

# *STEM Mentoring Program: Proactive and Holistic Advising to Promote Student Success*

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# Outline for Today's Talk

- Goals of the STEM Mentoring Program (SMP)
- Program Evolution over 5 Years—best practices developed
- Data and Discussion
- Analyze New Model for SMP in NSF funded grant
- Next grant model proposed and Institutionalization of Best Practices in Mentoring

# Mercy College STEM Mentoring Program

Design and implement a **data-driven, active outreach advising** and support program where **faculty, peer, and professional advising** provide **personalized pathways** to graduation and success for STEM majors

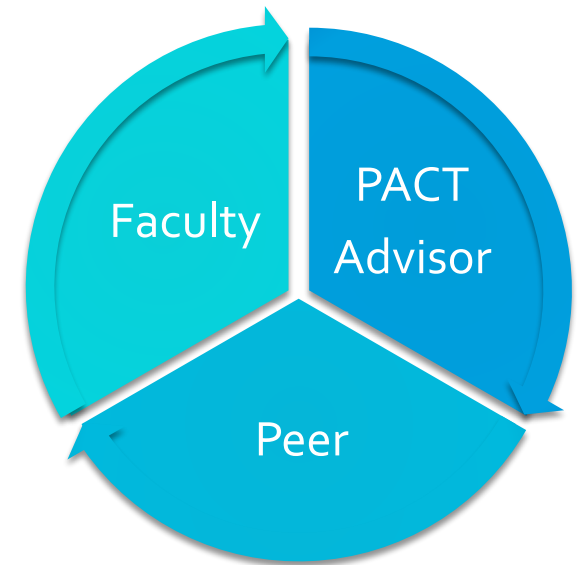
- Goals–increase STEM identity and efficacy:
  - increase retention of STEM students
  - persistence in STEM major
  - increased academic achievement
  - help ensure co-curricular engagement
  - support growth mindset and metacognitive skills

# Benefits of Mentoring for the Mentee

- First-generation students gain access to information (Parks-Yancy, 2012).
- Mentees learn time management and study skills (Salinitri, 2005).
- Development of professional identity (Murdock, Stipanovic, & Lucas, 2013).
- At risk, first-year undergraduates who were mentored had higher retention rates, than a control group (Salinitri, 2005).
- Minorities enrolled in STEM majors reported that their mentors made them feel “safe, comfortable, and supported” (Kendricks & Arment, 2011) and attributed their academic success to their mentorship (Kendricks, Nedunuri, & Arment, 2013).

# Features of the STEM Mentoring Program

- Growth mindset focused advising
- Intrusive advising (proactive)
- Focused—increase identity and efficacy in STEM (workshops, trips)
- Tri-Point Advising model:
  - faculty—help build scientific identity & efficacy for STEM students
  - peer—serve as role models and source of information for STEM students
    - Synergy between peer and faculty mentor
  - college/professional advisor—help with scheduling classes, financial aid



# Tactics of the STEM Mentoring Program

- Establish the mentoring relationship
- Recruit the right faculty and peer mentor
- Focused training for faculty and peer mentors
- Workshops and field trips
- Assessment and modification of program tactics

# Recruit the Right Mentors

- Each STEM major needs a faculty and peer mentor
- Need student-centered faculty
- Need peer mentors who are inspirational role models
- Goal is to create a learning community among the mentors



# Guiding Principles for Training

- Faculty & Peer Mentor roles
- Proactive/individualized mentoring
- Growth Mindset focus
- Essential strategies of mentoring

**psychology**  
**cybersecurity**  
**computer science**  
**STEM**  
science technology engineering mathematics  
**computer information systems**  
**mathematics**  
**biology**



