan State
- My high school or community college did a good job of preparing me for Stan State
- Setbacks and obstacles I encounter as a student are opportunities for me to learn
- Some students have to work harder than others to succeed in college



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Stanislaus State psychosocial questions

- I am comfortable asking [my major] professors questions
- I have at least one mentor at Stanislaus State
- I have friends and colleagues who can help me succeed at Stan State
- Getting a college degree will help me achieve my life goals
- I am interested in pursuing a graduate degree or certificate



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Stanislaus State psychosocial questions

- I know how to study for an exam at Stan State
- I use an agenda, calendar, or other scheduling tool to help me manage my time
- I know where to go on campus if I need help



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STEM psychosocial questions



- I enjoy conducting research
- I know how to design a scientific study to test a hypothesis
- I can distinguish good scientific work from bad scientific work
- I am confident in my ability to solve mathematical problems



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Major psychosocial questions



- I would like to learn more about careers in [my major]
- Careers for students who major in [my major] pay well
- Professionals who work in [my major] have fun
- I can write a scholarly paper in [my major]
- I can read scholarly papers in [my major]
- It's important for undergraduates in [my major] to conduct research



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Major psychosocial questions

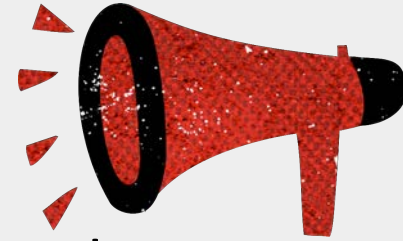


- I enjoy learning about [my major]
- Succeeding in [my major] requires a special talent that can't just be learned
- I am confident that I will complete an undergraduate degree in [my major]
- I have the skills needed to succeed in [my major]
- I feel like I belong in [my major]
- The faculty in [my major] at Stan State support me



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SoS recruitment methods



- Administered during first few weeks of semester
- Fall 2018 through Fall 2019: Instructors volunteer their courses for inclusion and provide their students with a survey link
- Spring 2020: Individualized survey invitation emailed to all students enrolled in at least one College of Science



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SoS consent page



College of Science Course Survey

Dear Student:

You are invited to complete a survey for research purposes. The survey responses will be used for a grant that is funded by the U.S. Department of Education. The survey will be administered by [redacted] and the evaluator of the grant [redacted] rates for students majoring in [redacted] demographic groups that offer [redacted] a science or mathematics major [redacted]

This survey will ask several questions about [redacted] specific courses in which you [redacted] in learning and the grade you [redacted] have been suggested by your [redacted] you more generally. For example, [redacted] completing your current major [redacted] campus community. You are welcome [redacted] prefer not to answer. The survey [redacted]

Some instructors of College of Science courses will be notified of the survey. Some students who complete this survey will be notified of the survey.

However, **all survey findings will be reported only in an aggregated (combined) manner that prevents your instructors and other people from learning your individual responses.** The survey findings should be available by September 30, 2020. If you would like to receive a copy, you may contact Dr. Stanislaw (see below for contact details). The survey findings may also be posted on the STEM Success web page (www.csustan.edu/STEM-success).

If you have any questions about this study, please phone Dr. Harold Stanislaw at (209) 667-3213, or email HStanislaw@csustan.edu. If you have any questions regarding your rights and participation as a research subject, please phone the UIRB Administrator at (209) 667-3784, or email IRBAdmin@csustan.edu.

How would you like to proceed? If you're willing to complete the survey, please indicate if your responses can be used for research relating to the Department of Education grant. Your College of Science instructor(s) will be informed that you accessed the survey, but they will not learn about your individual response to this or any other survey item.

I'd like to **opt out of this survey**

I'll complete the survey, but **don't use my responses for research**

I'll complete the survey, and you can **use my responses for research**

SoS major identification



What is your major? **If you have two majors, please select just one.**

Biology (including Undeclared with a Biology interest)

Business

Chemistry

Computer Science

Criminal Justice

Geology

Kinesiology (including Undeclared with a Kinesiology interest)

Liberal Studies

Mathematics

Nursing (including Undeclared with a pre-Nursing interest)



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SoS course enrollment



Are you **still enrolled** in these College of Science courses?

	Yes	No
BIOL 3100 (Biological Illustration)	<input checked="" type="radio"/>	<input type="radio"/>
CDEV 3550 (Early Interv High-Risk Child)	<input checked="" type="radio"/>	<input type="radio"/>
MATH 4530 (Abstract Algebra)	<input checked="" type="radio"/>	<input type="radio"/>
MBIO 4300 (Medical Microbiology)	<input checked="" type="radio"/>	<input type="radio"/>

College of Science courses have these prefixes:

ASTR	CHEM	HSCI	NURS
BIOL	COGS	MATH	PHYS
BOTY	CS	MBIO	PSYC
CDEV	GEOL	MSCI	ZOOL

Are all of your College of Science courses for this semester listed above?

Yes

No



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SoS course enrollment



Here are your College of Science courses:

BIOL 3100 (Biological Illustration)

CDEV 3550 (Early Interv High-Risk Child)

MATH 4530 (Abstract Algebra)

MBIO 4300 (Medical Microbiology)

You can add up to eight missing College of Science courses to this list.

To add a course you are taking this semester that is not list above, select the course prefix for the missing course, and then select the course description.

Add a missing College of Science course

Course prefix

Course description

Add a missing College of Science course

Course prefix

Course description



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SoS psychosocial items



Please indicate how strongly you agree with each of the following statements, on a scale of 1 (strongly disagree) to 7 (strongly agree). This survey is designed for students ranging from incoming freshmen to graduate students. Don't feel embarrassed or concerned if some of your responses aren't where they "should" be! **There are no right or wrong answers, just YOUR answers.**

	Strongly disagree 1	2	3	Neither agree nor disagree 4	5	6	Strongly agree 7
I can write a scholarly paper in Chemistry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My high school or community college did a good job of preparing me for Stan State	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have the skills needed to succeed in Chemistry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Succeeding in Chemistry requires a special talent that can't just be learned	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



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SoS time demands



**How many hours per week do you typically spend on the activities below?
Your hours may vary from one week to the next; please provide your best
estimate based on an "average" week.**

Attending classes	<input type="text" value="15"/>
Studying or doing academic work outside of class	<input type="text" value="6"/>
Commuting to and from campus	<input type="text" value="10"/>
Working for pay	<input type="text" value="15"/>
Volunteering	<input type="text"/>
Family commitments, such as caring for parents or children	<input type="text"/>
Exercising or participating in sports	<input type="text"/>
Relaxing (alone, with friends or family, etc.)	<input type="text"/>
Sleeping	<input type="text"/>
Other hours (please include description of activities)	<input type="text"/>



SoS course- specific questions



What grade do you think you will receive in MATH 4530 (Abstract Algebra)?

