Reimagining Developmental Education

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Evidence on the Effectiveness of Corequisite Remediation

Presenters:

- Alexandra W. Logue, CUNY
- Trey Miller, AIR
- Heather McKay, Rutgers University
- Florence Ran, CCRC

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Dispelling Myths About Mathematics Corequisite Remediation

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Dan Douglas
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This presentation

- Randomized controlled trial investigating the effects of corequisite math remediation on student success
- Focus of this presentation on the comparison between traditional and corequisite math remediation
- Data including graduation rates published in *Educational Evaluation and Policy Analysis* in 2016 and 2019, respectively
- Received What Works Clearinghouse "without reservations" rating in 2018

First some context

Theory:
Remedial courses prepare unprepared students for college-level work.

Actual results of traditional remedial courses

- Course pass rates are low
- Persistence/graduation rates are low
- Financial aid can be depleted
- Student loan default is high
- Civil rights are violated

Alternative:

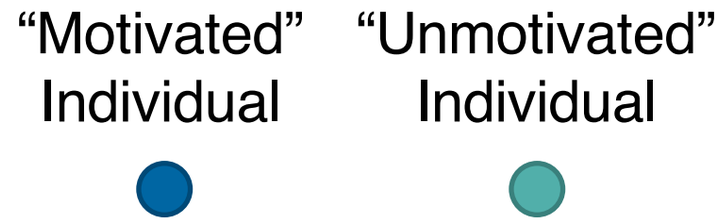
Corequisite Remediation

For years has been much evidence supporting this approach.

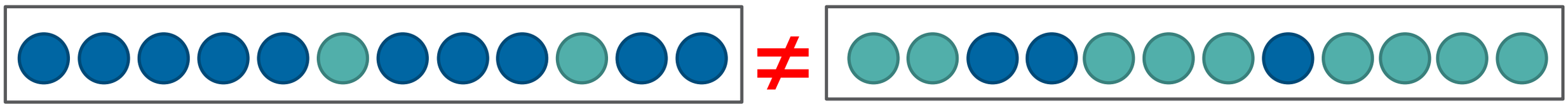
But some people said…

- Data don’t prove corequisite remediation is better.
- Data are primarily descriptive.
- Don’t involve controlled studies.
- The students in the corequisite courses and/or the faculty teaching them may not be the same as in traditional remedial courses.

Weak Evidence



Group experiences the program	Group does <u>not</u> experience the program



Differences in outcomes between these two groups of individuals could be the result of the types of individuals and/or the program.

Source: Michael Weiss, MDRC

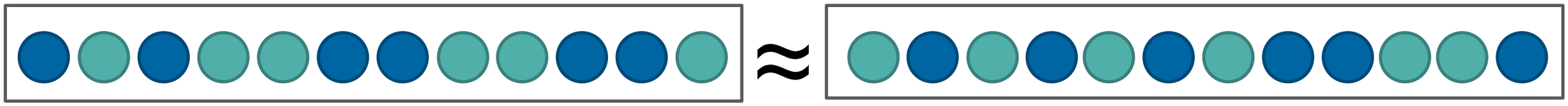
Strong Evidence
(Random Assignment)

"Motivated" Individual

"Unmotivated" Individual

Program Group

Control Group



Differences in outcomes between program and control group individuals are a result of the program (not the types of people)

Source: Michael Weiss, MDRC

Our randomized controlled trial

- 717 students at 3 CUNY community colleges, all assessed as needing remedial elementary algebra, and who did not need college algebra for their majors, were randomly assigned to:
  - Group **EA**: Traditional remedial elementary algebra (control)
  - Group **Stat-WS**: Introductory, college-level, statistics with a weekly workshop (corequisite remediation)