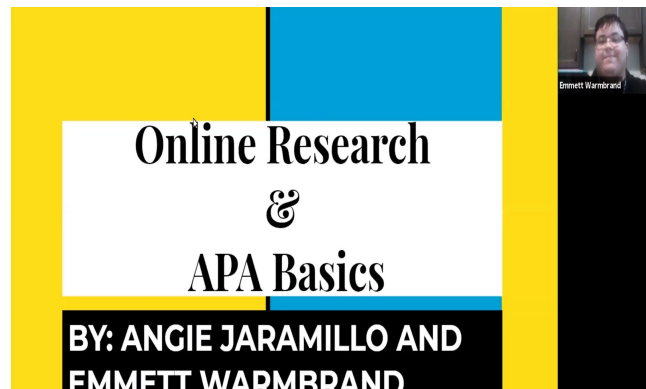
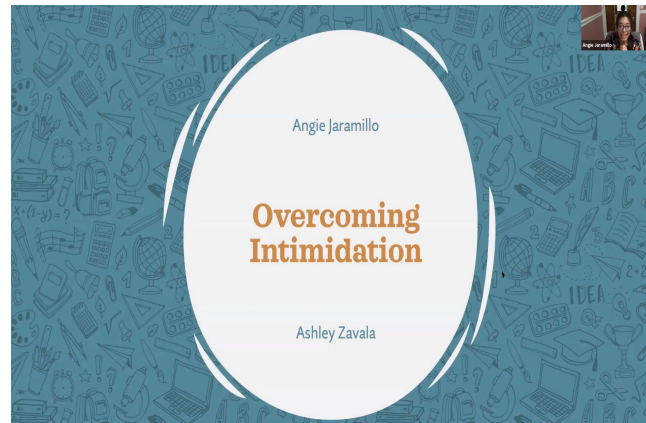
# Faculty & Peer Mentor Training

- Growth Mindset
- Metacognition
- Mentoring Strategies
- Virtual Mentoring Strategies
- EAB (faculty only)
- Peer Mentor Course
- Peer Mentor Virtual Training



# Mentee Workshops and Events



- Events:
  - Career panels
  - Drop-in hours
  - Ice cream social
- Workshops:
  - Online Research & APA Basics
  - Time Management
  - Growth Mindset
  - Metacognition
  - Study Strategies
  - Overcoming Intimidation
  - Excel Basics



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**Dr. Carolyn Cullen     Dr. Jack Simons**





# Field Trips

- Goal is to gain participation in the program, promote STEM identity, and a sense of community and belonging among mentees.