A	B	C	D	F	Credit	No credit
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What would you most like to learn about in MATH 4530 (Abstract Algebra)?

What, if anything, concerns you most about taking MATH 4530 (Abstract Algebra)?



SoS final items



Briefly describe your dream career or profession, and why it appeals to you.

If you'd like to make any comments about this survey or your classes, here's your chance!



SoS confirmation page



Thank you for accessing the Spring 2020 College of Science start-of-semester survey!

All of your College of Science instructors will be automatically notified of your student ID number, in case they are awarding extra credit for responding to the survey. However, your instructors will NOT learn any of your individual responses; only that you accessed the survey.

You may wish to print or take a screen shot of this page, as confirmation that you accessed the survey.

March 6, 2020
13:50:27



Sharing Findings



Stanislaus
State

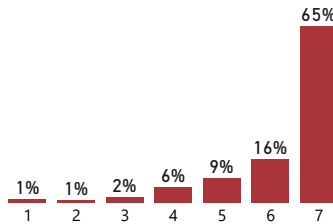
Distribution of findings

BIOL	CDEV	CHEM	COGS	CS	GEOL	MATH	MBIO	No Class	NURS	PHYS	PSCY	PSYC	PSYCH	ZOOL						
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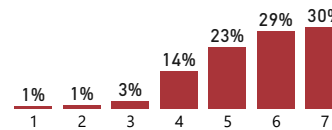
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Total Responses
1237

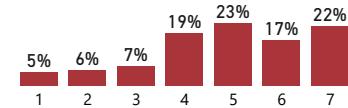
I am confident that I will complete an undergraduate degree in my major



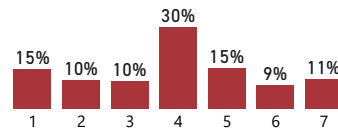
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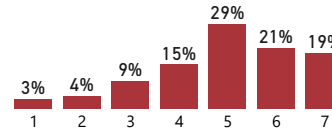
My high school or community college prepared me well



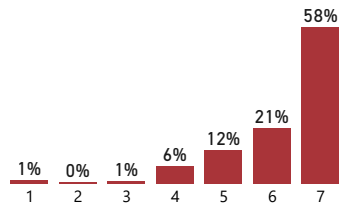
Succeeding in my major requires a special talent that can't be learned



I am confident in my mathematical abilities



Some students have to work harder than others to succeed



Distribution of findings

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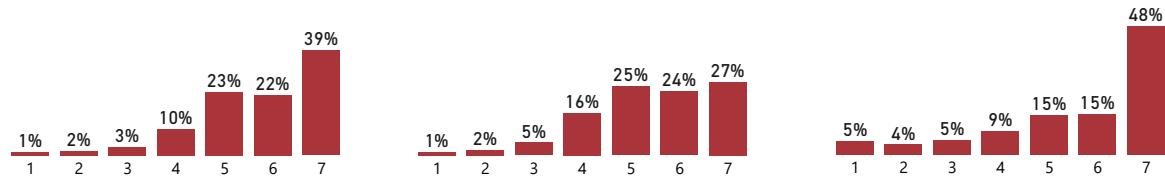
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Setbacks and obstacles I encounter as a student are opportunities to learn

I know how to study for an exam at Stan State

I use an agenda, calendar, or other scheduling tool



Activity	Average of Hours
Sleeping	34.6
Working for pay	14.3
Studying or doing academic work outside of class	13.1
Attending classes	12.7
Relaxing (alone, with friends or family, etc.)	12.3
Family commitments, such as caring for parents or children	9.9
Exercising or participating in sports	4.3
Commuting to and from campus	3.6
Volunteering	1.3

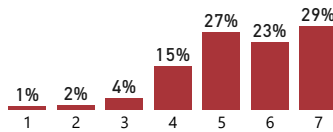
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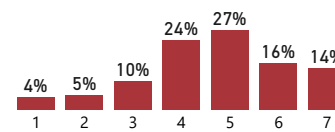
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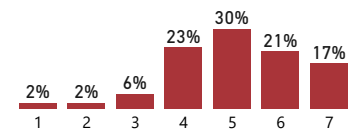
I can read scholarly articles in my major



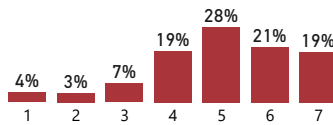
I can write a scholarly paper in my major



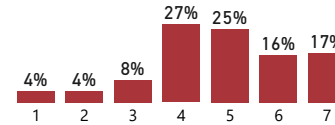
I can distinguish good science from bad science



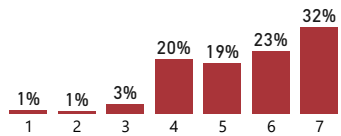
I know how to design a study to test a hypothesis



I am confident in my mathematical abilities



It's important for undergrads in my major to conduct research



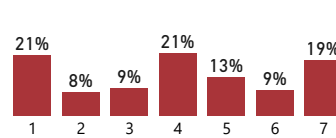
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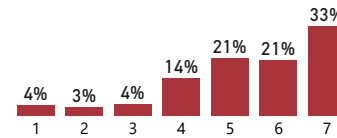
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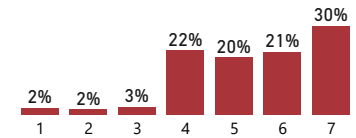
I have at least one mentor at Stan State



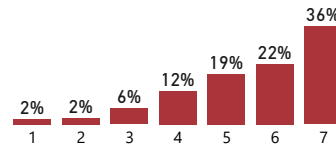
I have friends and colleagues who can help me succeed



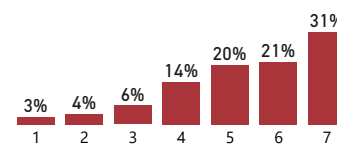
The faculty in my major support me



I am comfortable asking professors questions



I know where to go on campus if I need help



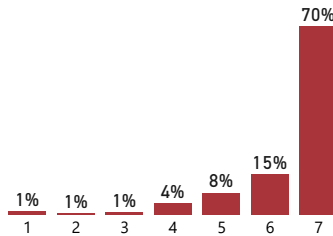
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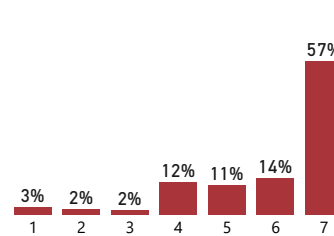
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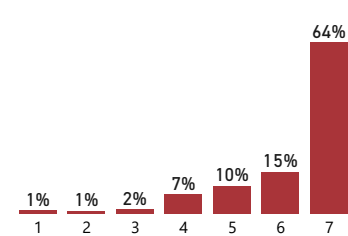
Getting a college degree will help me achieve my life goals