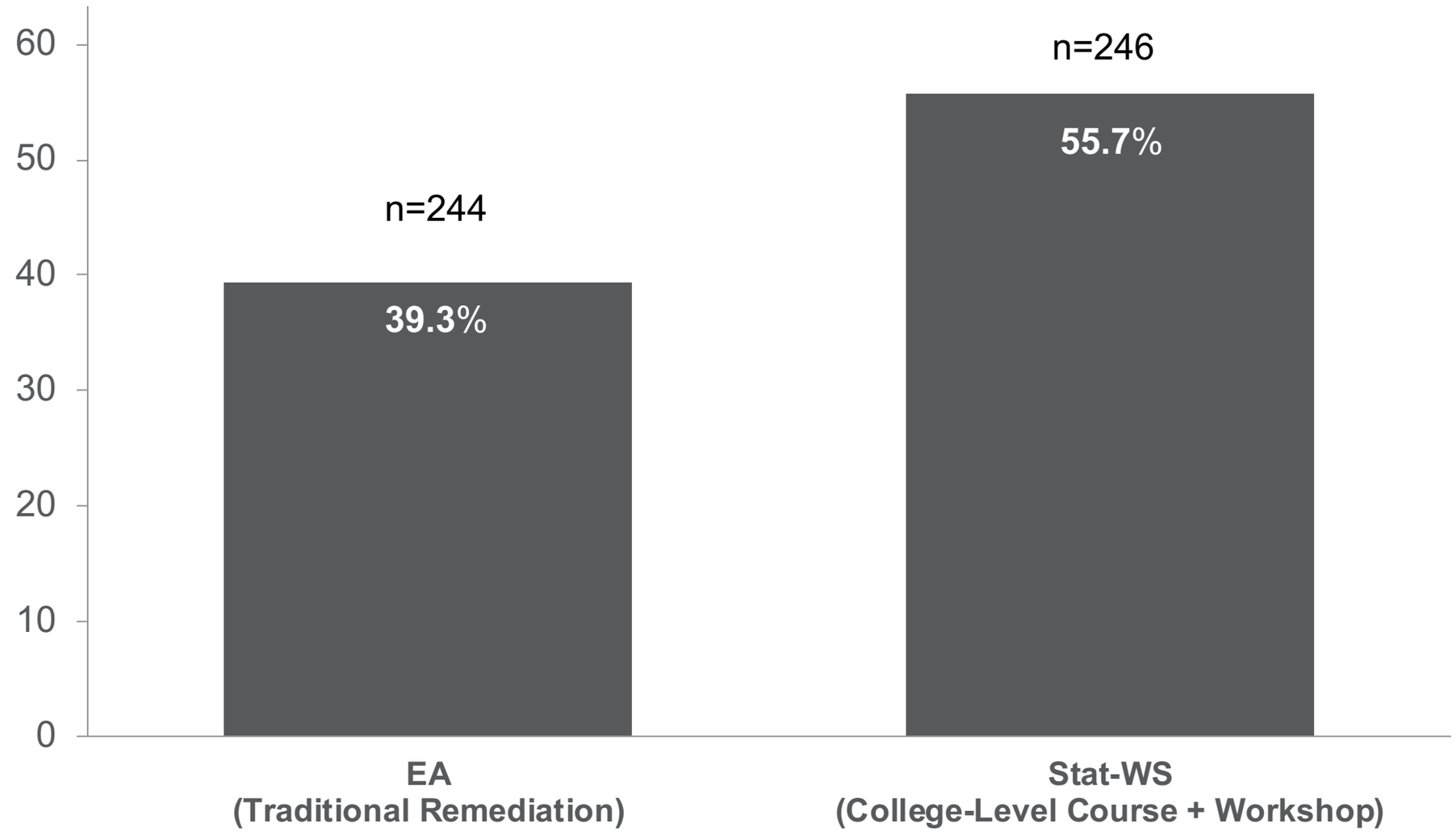
Some additional methodological details

- Students were randomly assigned in summer to courses in fall

- Workshops were 2 hours per week, led by advanced undergraduates

- Each instructor taught one section of each course type (EA and Stat-WS)