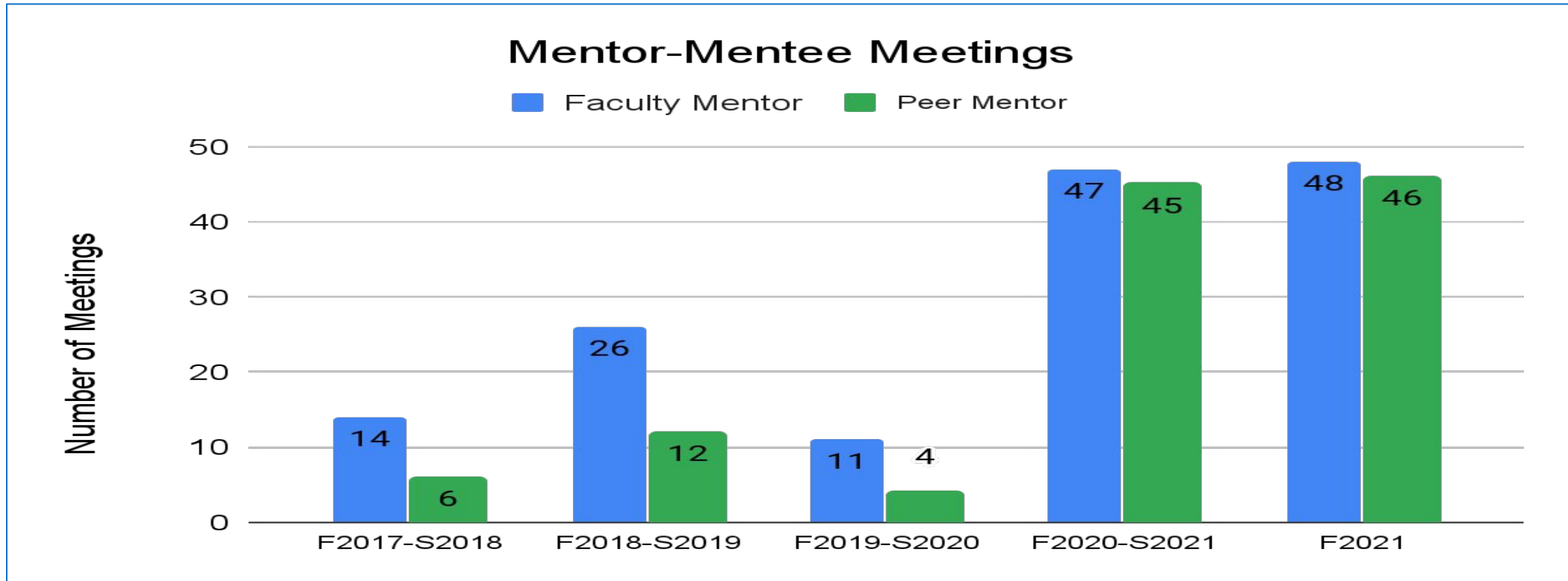


# Assessment

- Developed an assessment plan to collect and analyze data to inform success, efficacy, and evolution of program.
- Instruments
  - mentor checklists (monthly)
  - mentee assessment: beginning and end of year surveys
  - peer mentor assessment: focus group, survey
  - faculty mentor assessment: focus group, survey
- Internal and external evaluators

# Engagement with Mentees

- The goal is to develop a strong relationship with the mentees



-Opt-in year  
-Only 33 Freshmen  
-N=33, 42% FM, 18% PM

-Opt-out year  
-N=75, 35% FM, 16% PM

-Most meetings in F2019  
-Covid S2020  
-Included sophomores S20  
-N=194, 6% FM, 2% PM

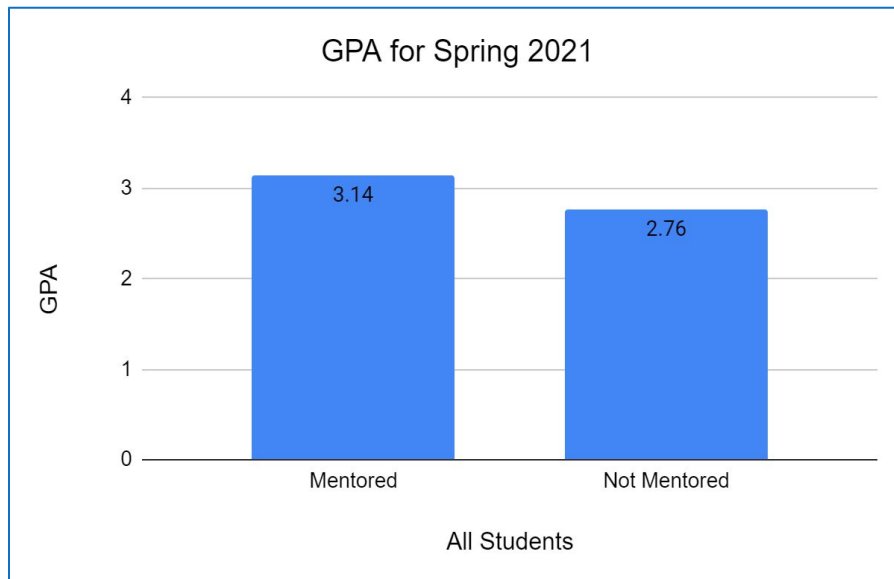
-New engagement strategies  
-More texting/virtual meetings  
-Peer-led workshops  
-Increase in Instagram presence  
-20-21: N=414, 11% FM, 11% PM  
-Fall 2021: N=435, 11% FM, 11% PM



