

# **The Relationship between High School Math Performance and College Success:**

## **A Preliminary Study of Students from High Schools in the West Valley**

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# Who were the students?

- **90 Students who went to West Valley High Schools & attended Estrella Mountain\***
  - 30 from Buckeye Union High School District
  - 21 from Agua Fria Union High School District
  - 17 from Tolleson Union High School District
  - 15 from Dysart Unified School District
  - 4 from Phoenix Union High School District
  - 1 from Peoria Unified School District
  - 1 from Saddle Mountain Unified School District
  - 1 from Estrella Charter School

\*Numbers in analysis vary because not all student had data on all measures. (e.g., we had AIMS score for only 65 students)

# What We Measured

- We collected:
  - 6 measures of students' high school math performance
- And compared them to:
  - 3 measures of student's outcomes in EMCC math

# What We Measured

## High School Performance

- Overall Student Math GPA
- Grade in Final HS Math Class
- AIMS score
- Highest Level of HS Math Completed
- Number of Years of HS Math
- Number of Years of HS Math with C or higher

## EMCC Outcomes

- Course Placement
- Passing first EMCC Math (P/F)
- Grade in first EMCC Math

# What Were the Students' High School Performance Like?

- Average GPA for all Math Classes was 2.40
- Average Grade in Final Math Class was 2.21
- Average AIMS for students was 714
- Average Number of Years of HS Math was 3.12
- Average Number of Years of HS Math with C or higher was 2.38
- Highest level of math needs to be added