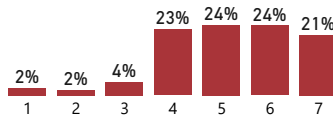
I am interested in pursuing a graduate degree or certificate



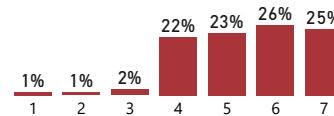
I would like to learn more about careers in my major



Careers for students in my major pay well



Professionals who work in my major have fun



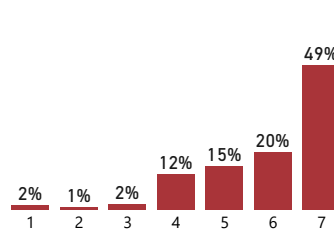
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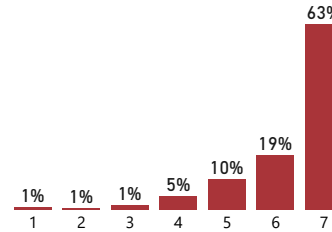
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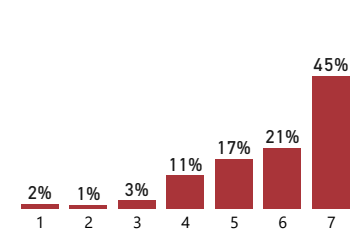
I'm glad I'm a student at Stan State



I enjoy learning things in my major



I feel like I belong in my major



Major*	# of students	Percent
Undeclared	18	1.5%
Sociology	22	1.8%
Social Sciences	11	0.9%
Psychology	335	27.1%
Physics, Physical Sciences & Geology	17	1.4%
Other	9	0.7%
Nursing	88	7.1%
Mathematics	14	1.1%
Liberal Studies	59	4.8%
Kinesiology	55	4.4%
Criminal Justice	39	3.2%
Computer Science	123	9.9%
Child Development	41	3.3%
Chemistry	44	3.6%
Business	38	3.1%

* Students with two majors were asked to select just one of those majors in answering this question.

Distribution of findings



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An	Barnes	Bianchi	Bissonnette	Carter	Cortez	Cotter	Cover	Emerson												

Total Responses

1237

If you go on to pursue a graduate degree or certificate, which field(s) would you study?

- zoology
- waterborne pathogens
- Veterinary Medicine/Science
- Veterinary medicine
- Veterinarian
- vet
- Urban Planning
- unsure
- Undeclared
- Undecided
- Ultrasound tech
- Toxicology
- The Medical Field
- Technology
- Teaching Credentials, M.A. School Counseling, Ed.D in education administration or Ph.D in History of

Briefly describe your dream career or profession, and why it appeals to you.

- Zoo Veterinarian because I want to help rescue and release animals.
- Working with the environment and working to conserve it. It's important to keep our ecosystems intact.
- Working with premature babies in the NICU. I really enjoy children and being able to combine working with babies and nursing seems like something I would enjoy doing especially with newborns.
- Working with people, helping people. Either in the medical field or as a social worker.
- Working with people who need help for a good duration of time as well as maintaining days off, a stress-free work environment, and decent pay.
- Working with kids
- Working with families, children, and individuals in a therapeutic setting
- working with adolescence
- Working on video games because I have a passion for playing and the work that goes into it
- Working on research programs, that involves new tech, and maybe write or designing programs for that tech.
- Working in sports such as a sports therapist or trainer because I love sports and working with people
- Working in robotics at a larger company or owning my own business
- Working in office

If you'd like to make any comments about this survey or your classes, here's your chance!

-
- I just want to learn and pass my classes. - Be more social. -Less afraid of taking big steps.
- I thought this was interesting.
- ...
- :)
- :^)
- 1-7 feels like to many choices
- A simple survey I enjoyed taking
- All my biology professors seem supportive.
- All my psych classes are pretty well taught the only thing is I wished there was more explaining and comparing between terms being learnt because it can be very confusing. just wishing everything would tie in better.
- Although I don't have a class with professor Gardner this semester. He is a really great professor.
- Any professor who says people don't usually pass this course. Work on how you lecture
- As a new transfer student, I am very excited to learn about the various fields of psychology at Stan State!
- As someone who is repeating the course, I still feel this pressure when it comes to quizzes or exams in this class specifically.
- Biology 1050-009

Distribution of findings

BIOL		CDEV		CHEM		COGS		CS		GEOL		MATH		MBIO		NURS		PHYS		PSYC		ZOO	
1000	1010	1050	1110	1500	2010	2020	2030	2110	2250	2310	3000	3010	3310	3350	3400	3550	3600	3680	3700	3750	3790	3800	
An		Barnes		Bianchi		Bissonnette		Carter		Cortez		Cotter		Cover		Emerson		Ferriz					

What grade do you think you'll receive?	Count of Responses
A	673
B	506
C	95
Credit	6

What would you most like to learn about?

Wildlife
 Why we think and act a certain way during certain phases in our lives.
 Why we act the way we do.
 Why us humans are easy controlled by lust
 Why the brain functions the way it does, why people do what they do
 Why people make impulsive decisions
 Why people have abnormal behaviors? What exactly are abnormal behaviors? Does it relate to the chemical procured in our brain or does our environment have more of an influence in abnormal behaviors?
 Why people do what they do.
 why people care about sex so much
 Why people behave in certain ways
 Why our brains do what they do, and what we can do as individuals to help those in need
 Why is there so many different kind of forces in chemistry
 Why I have to take it to be a Physical Therapist!
 Why Biology is important for everyone to learn. I want to actually learn from this class, not just pass for my G.E.
 when will we assimilate alien genetics with our own, transcending as a species.

What, if anything, concerns you most?

As of right now the only thing that concerns me is the final exam and how it will look.
 Being overwhelmed with creating papers for the class because I'm taking 17 units for this semester, but that was my choice.
 I want to get a good grade, so I hope it won't be too challenging.
 Nothing. It seems like an enjoyable and fun class.
 A concern that I have for this course would be learning difficult concepts.
 A full online class, as it is my first online class and I do not know what to expect fully.
 A little nervous the content may be dense (heavy)
 a lot of reading.
 All the clicker questions
 All the math and variables to keep track of. That stuff's wack.
 Almost everything, especially DNA structures.
 Amount of time I will be spending in the class
 Anything revolving around calculations.
 As a sexual behavior class, I'm concern with some of the topics may appear as overly crude.
 As mentioned before I am uninformed on computers and programming and not great at math.
 At most it would be that the workload is more than my other 4 classes combined, but that is fine by itself as I will still at least try to get them done.