# Effects of the STEM Mentoring Program on Mentees

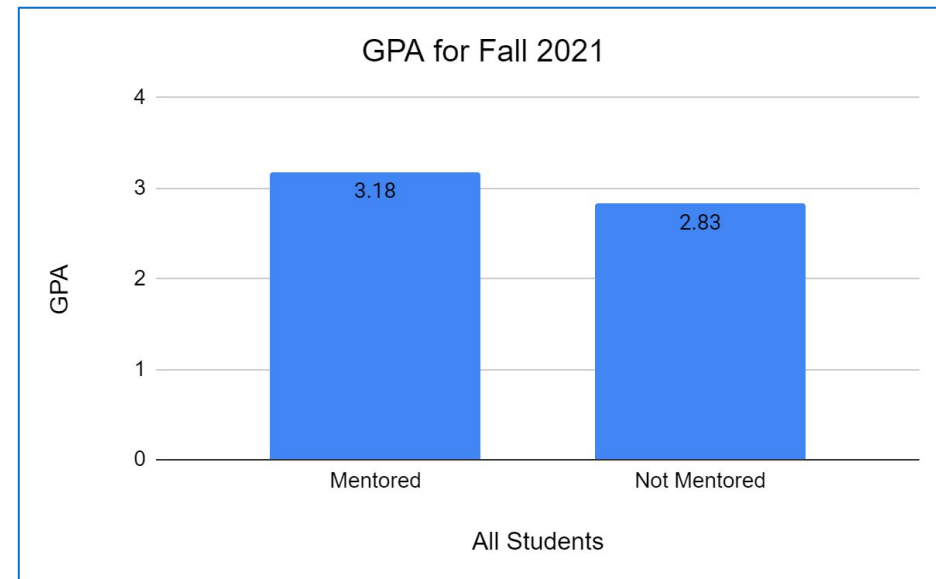
- Differences in GPA between those who met with a mentor at least once in a semester compared to those who did not.
- Differences in retention between those who met with a mentor at least once in a semester compared to those who did not.
- Differences in persistence in STEM major between those who met with a mentor at least once in a semester compared to those who did not.
  
- **Analyses were conducted for all students enrolled in the program.**
- **Analyses were conducted for Hispanic students enrolled in the program.**

# Effect of Mentoring on GPA



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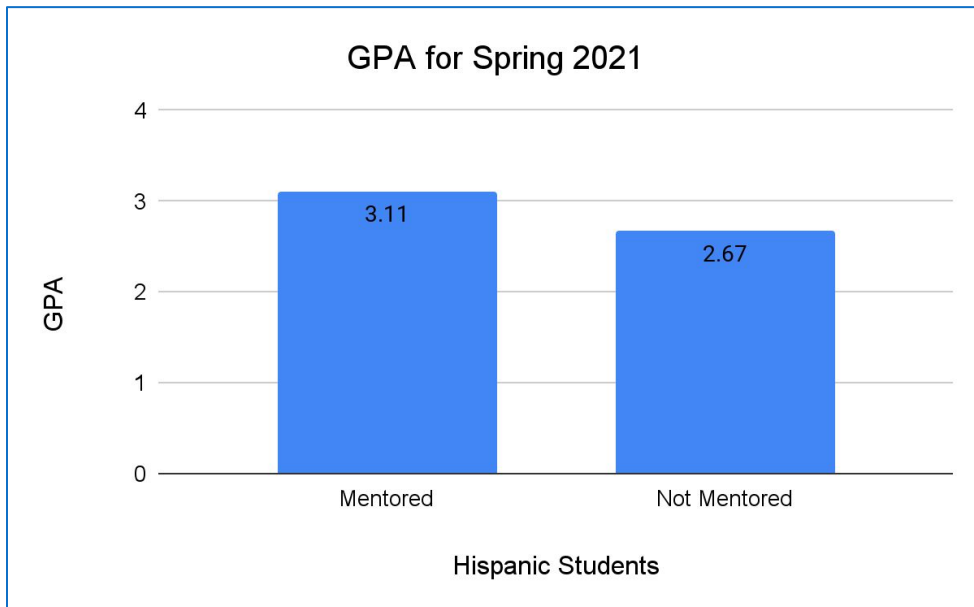
Mentees who saw a mentor at least once in either Fall 2020 or Spring 2021 had significantly higher GPAs in Spring 2021 than those who did not see a mentor.