Course Pass Rates

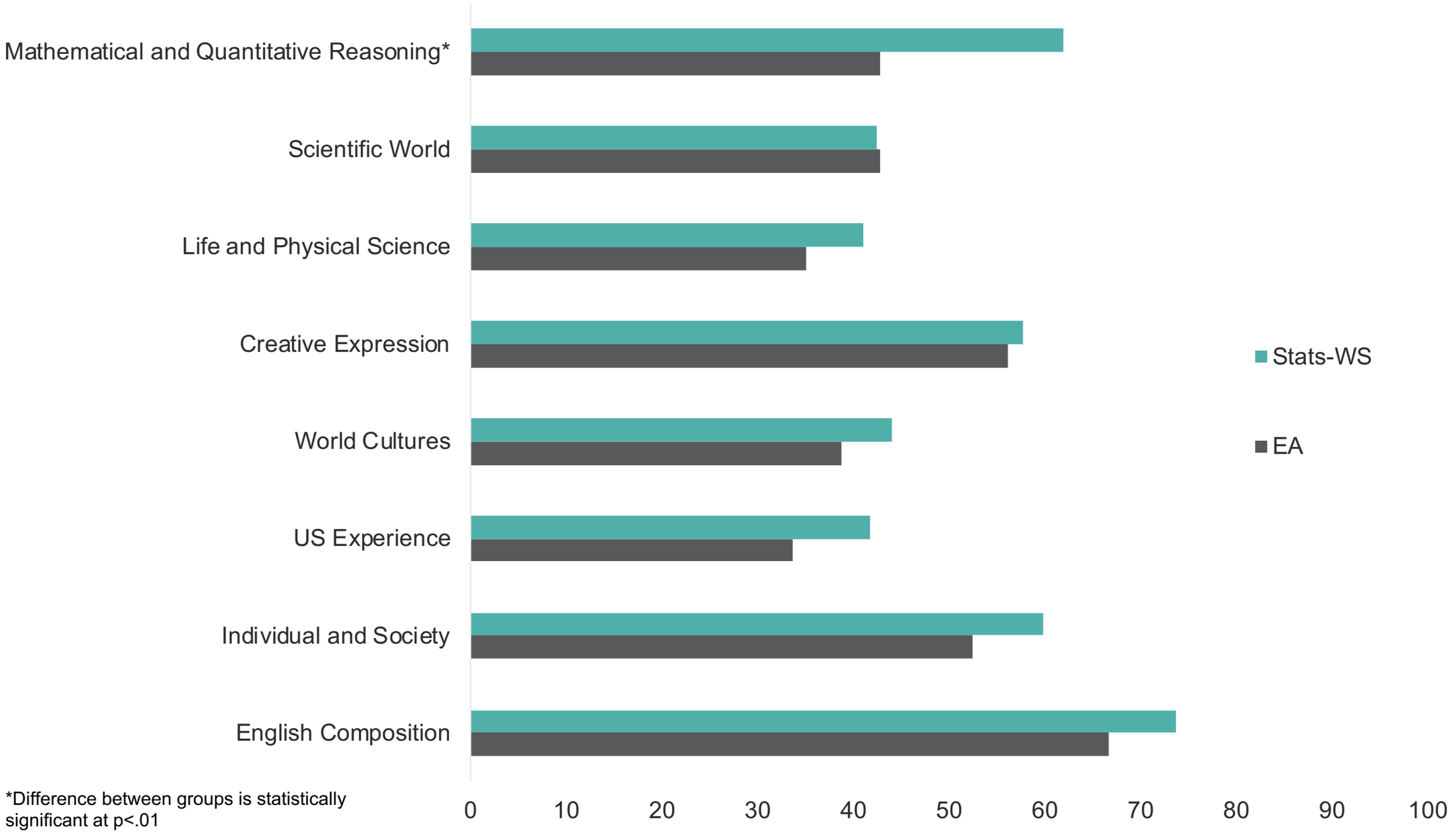


But some people said…

- The statistics students only did better than the elementary algebra students because the faculty were easier on the statistics students.

- For this reason, and because they never had the elementary algebra they were supposed to have, the statistics students won't be able to pass other courses, including their natural and social science general education courses.

Percentage of Students Completing Each of CUNY's General Education Categories Within Three Years



*Difference between groups is statistically significant at p<.01

But some people said…

- The Stat-WS students will not take and pass the math courses that need elementary algebra and college algebra as a prerequisite

- Some EA students will take elementary and college algebra and get excited by math so that they take advanced math courses, but Stat-WS students will not have that opportunity

All math courses taken and passed by EA and Stat-WS students in the three years since the experiment

Course	EA	Stat-WS
Statistics (Intro and Advanced)	80	174
College Algebra	42	32
Liberal Arts Mathematics	35	2
Health-Related Mathematics	16	13
Quantitative Reasoning	4	2
Precalculus	14	19
Calculus I	6	14
Calculus II	3	3
Calculus III	3	1
Differential Equations	1	0
Linear Algebra	0	2
Total	**204**	**272**

But some people said…

- Students assessed as needing elementary algebra can’t take and pass college algebra without passing elementary algebra first

Number of Stat-WS students:

who passed their assigned statistics course during the experiment and later passed college algebra without ever having taken elementary algebra and with no additional assistance:

14

But some people said…

- If you don’t make these students take elementary algebra, they will not be able to later change their mind and complete math-intensive majors

All students who graduated within three years with a major requiring college algebra or above:

EA	Stat-WS
Associate in Engineering	Associate in Computer Science
A.S. in Science	Assoc. in Business Admin.
	A.S. in Liberal Arts
	A. S. in Liberal Arts
	A. Bus.