Distribution of findings

Total Responses

1237

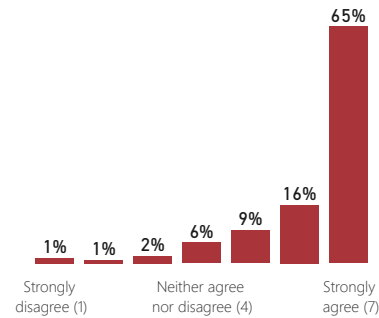
Major Department

College of Arts, Humanities and Social Sciences
College of Business Administration
College of Education, Kinesiology & Social Work
College of Science
Undeclared

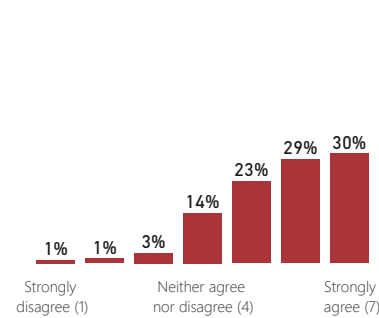
Major

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Psychology
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Other

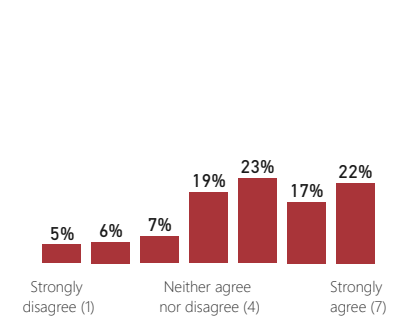
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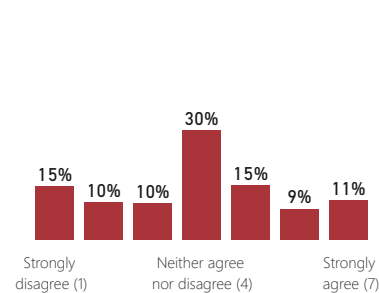
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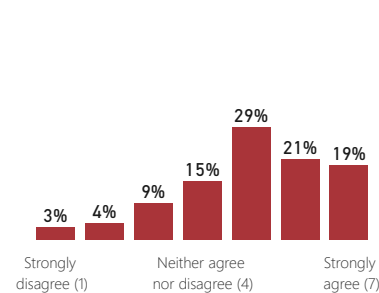
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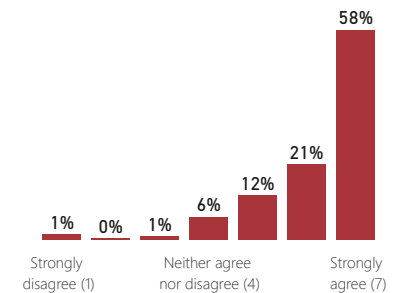
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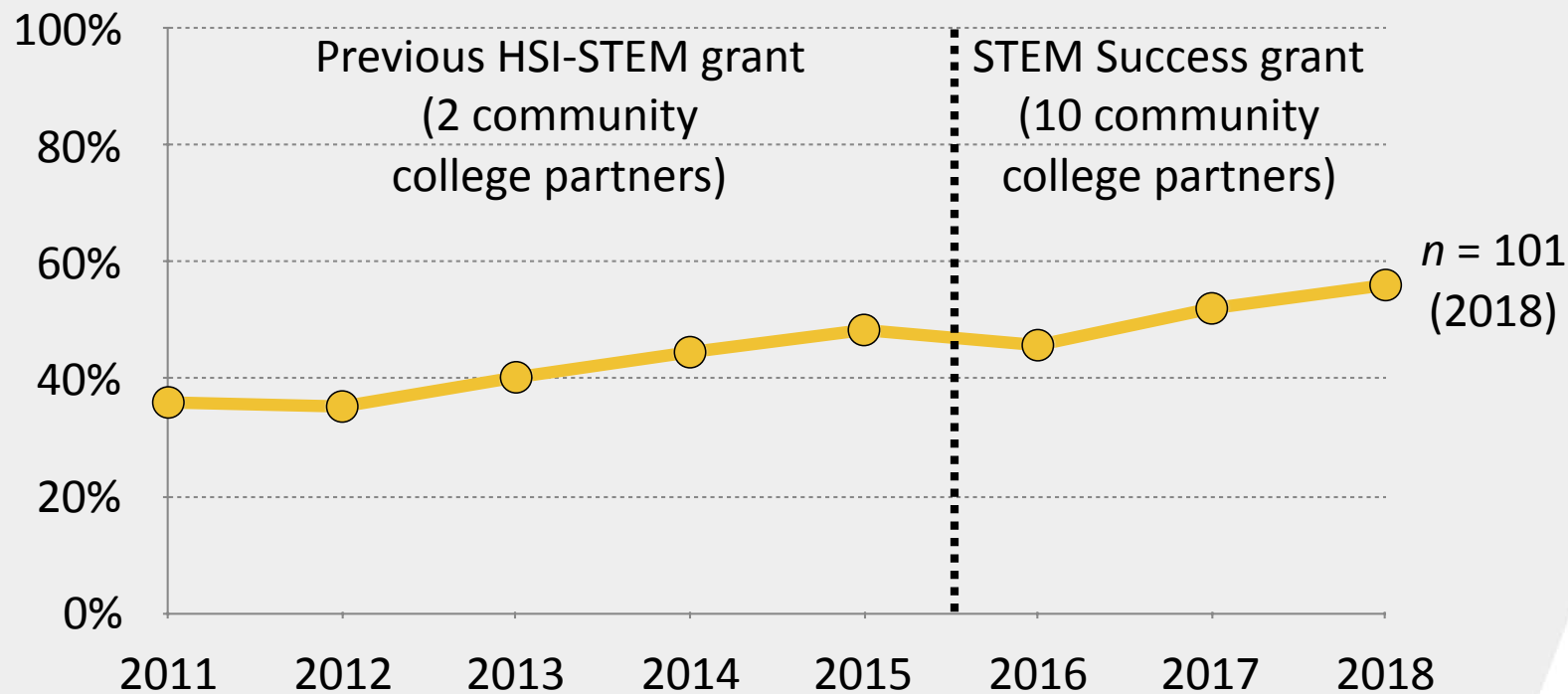
Program Outcomes