$p < .001$

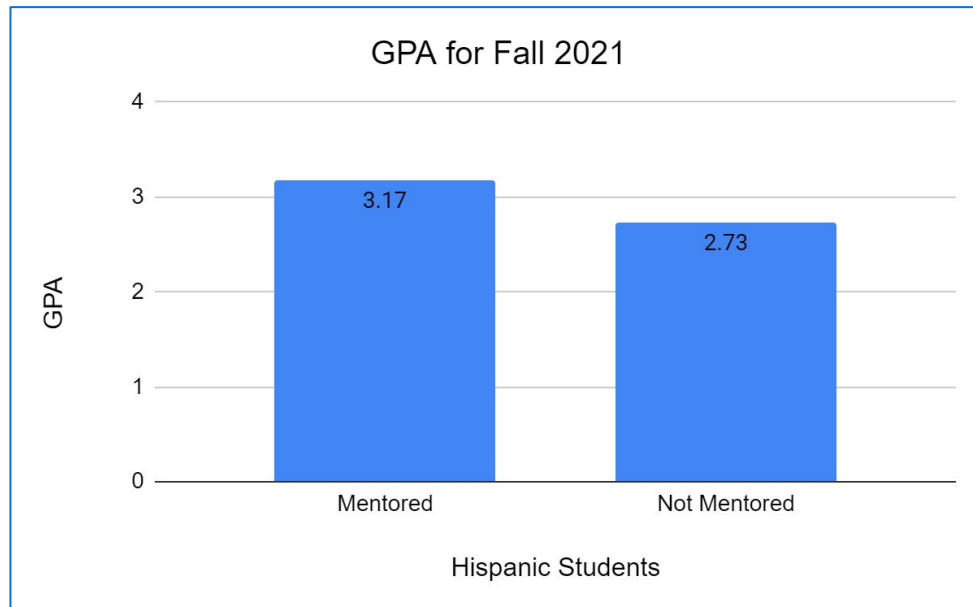
Mentees who saw a mentor at least once in Fall 2021 had significantly higher GPAs that semester than those who did not see a mentor.

# Effect of Mentoring on GPA



$p < .001$

Mentees who identified as Hispanic and saw a mentor at least once in either Fall 2020 or Spring 2021 had significantly higher GPAs in Spring 2021 than those who did not see a mentor.

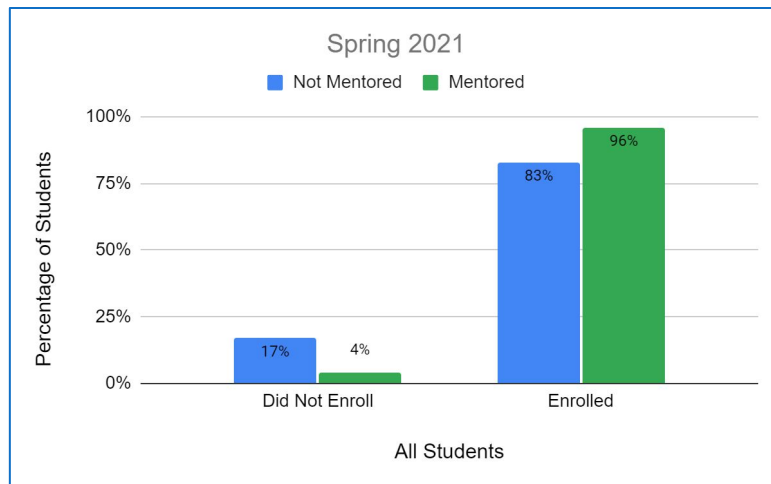


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Mentees who identified as Hispanic and saw a mentor at least once in Fall 2021 had significantly higher GPAs that semester than those who did not see a mentor.