But some people said…

- Changing one course requirement won’t affect graduation rates, and it certainly won’t *increase* graduation rates.

Summary of 3-Year Results

Group	Not Enrolled	Enrolled	Graduated
EA	52.9%	30.0%	17.2%
Stat-WS	48.1%	26.7%	25.3%

- Graduation rate of Stat-WS students is 8.1 percentage points higher than that of EA students
- 47% more Stat-WS students graduated than EA students

But some people said…

- Maybe the Stat-WS students graduated at a higher rate, but they won’t do as well as the EA students after graduation because they won’t have had the elementary algebra that people need for their jobs.

Postgraduation Performance:

We don’t have employment data for the students in our experiment (yet).

But two recent studies have shown that, for the great majority of jobs, algebra is not needed. In contrast, having taken statistics may help increase women’s postgraduation salary (Belfield & Liu, 2015; Douglas & Attewell, 2017).

Effects on Performance Gaps

- None of our results differ by students' race/ethnicity
- Given that students from underrepresented groups are more likely to be assigned to math remediation, and given that corequisite remediation helps all students assigned to math remediation similarly, corequisite remediation can help decrease graduation rate gaps between underrepresented and other students.

And concerning the cost of education:

Of all EA and Stat-WS students randomly assigned:

Mean number of math courses an EA student had to take to pass his/her general education quantitative requirement: **5.2**

Mean number of math courses a Stat-WS student had to take to pass his/her general education quantitative requirement: **2.6**

Conclusions

Students assessed as needing elementary (remedial) algebra & not majoring in a math-intensive major:

- Are more likely to pass assigned course if instead take college-level statistics with extra support
- Are more likely to graduate, including passing college-level general education social & natural science courses and all types of math courses
- This approach can help close performance gaps