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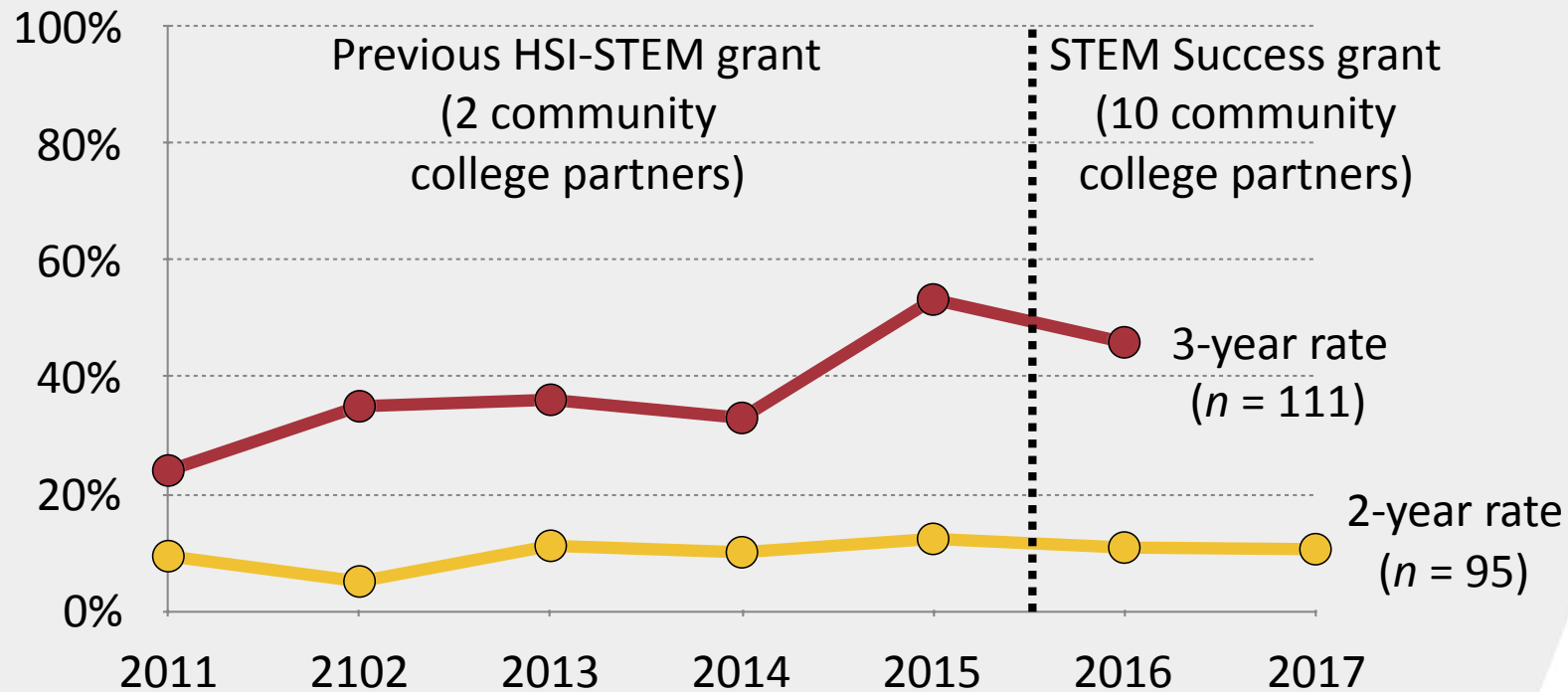
WOW 2 STEM: Prerequisites completed

- Gateway course completion rates at entry for transfer students in target population