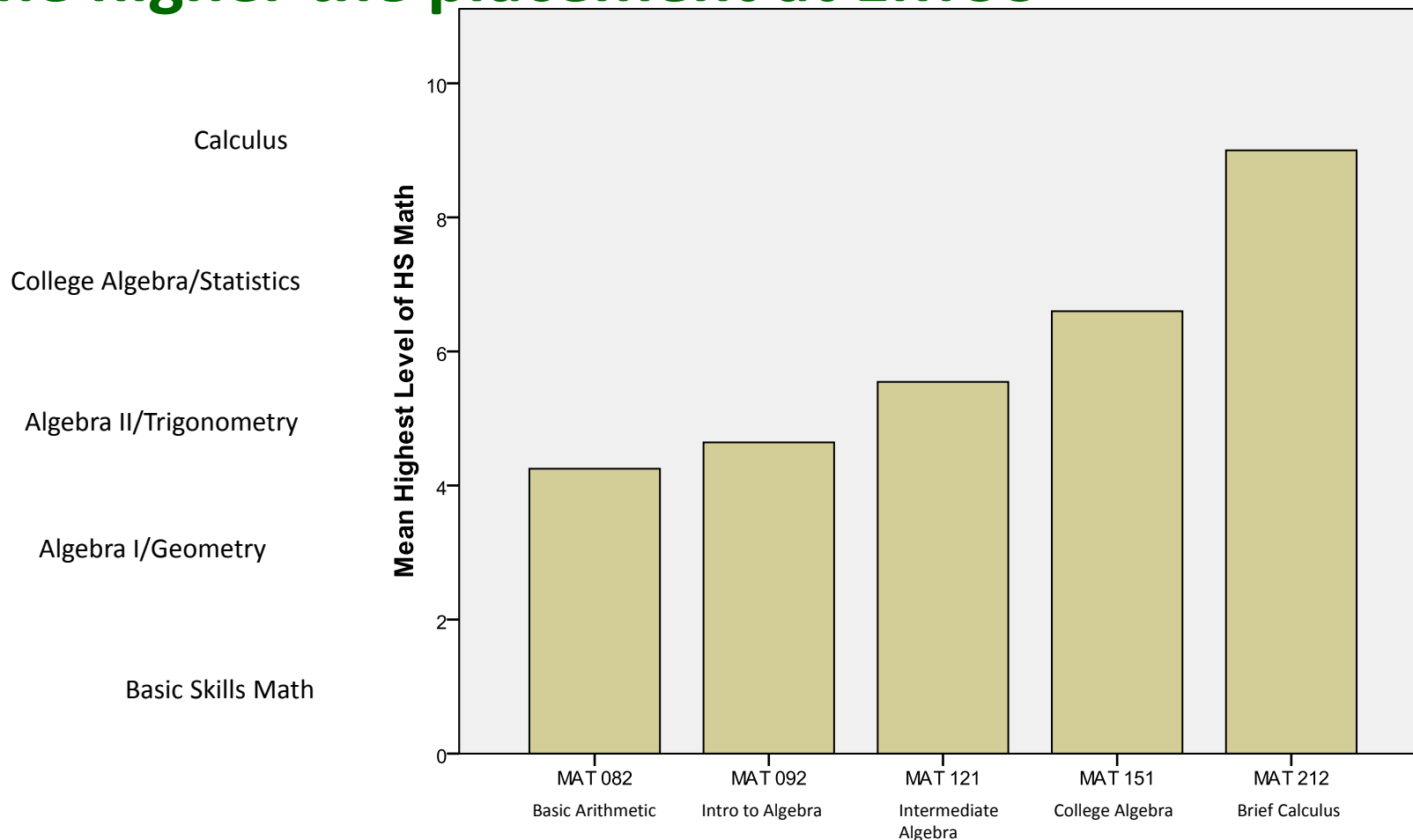
# The Research Questions

- **Does HS performance predict math placement at EMCC?**
  - Does the highest level high school math course completed predict EMCC math placement
  - Do AIMS math scores predict math placement at EMCC?
- **Does HS performance predict success in first EMCC class?**
  - Does the grade in the final math course taken predict success in the first math course at EMCC?
  - Does overall Math GPA during four years of HS predict performance in the first math course at EMCC?
  - Do the AIMS math scores predict success in the first math course at EMCC?
  - Does number of years of math students have taken predict success in their first math course at EMCC?

## Does HS performance predict math placement at EMCC?

Does the highest level high school math course completed predict math placement at EMCC?

**Yes, the higher a student performed in high school the higher the placement at EMCC**



# Discussion Point

However, many students in the developmental math classes at EMCC are placing at a lower level of math than they completed in high school.