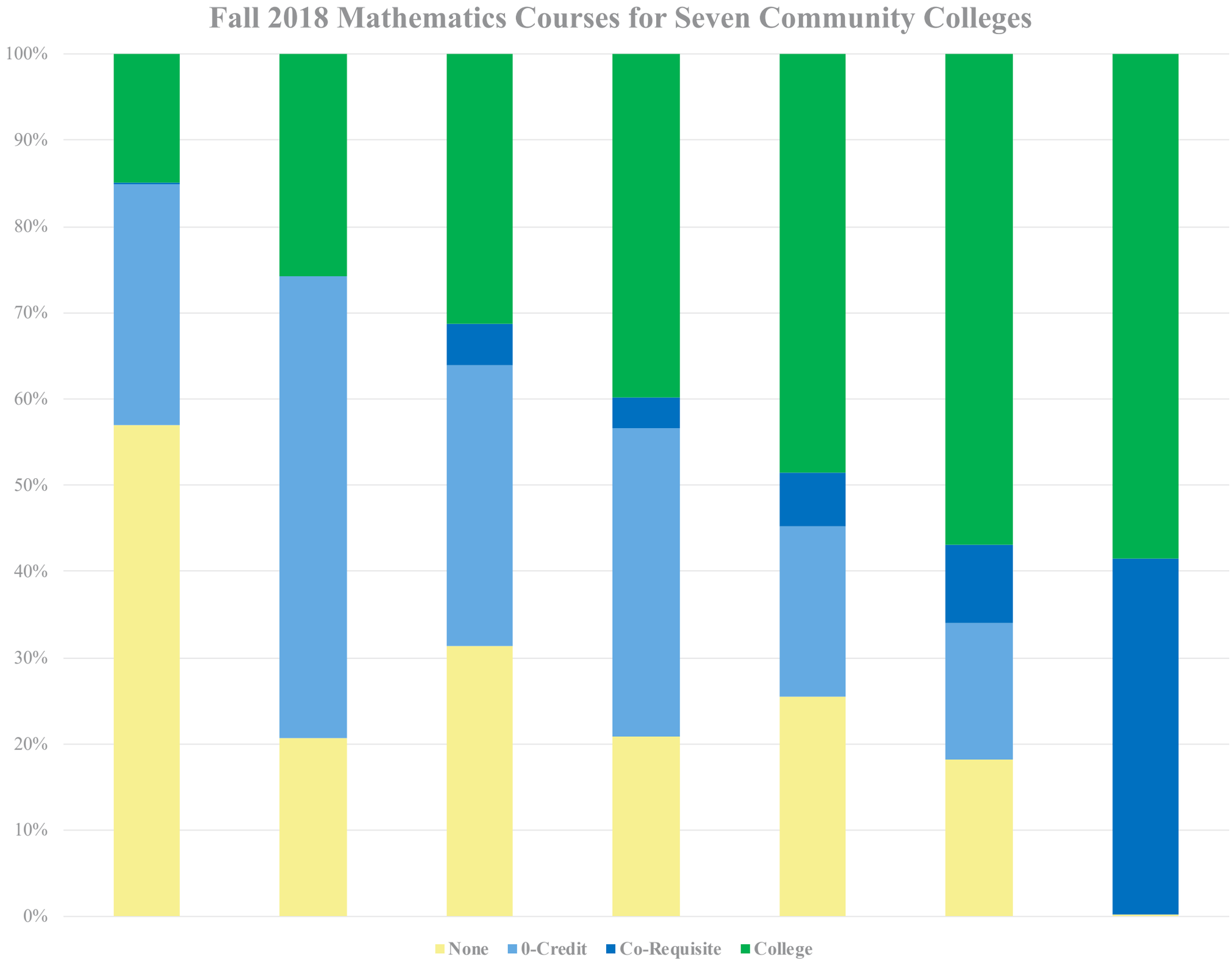
Conclusions
continued

- Corequisite math remediation works!

- Is everyone now using it?

How about CUNY?

- What percentage of new associate-degree students should be in college-level math or corequisite math remediation each fall?


Fall 2018 Mathematics Courses for Seven Community Colleges
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
None
0-Credit
Co-Requisite
College

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Alexandra W. Logue
The City University of New York

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Experimental Evidence on the Impact of Corequisite Remediation in Texas

Trey Miller, Principal Researcher, American Institutes for Research

Background

- 2011: Texas passed broad set of policies on developmental education reforms (e.g., accelerated models, multiple measures, change to assessment)
- 2013: IES-funded research-practice partnership between RAND and Texas Higher Education Coordinating Board (THECB) to study reforms, build research agenda
- 2015: RAND and THECB received IES funding to rigorously evaluate one of these reforms, corequisites

The intervention is direct enrollment in a writing and reading corequisite

- Treatment: Immediate enrollment in a Composition I course with a concurrent Integrated Reading and Writing (IRW) support
  - Common features across study colleges: Student learning outcomes, credit hours for course and support (3 SCH for course, 1 SCH DE support), writing score range for sample
  - Varied corequisite models
- Control: Enrollment in a IRW course prior to Composition I enrollment
  - No opportunity to enroll in a college-level writing or reading intensive course in the first semester
  - Required to enroll in 2-3 additional SCHs of DE coursework overall
  - DE not as closely aligned with credit-bearing course (and other differences in content, structure, pedagogy)

The RCT examined three types of corequisite models

	Accelerated Learning Program	Extended Instructional Time	Required Support Service Use
Structure of support	Classroom instruction	Classroom instruction	Tutoring in office hours, writing center
Instructor for course/support	Same	Same	Same at one college, different at other
Student mix in college course	Mix of college-ready and DE	All DE	Mix of college-ready and DE
Student-to-faculty ratios in DE support	10:1	22:1	5:1, 10:1