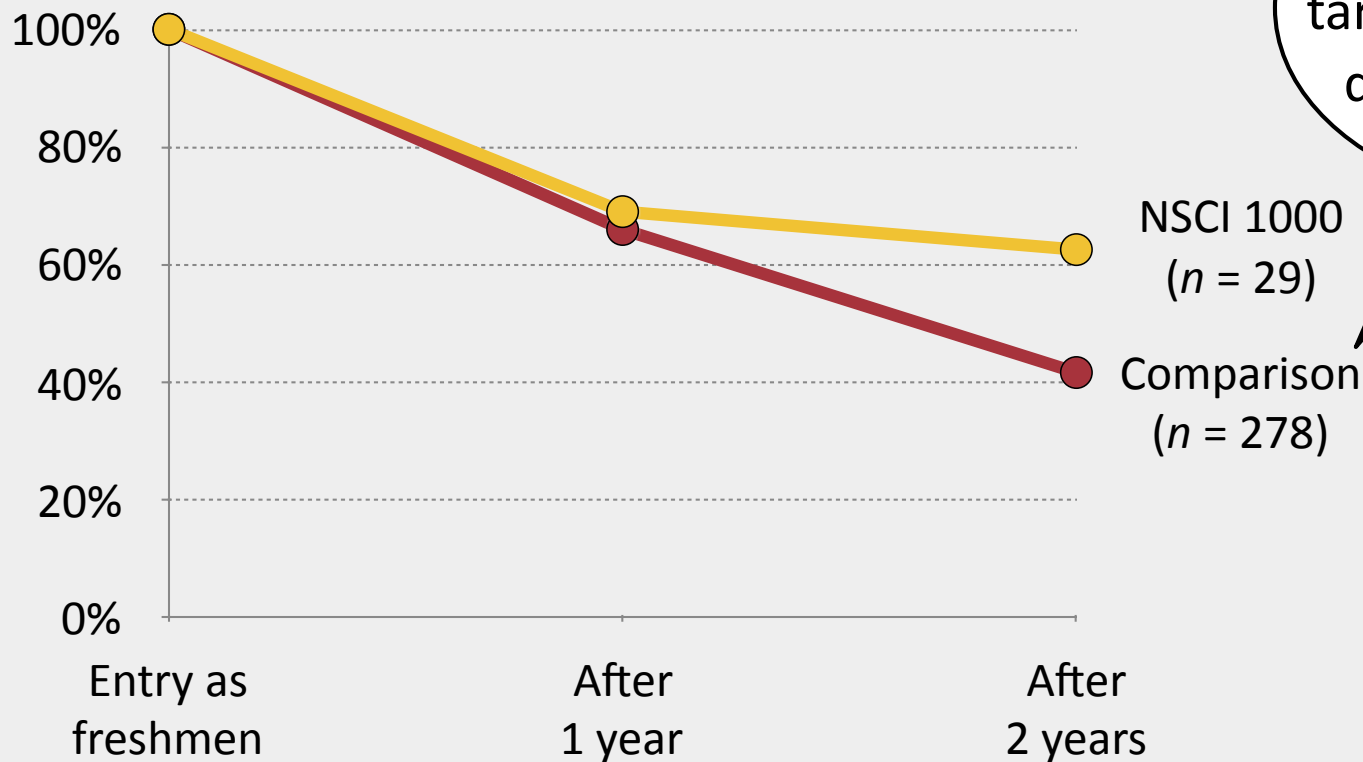
WOW 2 STEM: Graduation rates

- 2- and 3-year graduation rates for transfer students in target population



NSCI 1000: Persistence in STEM

- Percentage of entering students who remained enrolled and in STEM

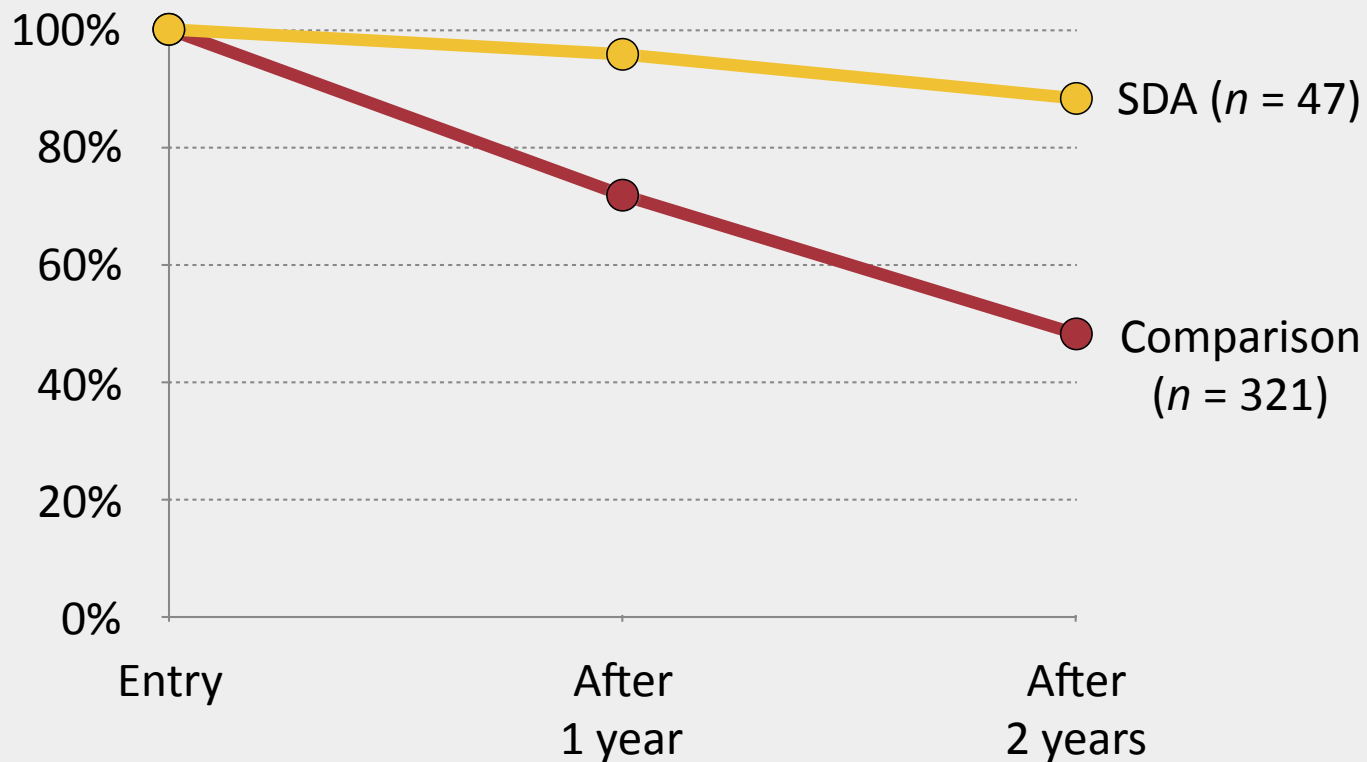


STEM majors in target population who did not participate



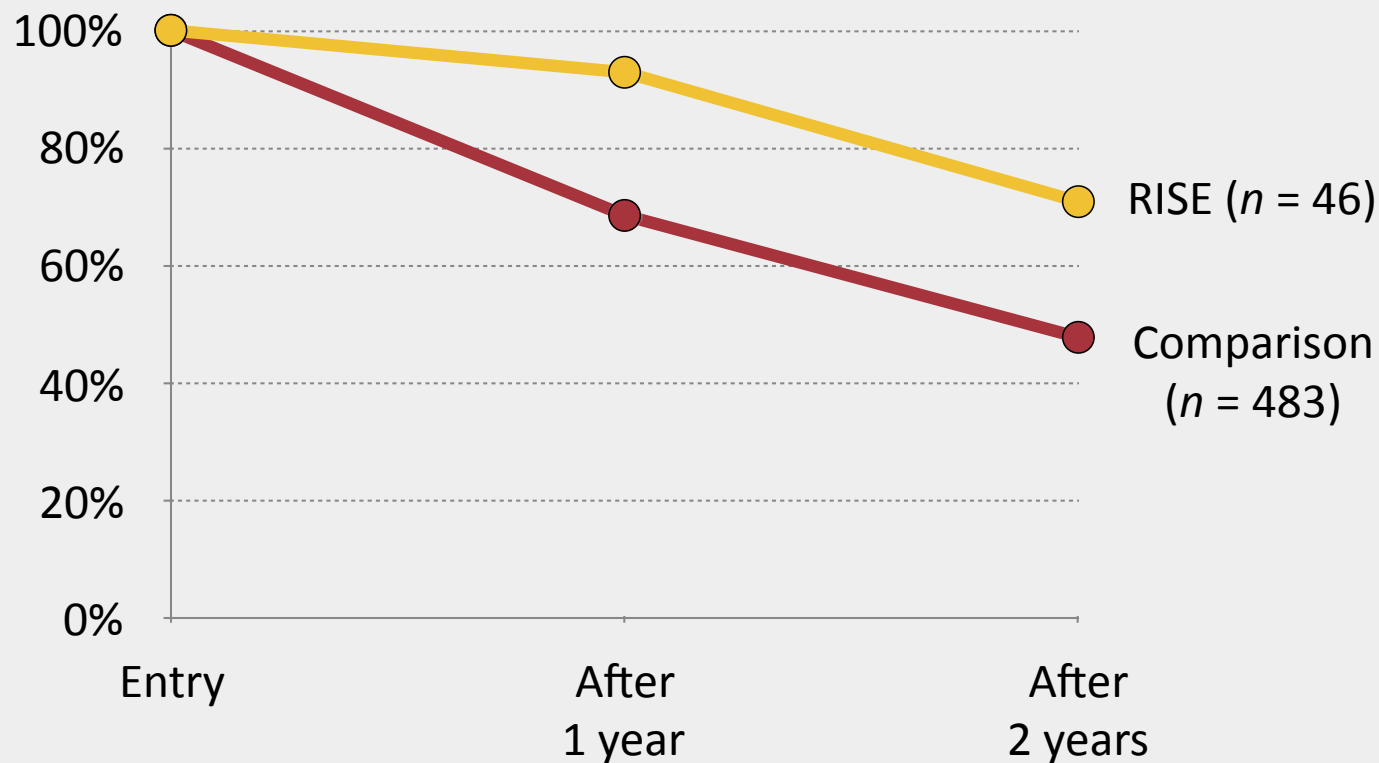
SDA: Persistence in STEM

- Percentage of entering students who remained enrolled and in STEM