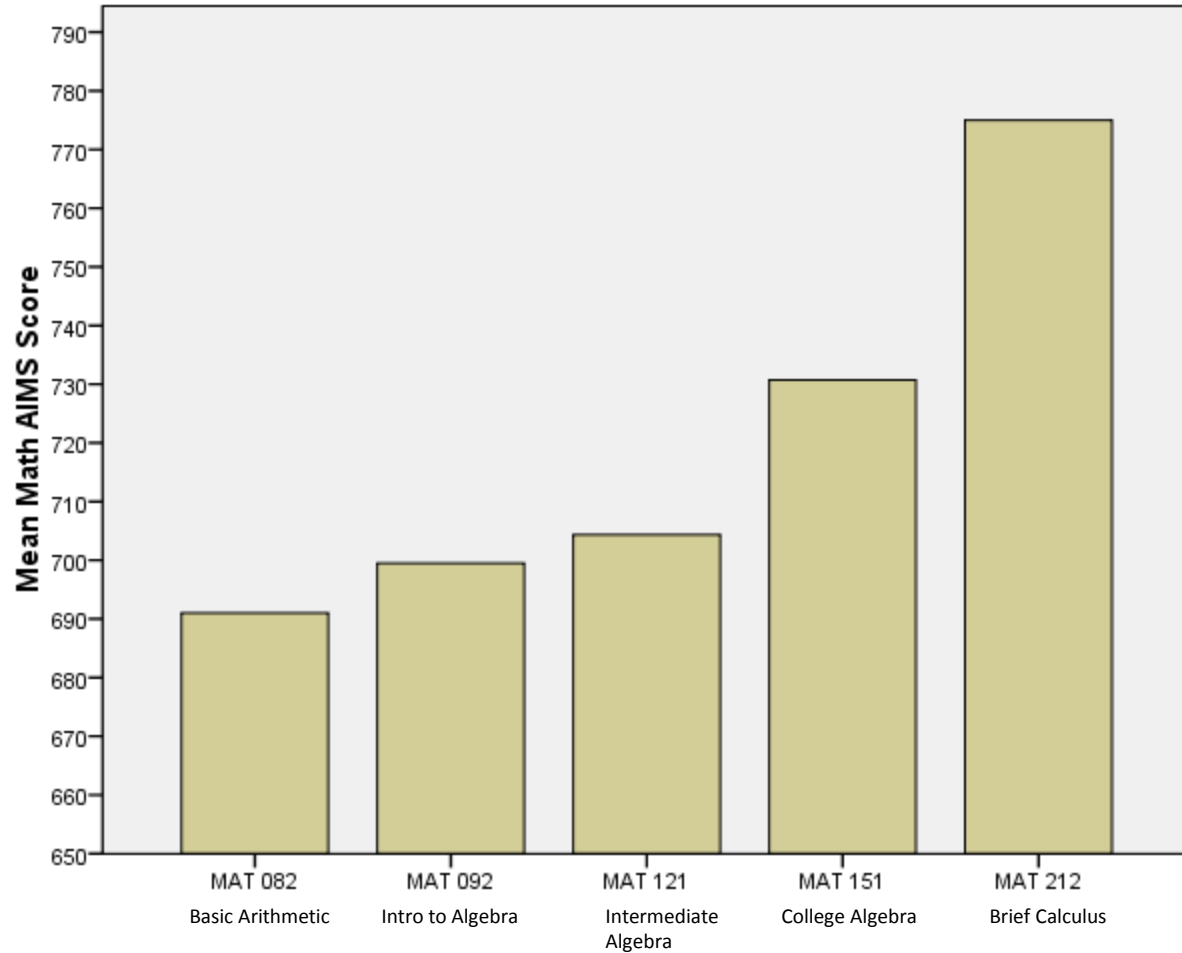
- Of the 33 students in this sample taking developmental math courses, 60% (i.e., 20 students) had completed Algebra II or higher in High School.



## Does HS performance predict math placement at EMCC?

Do AIMS math scores predict math placement at EMCC?

**Yes, higher AIMS scores predict higher placement scores**



Does HS performance predict math placement at EMCC?

# Discussion Point

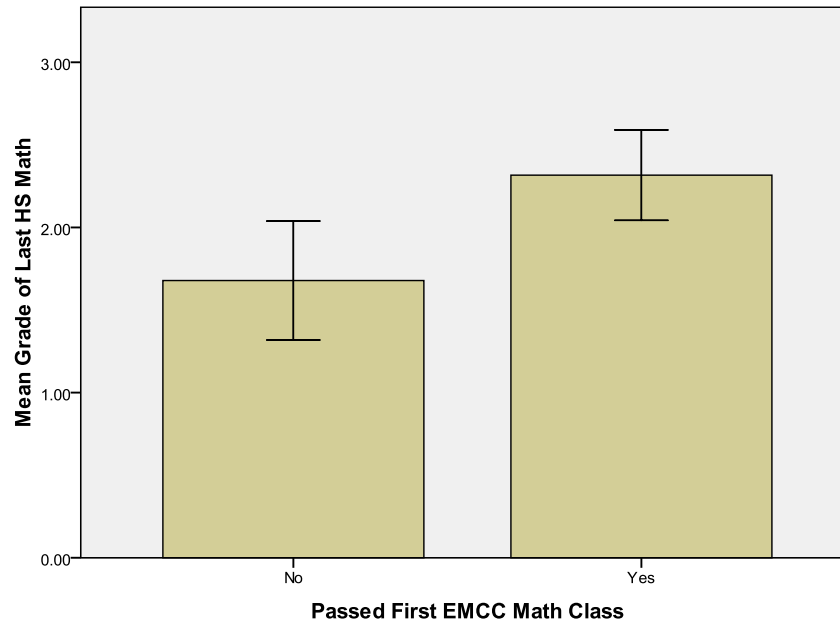
**Of 81 students, 80 students achieved “meets standard” on the AIMS test (i.e., scored between 683-748). Yet, 41% (33 students) placed in developmental math.**