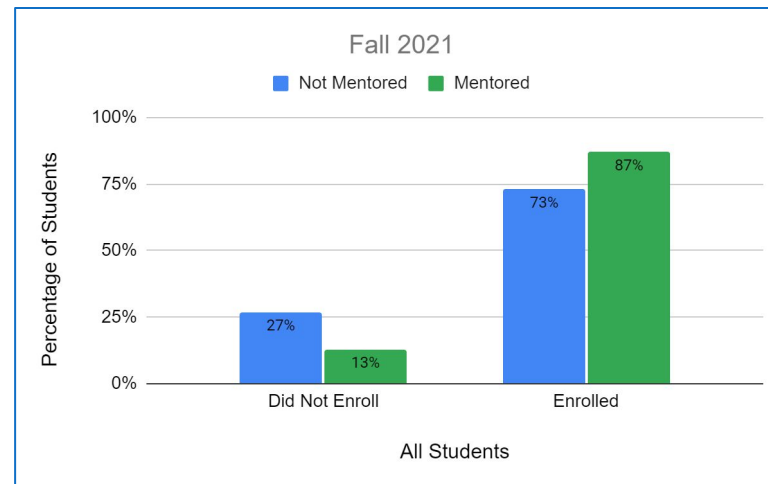


# Effect of Mentoring on Retention



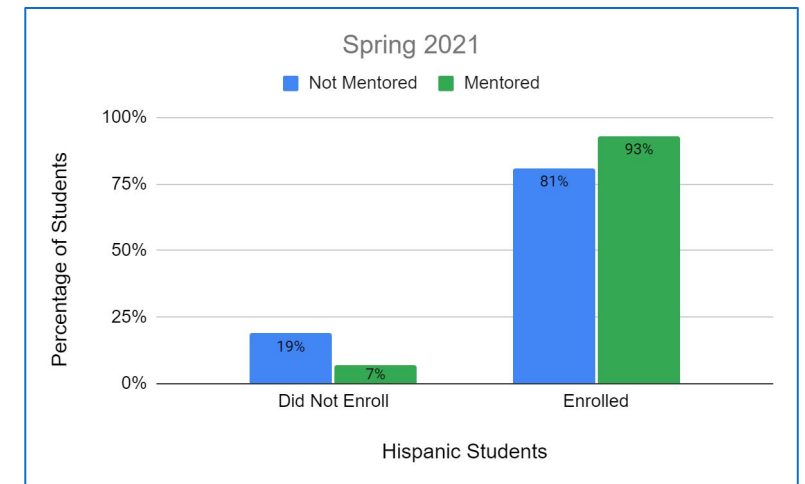
$p = .001$

Mentees who saw a mentor in Fall 2020 had higher retention rates in Spring 2021.



$p < .01$

Mentees who saw a mentor in Spring 2021 had higher retention rates in Fall 2021.