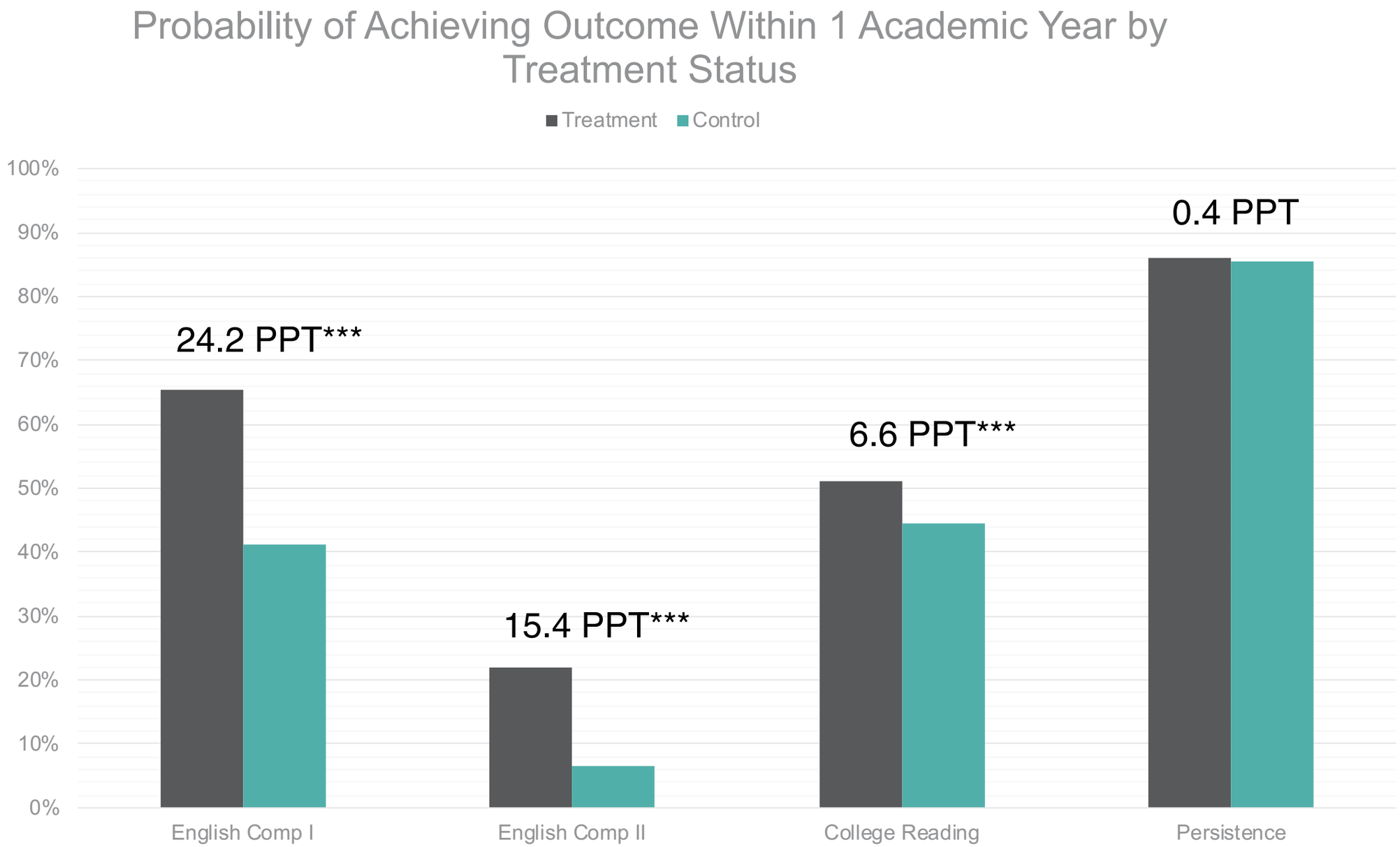
We conducted a randomized experiment in five Texas community colleges

- Setting: 5 colleges in large community college systems in urban/suburban regions; large populations of at-risk students
- Sample: First-time in college students scoring into the highest level IRW course placement range
  - N=2,157 randomized fall 2016-fall 2018
- Recruitment: Students recruited, surveyed, and randomized at time of course registration
- Randomization: 50% T/50% C for most; 67% T/33% for one college in fall 2017

