



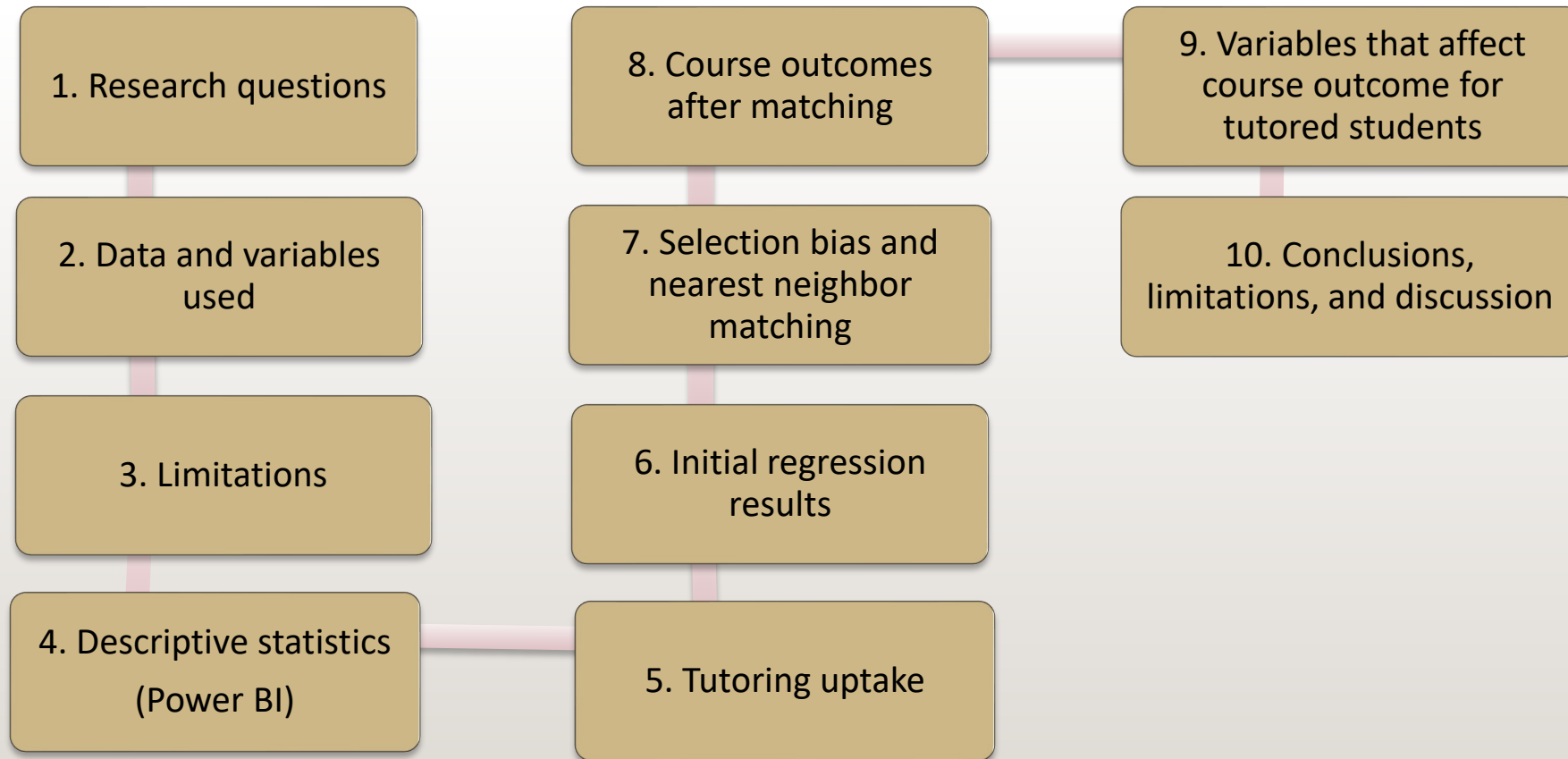
ACADEMIC CENTER FOR EXCELLENCE

TUTORING RESULTS

FROM THE OFFICE OF INSTITUTIONAL RESEARCH AT FLORIDA STATE UNIVERSITY



OVERVIEW





RESEARCH QUESTIONS

1. What predicts tutoring uptake?

- By LLC?

2. What are course outcomes given tutoring?

- Outcomes by letter grade?
- Outcomes by pass/fail?