- **Of the 33 students who took developmental math courses, 30% (i.e., 10 students) did not pass.**

## Does HS performance predict success in first EMCC math class?

Does the grade in the final math course taken predict success in the first math course at EMCC?

**Yes, students who succeed at EMCC earned a grade of C or higher in their final math class.**



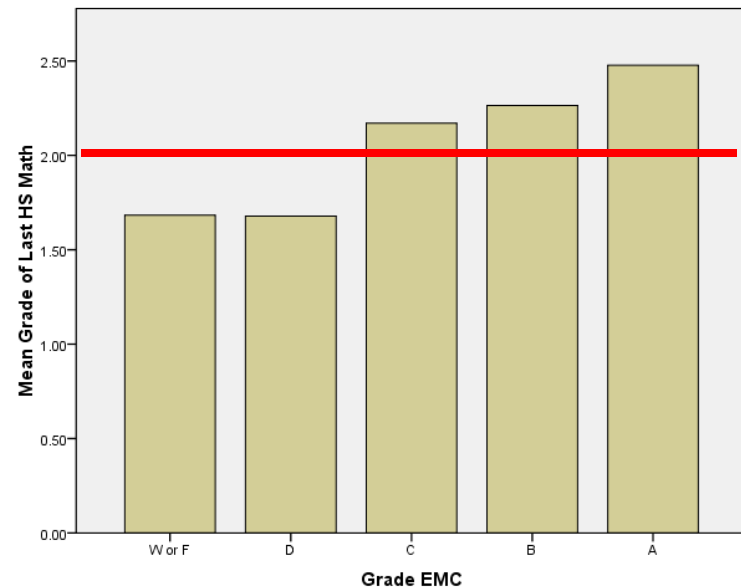
Error Bars: 95% CI

Does HS performance predict math placement at EMCC?

# Discussion Point

The analysis of student grades also confirms the importance of obtaining a C (2.00 on the graph) or higher in the final math class to succeed in their first EMCC class

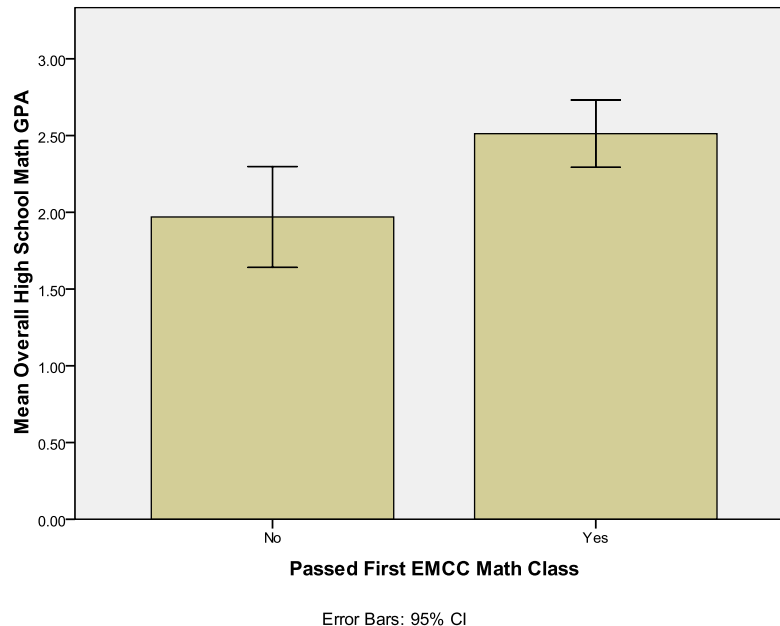
Success ->



## Does HS performance predict success in first EMCC math class?

Does overall Math GPA during four years of HS predict performance in the first math course at EMCC?