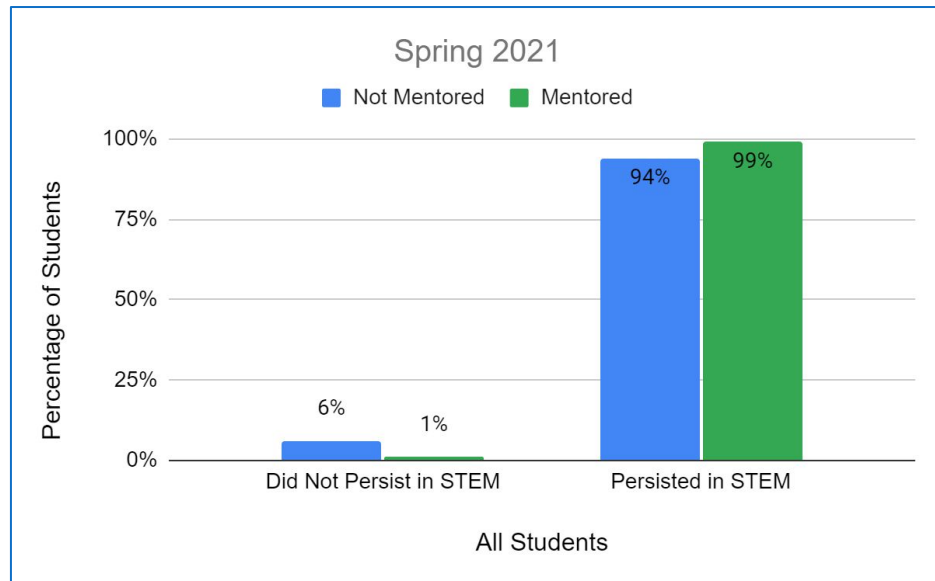


$p < .05$

Mentees who identified as Hispanic and saw a mentor in Fall 2020 had higher retention rates in Spring 2021.

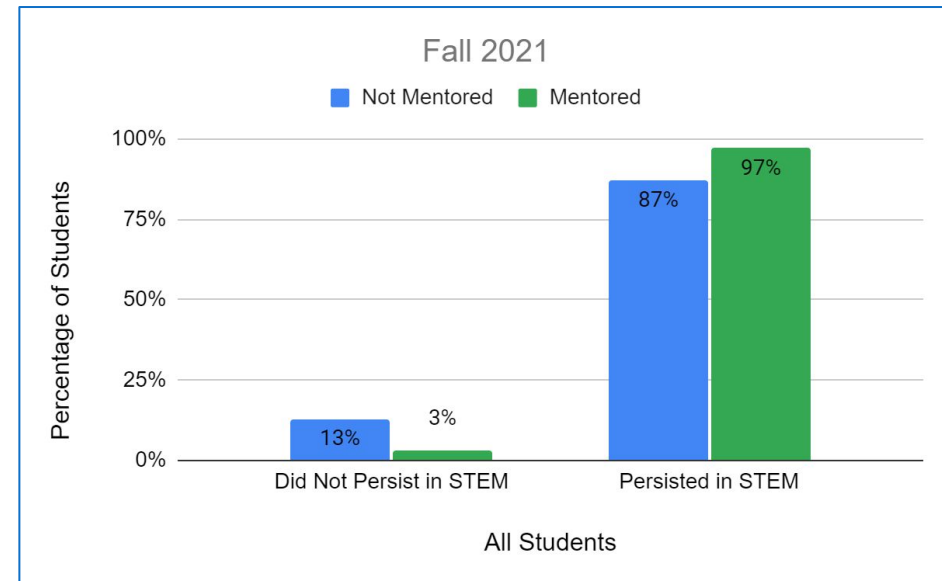
\*No significant differences in retention in Fall 2021 for Hispanic students who were mentored vs. not mentored.

# Effect of Mentoring on Persistence in STEM Major



$p < .05$

Mentees who saw a mentor in Fall 2020 persisted in their STEM major in Spring 2021.