3. What supported course outcomes for students who were tutored?



DATA

- Observations are unique at a student/term/course level
- Dataset includes all students from the following courses from Fall 2016 to Fall 2019 excluding summer semesters and semesters when no tutoring for a course was offered.
 - ACG2021; ACG2071; BSC2010; BSC2010L; BSC2011; CHM1045; CHM1045L; CHM1046; CHM1046L; CHM2210; CHM2211; COP3014; ENC1101; ENC2135; HUN1201; MAC1105; MAC1114; MAC1140; MAC2233; MAC2311; PHY2048C; PHY2049C; PHY2053; PHY2054
- Data inconsistencies reduced overall count of tutoring.
- Resolved some missing data problems by recoding course based on logic (enrolled in CHM 1050, tutored in CHM 1045)



VARIABLES

Demographics	Pre-College Factors	College Factors	Term Characteristics	Course Characteristics
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Sex	<input type="checkbox"/> ACT/SAT Overall Score	<input type="checkbox"/> Housing	<input type="checkbox"/> FSU Cumulative GPA	<input type="checkbox"/> Grade/DFW
<input type="checkbox"/> Race	<input type="checkbox"/> Math ACT/SAT	<input type="checkbox"/> CARE	<input type="checkbox"/> Level	<input type="checkbox"/> Course
<input type="checkbox"/> First gen	<input type="checkbox"/> HS GPA	<input type="checkbox"/> LLC	<input type="checkbox"/> Early Alert	<input type="checkbox"/> Location
<input type="checkbox"/> Residency		<input type="checkbox"/> Term units taken		<input type="checkbox"/> Total enrollment
<input type="checkbox"/> FTIC		<input type="checkbox"/> STEM		<input type="checkbox"/> Instructor ID
<input type="checkbox"/> Pell		<input type="checkbox"/> Health		<input type="checkbox"/> Multiple attempts
		<input type="checkbox"/> In course dept.		



LIMITATIONS

- Matching does not resolve differences in unobserved characteristics (Ex. motivation).

- The not-tutored group could have received outside additional treatment for which we did not account. (Ex. private tutoring)

- Our data does not control for how late in the semester a student started going to tutoring (Students going late in the semester will receive less benefit than a student going at the start.)



FLORIDA STATE UNIVERSITY
INSTITUTIONAL RESEARCH

DESCRIPTIVE STATISTICS (POWER BI)



FACTORS RELATED TO RECEIVING TUTORING

Pre-College Factors	Significance
ACT/SAT Score	***
Math ACT/SAT Score	***
HS GPA	
FSU GPA	

Demographics	Significance
Race	
Female (ref: Male)	***
Pell	
Sophomore (ref: Freshman)	*
First gen	***
CARE	
Residency	
Admit Type	

College Factors	Significance
Fall Term (ref: Spring term)	***
Total Enrollment	
BSC Courses (ref: not BSC)	***
CHM Courses (ref: not CHM)	***
MAC Courses (ref: not MAC)	***
PHY Courses (ref: not PHY)	*
In Class Department	***
Instructor ID	
Course Attempt Number	***
Multiple Attempts	
Term Units Taken	
Exploratory	
STEM	
Health	*
Global	
Online	

LLC	Significance
On-Campus Housing	***
BHLC (ref.: not LLC)	***
BPALC	
EILC	
MLLC (ref.: not LLC)	***
NLC (ref.: not LLC)	*
RHC (ref.: not LLC)	***
SJLC (ref.: not LLC)	**
WIS (ref.: not LLC)	**

Early Alert	Significance
Early Alert	***

Positive relationship
Negative relationship

*** p<0.01, ** p<0.05, * p<0.1

N=76,728

Across all terms and all undergraduates



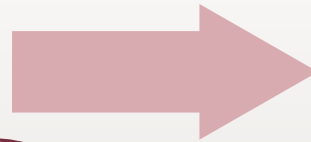
INITIAL FINDINGS

Due to limitations and selection bias, initial results show students who are tutored tend to have worse grade outcomes than students who are not tutored. These findings are statistically significant.

Naïve Model 1 – Full Sample

Tutored students

- have lower grades
- less likely to pass



Naïve Model 2 – Restricted Sample

Tutored students

- have lower grades
- not significantly more or less likely to pass



SELECTION BIAS

Students who go to tutoring are not the same as students who do not go to tutoring, when comparing observable characteristics.



	Not tutored	Tutored	Significance
ACT/SAT Score	+		***
Math ACT/SAT Score	+		***
HS GPA	+		**
FSU GPA	+		
First Gen		+	
In Class Department	+		***
STEM	+		***
Health		+	**
Multiple Attempts		+	
LLC		+	**
Exploratory		+	
Early Alert		+	***
*** p<0.01, ** p<0.05, * p<0.1			



SELECTION BIAS

Selection into treatment biases the effect of tutoring on course outcome when using regression. We are comparing apples to oranges.