We collected a range of data

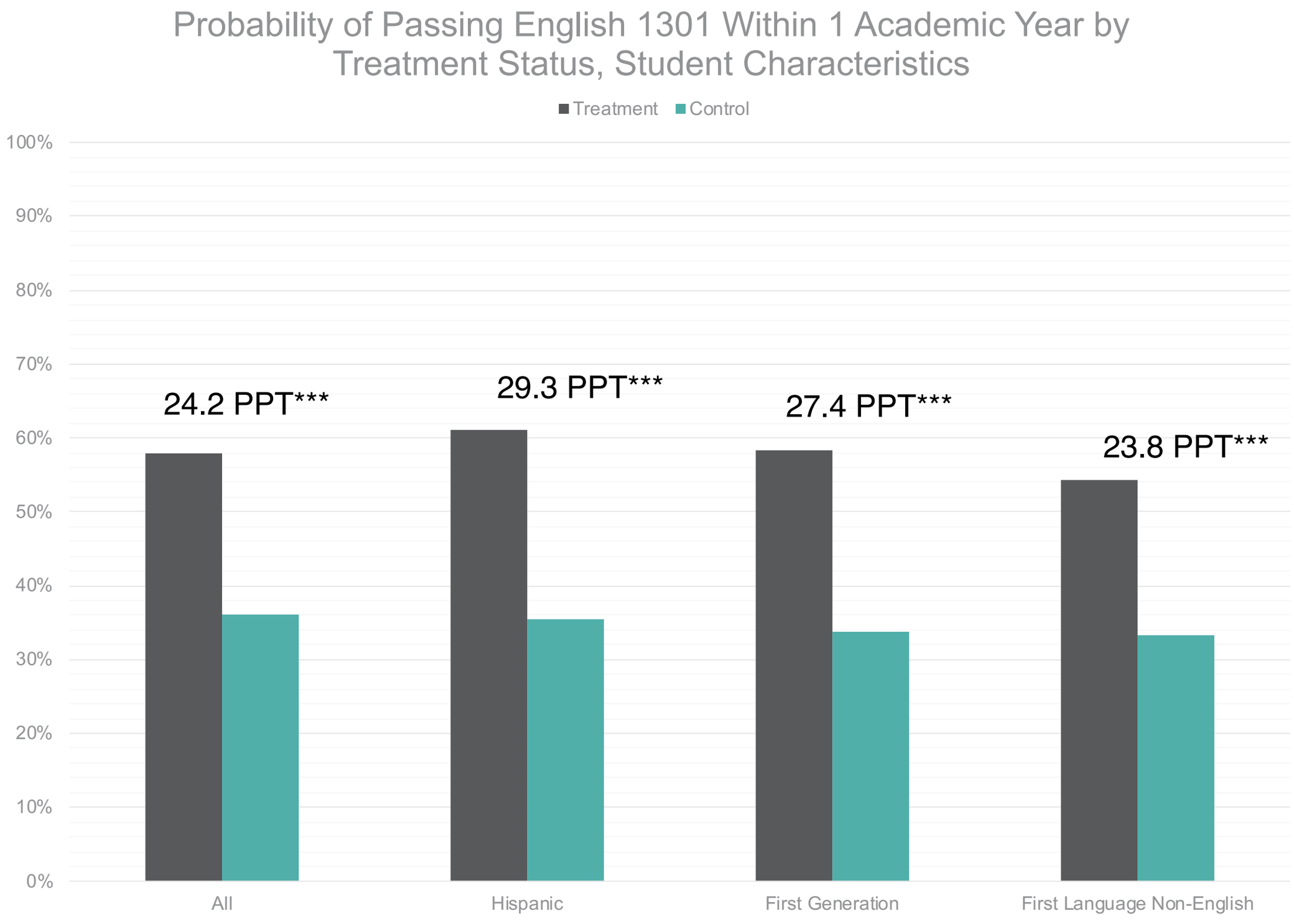
- Administrative data: Student and faculty characteristics, course enrollment, outcomes
- Student surveys
  - Baseline: Detailed student characteristics
  - Follow-up: First-semester experiences and early outcomes
- RCT implementation data: Faculty survey, student and faculty focus groups, administrator interviews, observations, course documents, cost data
- Statewide implementation data: Statewide institutional survey, interviews with administrators/faculty leads from 36 community colleges

Students assigned to treatment were significantly more likely to pass English Composition I and II within 1 academic year



* = statistically significant at 0.1 level
** = statistically significant at 0.05 level
*** = statistically significant at 0.01 level