**Yes, students who succeeded at EMCC earned a 2.5 GPA in their High School Math classes.**

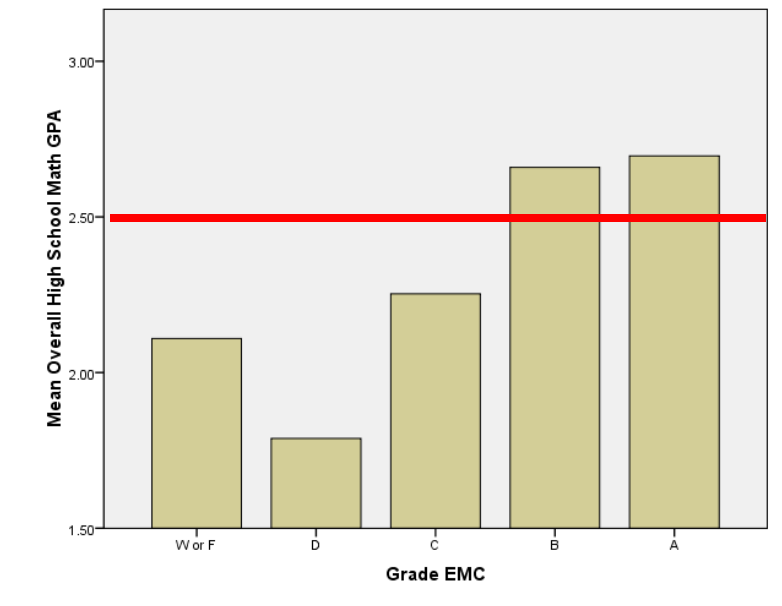


Does HS performance predict math placement at EMCC?

# Discussion Point

The analysis of student grades also show that an average GPA of 2.50 in high school math classes predicts above average success (i.e., getting an A or B in the first math class) at EMCC

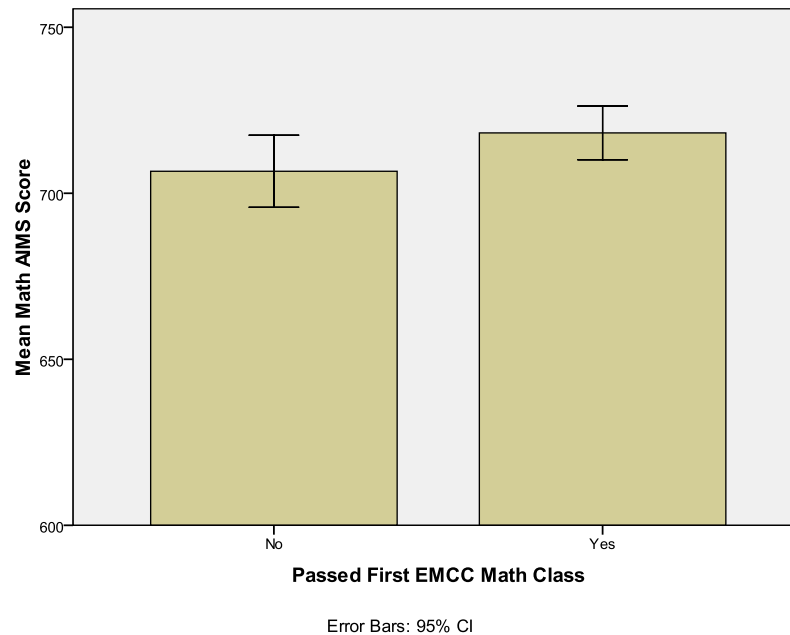
Above Average Success ->



## Does HS performance predict success in first EMCC math class?

Do AIMS math scores predict performance in the first math course at EMCC?