We have a missing data problem as we cannot observe counterfactuals.

Our solution is to use a matching method. Now we are comparing apples to apples.

ATET

Average Treatment Effect of the Treated (ATET): The effect of treatment after matching.



NEAREST NEIGHBOR MATCHING (NNM)

- Used to reduce bias associated with observational data and selection into tutoring
- Calculates distance between matches using a set of specified variables
- Specified variables are selected based on significance in likeliness to go to tutoring
- Goal is for matched sample to look balanced – have comparable means – on selected variables
- Each not-tutored observation can be matched to more than one tutored observation – improves balance



NEAREST NEIGHBOR MATCHING (NNM)

Variables matched on:

- Total enrollment; ACT/SAT score; Math ACT/SAT; HS GPA; FSU Cumulative GPA; Gender; Level; First Gen; In class dept.; STEM; Health; Instructor ID; Multiple Attempts; LLC; Exploratory; ACT/SAT x HS GPA; Early Alert
- Exact match on course

New matching sample only includes the following:

- Spring 2019
- FTIC students
- First time attempting the course



GRADE OUTCOMES (0 TO 4 SCALE)

After matching, the previously negative relationship between tutoring and course outcomes is cut in half and is no longer statistically significant. We see similar results when using Pass as the outcome variable.

Outcome: Grade	Naïve Model 1	Naïve Model 2	After Matching
Tutoring	Negative & Significant	Negative & Significant	Negative & Not Significant
Observations	82,839	6,732	882 - Pairs

Outcome: Grade	Naïve Model 1	Naïve Model 2	After Matching
Lower Bound	Negative	Negative	Negative
Upper Bound	Negative	Negative	Positive



WHAT ELSE IS RELATED TO COURSE OUTCOMES?

Beyond tutoring, there are other characteristics that are related to course grade or passing.

Pre-College Factors	Grad Sig.	Pass Sig.
ACT/SAT Score		
Math ACT/SAT Score	***	***
HS GPA		
ACT/SAT x HS GPA		

Demographics	Grade Sig.	Pass Sig.
Race		
Sex		
Pell		
First gen		**
Residency		

College Factors	Grade Sig.	Pass Sig.
Housing		
CARE		
LLC		
Term units taken	**	***
STEM		**
Health		
In course dept.		

Course Characteristics	Grade Sig.	Pass Sig.
Location		
Multiple attempts	***	

Term Characteristics	Grade Sig.	Pass Sig.
FSU GPA	***	***
Level	***	
Early Alert	***	***

Positive relationship
Negative relationship

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

N=1,764
Matched Sample



TUTORING AND COURSE GRADE IN SPECIFIC SUBJECT AREAS?

The relationship between tutoring and course grade are not observed in every subject area, and tutoring is not the only predictor of course success. Results are similar for Pass as an outcome.

Outcome: Grade	ACG	BSC	CHM	COP	MAC	PHY
Tutoring	**			***		
Sex			**	***		*
Concorded Math ACT Score			**	***	***	
FSU Cumulative GPA	***	***	***	***	***	***
Classification - Sophomore			***	***	**	
Term Units Taken				***	***	
Total Enrollment			***		*	*
Observations	112	112	502	20	912	106

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Positive relationship

Negative relationship



FOR TUTORED STUDENTS ONLY, WHAT SUPPORTS COURSE OUTCOMES?

- Overall tutoring count → positive course outcomes for BSC and MAC students
- Math Studio count → positive course outcomes for MAC students
- Other variables that positively relate to course outcomes:
 - Math ACT/SAT score
 - FSU cumulative GPA
 - Total enrollment in the course
 - Non-senior on-campus residents
 - HS GPA and overall tutoring count
 - Students with lower HS GPAs have better course grade payoffs for the number of tutoring sessions attended
 - Cross over occurs at between 2 and 3 sessions

Results

- Tutoring was found to have no statistically significant impact on course outcomes after matching.
- The number of times a student attended tutoring overall and the Math Studio was statistically significant and positively correlated with outcomes in MAC courses.
- FSU GPA and Math ACT/SAT are consistently correlated with better course outcomes.
- Students taking higher numbers of term units are positively correlated with better course outcomes.

Summary/Recap

- On-campus living and the course subject area (CHM and MAC) were some of the strongest predictors of tutoring uptake.
- Comparing tutored students with all other students in courses showed tutoring to have a negative impact on course outcomes due to the type of students attending tutoring
- Matching allowed us to reduce some bias and form a more accurate comparison group
- The effect of tutoring after matching still appeared negative, but was no longer statistically significant
 - Negative is likely due to confounding factors we are unable to control for
- Math ACT and FSU GPA seem to be the best predictors of course outcomes