RISE: Persistence in STEM

- Percentage of entering students who remained enrolled and in STEM



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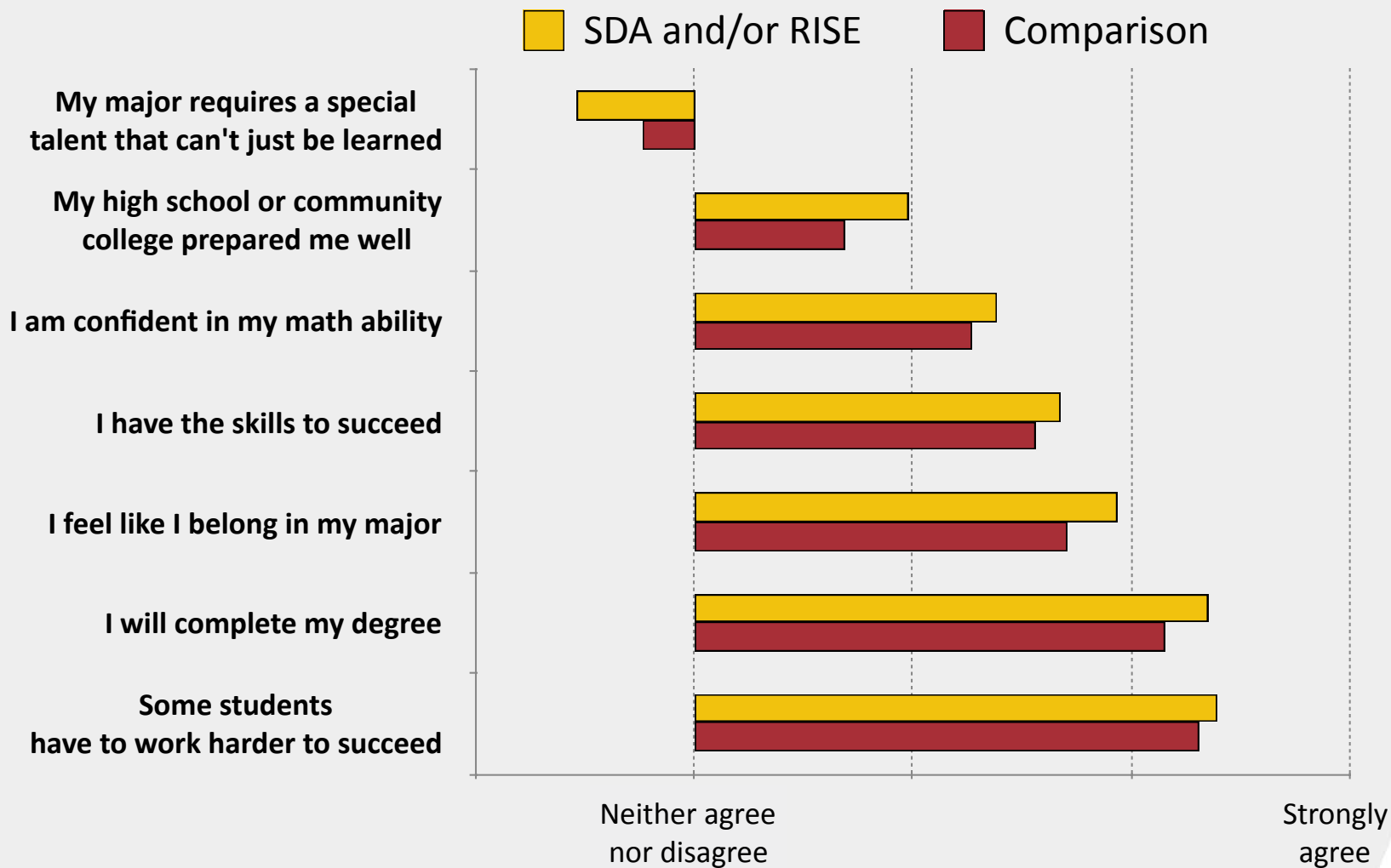
Psychosocial factors

	Sample size	Biology majors
SDA only	$n = 29$	66%
RISE only	$n = 48$	38%
Both SDA and RISE	$n = 34$	29%
Total STEM Success*	$n = 111$	42%
Comparison group	$n = 708$	63%

*Excludes WOW 2 STEM and NSCI 1000 (insufficient data)