**Interestingly, AIMS scores do not help predict students will pass or fail their first EMCC class**

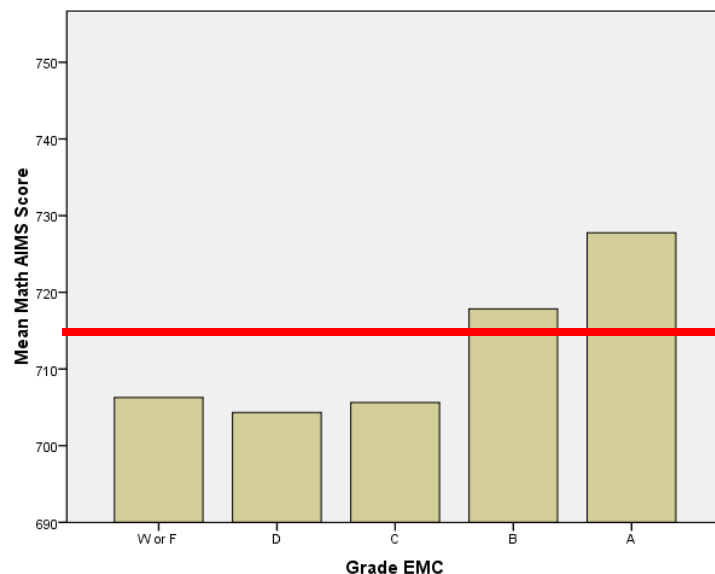


Does HS performance predict math placement at EMCC?

# Discussion Point

However, like GPA, the AIMS does predict which students will obtain above average success in college. Students who get above a 715 are more likely to earn an A or B in their first math class at EMCC

Above Average Success ->

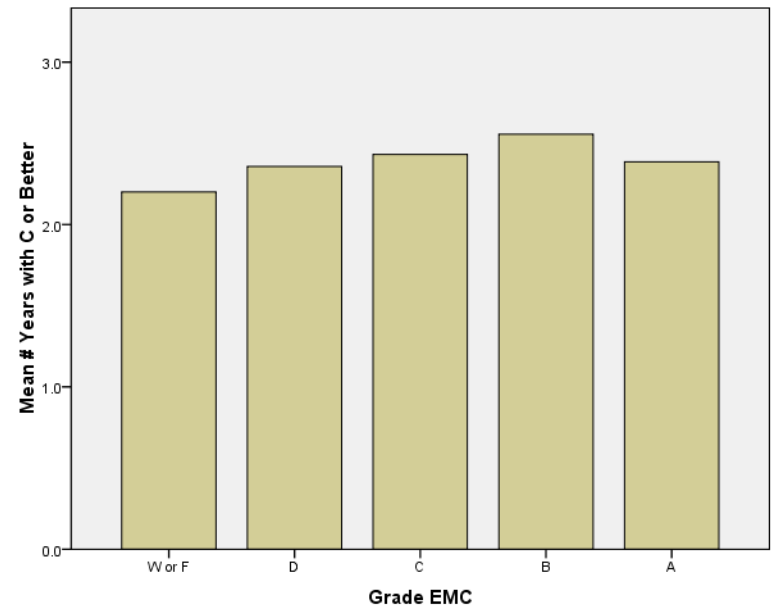
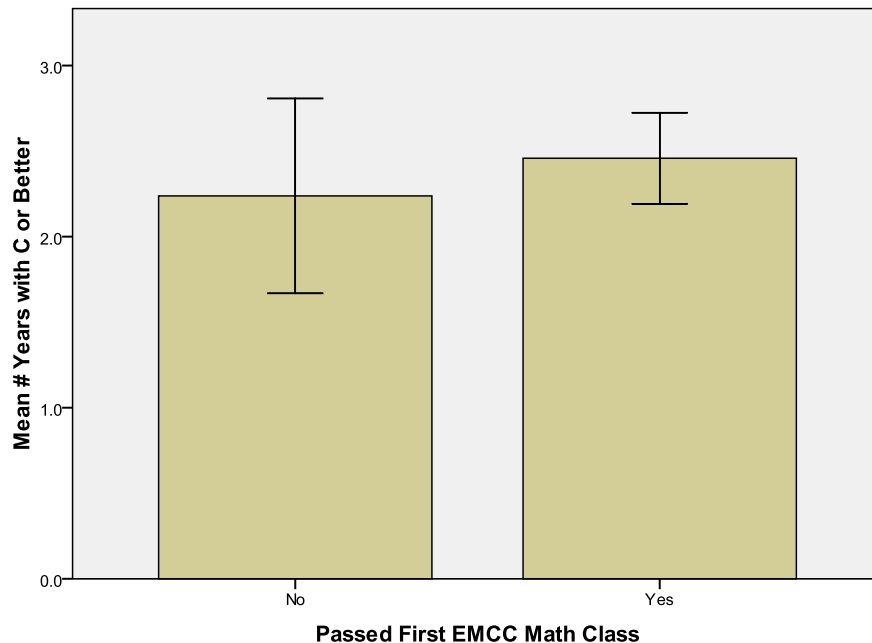