$p < .05$

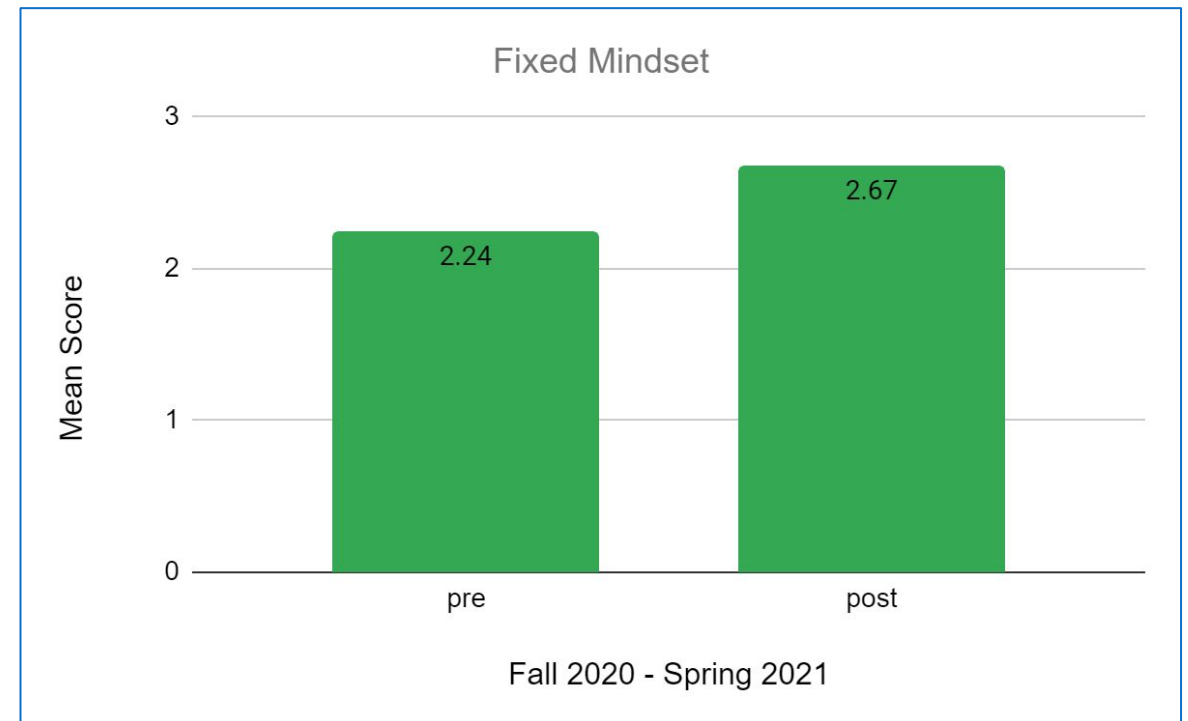
Mentees who saw a mentor in Spring 2021 persisted in their STEM major in Fall 2021.

\*No significant differences in persistence in STEM major for Fall 2020 for all mentored and not mentored students.

\*No significant differences in persistence in STEM major for Fall 2020, Spring 2021, and Fall 2021 for Hispanic students who were mentored vs. not mentored.

# Effects on Mindset

- Mindset was measured using a 6 point Likert scale ranging from Strongly Agree to Strongly Disagree (Dweck et al., 1995).
- Sample question:
  - "To be honest, you can't really change how intelligent you are."
- Data was collected at the beginning of the academic year and again at the end of the academic year.
- In the past 3 academic years, mentees generally agreed more with the fixed mindset at both time points, however they agree slightly less at the end of the year vs. the beginning of the year.





# Idealized Model of Mentoring Program: Model for Next Grant Funded Program

- Ensure engagement of mentees and mentors
  - integrate mentoring with first year experience course; gateway science courses
  - peer mentor training course for credit, lead workshops, train incoming mentors
- Combined faculty and near peer advising model (create an engaged learning community)
- Offer series of events: peer-led skills workshops and faculty-led workshops
- Use personalized and evolving mentoring strategies—use of College Science Inventory
- Collect data—integration of data collection; models for tracking student engagement in mentoring and co-curricular activities
- Recruit experienced, dedicated, motivated mentors (growth mindset)
- Need a core group of faculty mentors to support the peer mentors and mentoring program

## Economical Institutionalization of Mentoring

- All institutions particularly HSIs should offer peer and faculty mentoring—integrate with orientation and gateway courses
- For credit courses for peer mentors and mentees
- Workshops by faculty and peer mentors
- Data tracking to show impacts
- Faculty training on growth mindset, metacognition, and mentoring

# Questions?

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