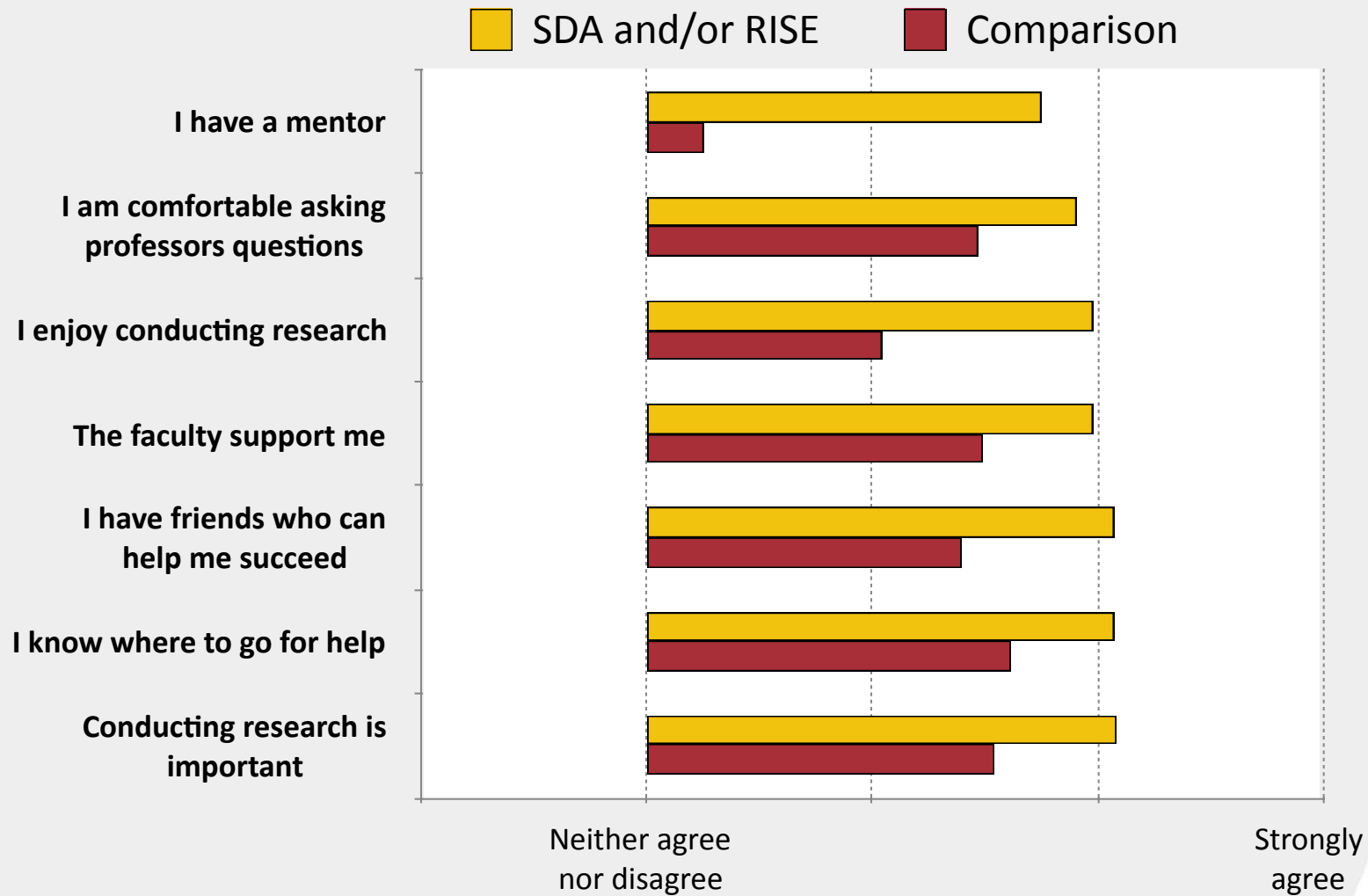


Non-significant psychosocial impacts ($p > .05$)

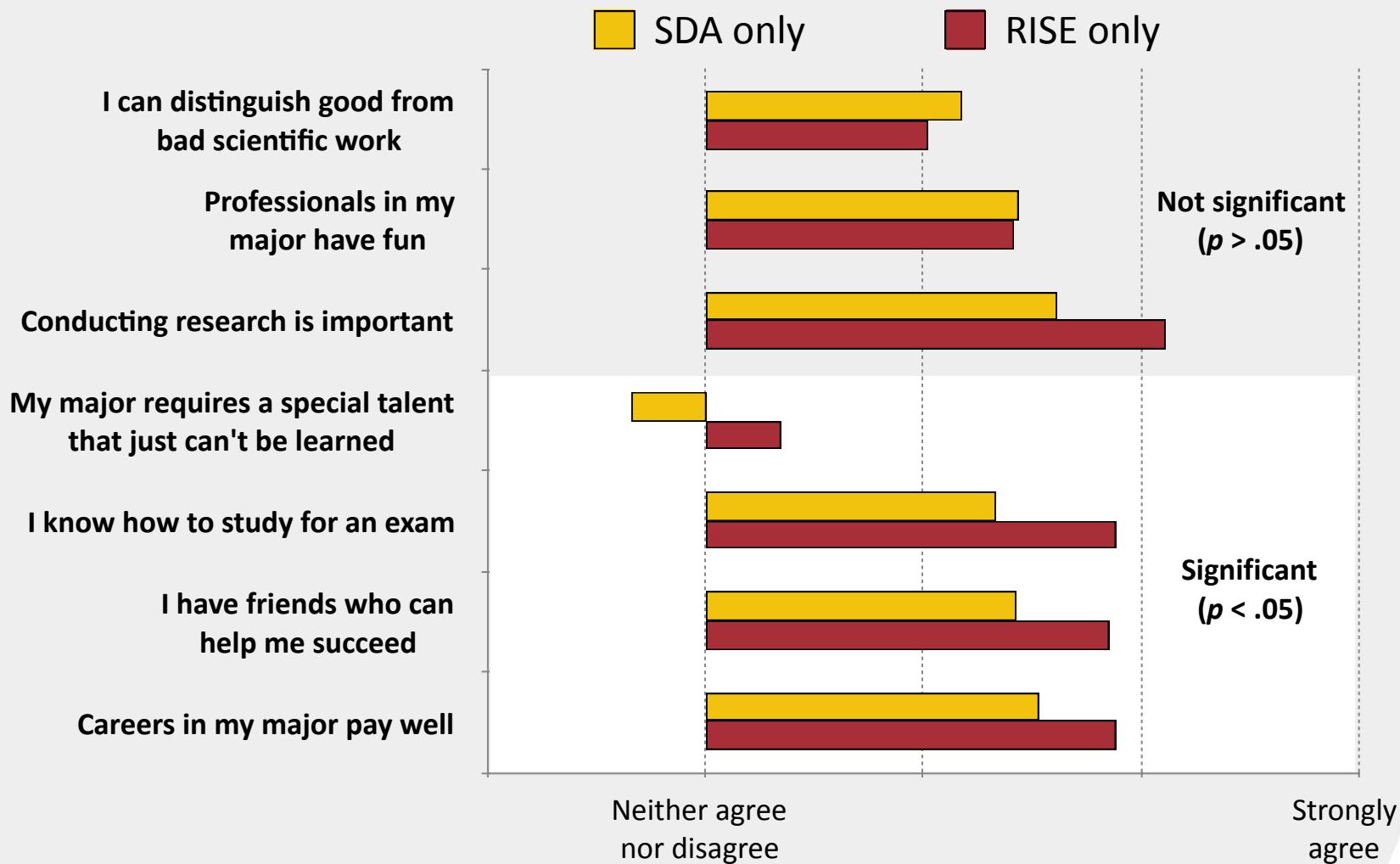


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Significant psychosocial impacts ($p < .05$)



Differential impacts of SDA and RISE



“Because I participated in RISE ...”

... I learned a lot more about my major

... many more doors will open for me

“If someone asks me about RISE, I’ll say ...”

... It is a great experience that allows you to learn as well as gain new relationship

... it’s a great program for student with desires to become scientist



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“RISE made me realize ...”

... different types of research opportunities we have & confirmed the major we chose for us

... that theirs [sic] more to being a STEM major

... I could find friendship among my coworkers and mentors



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Key Findings and Next Steps



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Key findings

- Since WOW 2 STEM began, transfer students arrive having completed more gateway courses, and have higher 3-year graduation rates
- STEM Success participants are more likely to remain in STEM
 - NSCI 1000 may be less effective than SDA and RISE in retaining students in STEM



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Key findings

- Participants in SDA and/or RISE have stronger psychosocial scores than students who do not participate in STEM Success
 - More likely to enjoy and endorse conducting research
 - More likely to be supported by a mentor or friends
 - More comfortable seeking help



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Key findings

- SDA and RISE have mostly similar retention and psychosocial benefits
 - SDA students have more growth mindset
 - RISE students more confident in their exam-taking skills; report more support from friends; more likely to believe their future careers will pay well
- There are no added benefits to participating in both SDA and RISE; one activity suffices



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Next steps

- Involve community college students in collaborative research before they transfer to Stanislaus State
- NSCI 1000 needs further revision
 - May be used to institutionalize a non-residential, in-semester form of SDA
- May replace RISE with a CURE for entering students
 - Are entering students ready to conduct authentic research, as opposed to running canned labs?



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Unexplored options

- Involve the family
 - Especially important for discussions about switching majors
- Students want to see how their classes relate to their future careers
 - Mention career relevance in classes
 - Link students to professionals



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Thank you!

www.csustan.edu/STEM-success



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