## Does HS performance predict success in first EMCC math class?

Does number of years of math students have taken and achieved a grade of C predict success in their first math course at EMCC?\*

# No, number of classes taken does not predict student success at EMCC



Error Bars: 95% CI

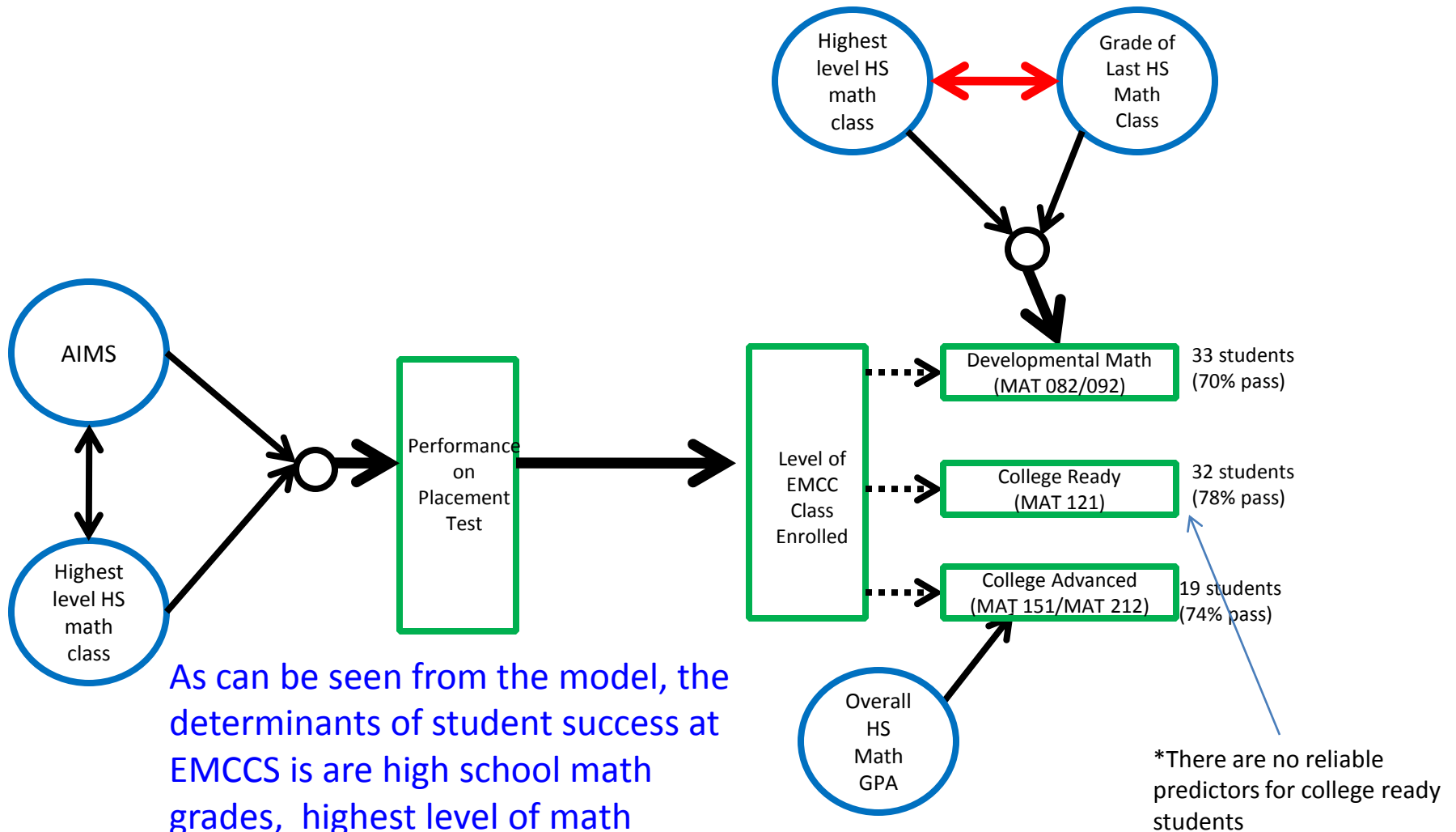
\*The pattern is the same for all years of HS classes taken without considering grades

Does HS performance predict math placement at EMCC?

# Discussion Point

**The determinant of student success in Math at EMCC is not the number of courses taken, but student performance in the classes, specifically the highest level of math achieved and grades (This can be seen on the model on the next slide)**

# A Model of the Relationship between High School Performance and College Success\*



As can be seen from the model, the determinants of student success at EMCCS is are high school math grades, highest level of math achieved, and AIMS score. Number of math classes taken or passed plays almost no role

\*There are no reliable predictors for college ready students

\*Model constructed through regression analysis

# Summary of Findings

1. Highest level high school math course predicts how students will place at EMCC, but many students who have passed Algebra II in high school are still needing developmental classes.
2. AIMS also predicts placement score, but even though almost all students “meet standards”, 41% have a developmental math class as their first class. (and of those students 30% do not pass that developmental math class.)
3. AIMS scores do not predict whether students pass or fail their first EMCC class, but they do predict whether students will obtain an A or B
4. Both overall math GPA (2.5 or higher) and final math grade (2.0) predict whether a student will do well in their first EMCC math class (i.e., obtain a B or A)
5. The model of student success illustrates that factors play a large role in student success: 1) Highest math class achieved in high school, 2) Grades in math class, and 3) Student’s aims scores
6. The number of math classes a student has taken plays little role in predicting student success at EMCC. More important are the quality of the classes and the quality of the students’ performance.

# Further Discussion Points

- *Based on these findings, what can be done to maximize High school student success in level of placement and achievement of above average success? What policy changes may positively support these strategies?*
- *The AIMS test appears to be a good measure of grade, but not Pass/Fail. Why is there this different?*
- *The placement model suggests that the best case scenario for improving student success is to have high grades in higher level math courses. This does not always occur. For many students, higher level high school math is often associated is often associate with lower grades. How can high grades and high levels of math be balanced?*
- *Why was there no evidence that the number of math classes taken in high school predict student success?*

# Next Steps

- Is there value in conducting a larger sample with a new cohort?
- Is there any actionable items we can take from the existing data or do we require more research first?