Effects were positive for key subgroups of interest



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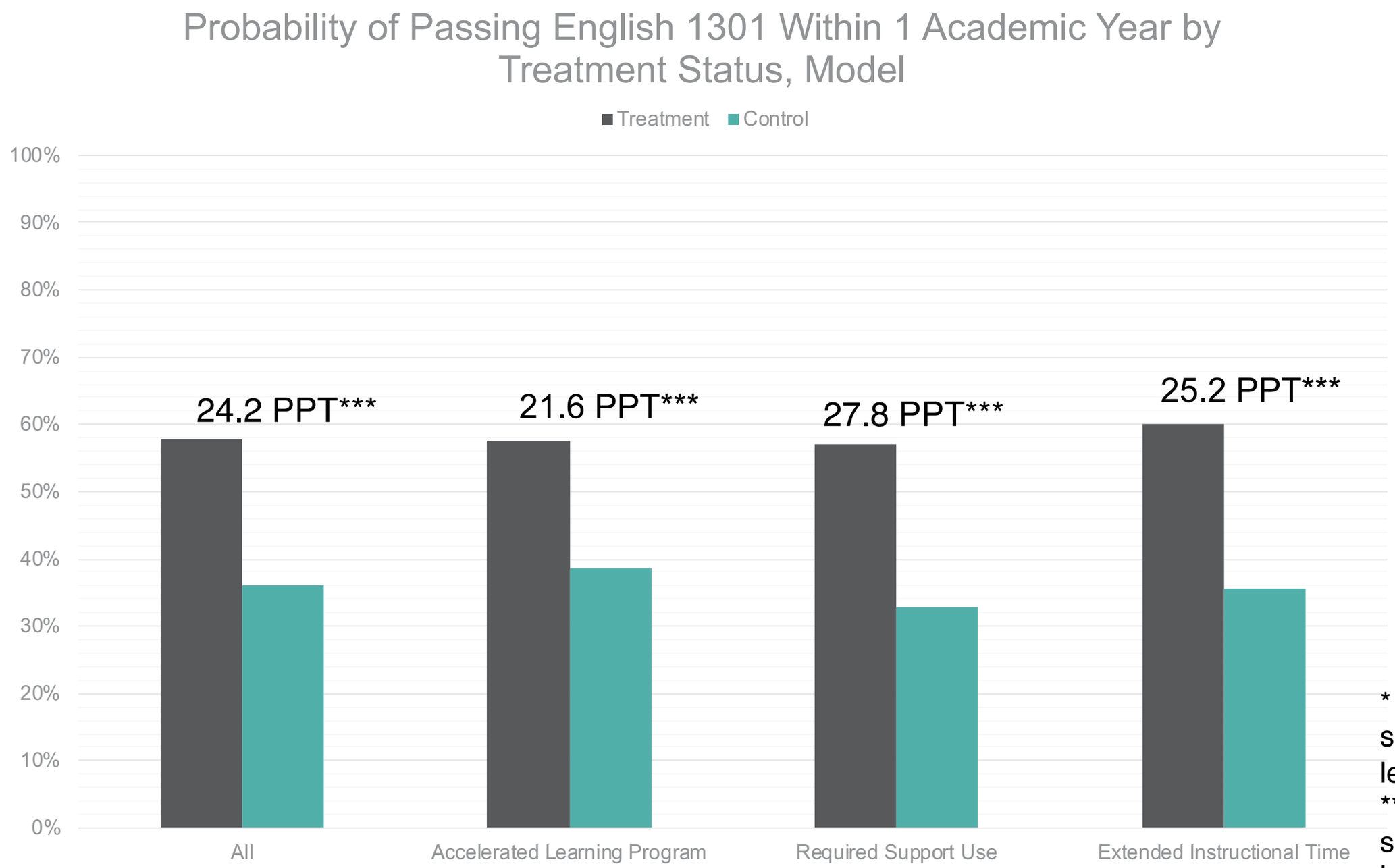
*** = statistically significant at 0.01 level

We found evidence of short-term effectiveness for all three models



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*** = statistically significant at 0.01 level

We will continue to analyze impacts through 2021

- Additional cohorts of students
  - Including some scoring at lower levels
- Additional outcomes
- Longer-term impacts
- Cost-benefit analysis
- Explaining impacts
  - Statistical analysis examining variation in impacts, moderators and mediators
  - Implementation analysis examining treatment contrasts across nine areas of interest

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Thank you!

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THE STATE UNIVERSITY OF NEW JERSEY

Alternatives to Mathematics Education: An Unprecedented Program (AMP-UP)

Project Team

Rutgers:
Heather A. McKay
Daniel Douglas
Renee Edwards

Union County College:
Liesl B. Jones
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Kessler McCoy-Simandle

Bergen Community College:
Robert Fusco

First in the World Grant Program

- Obama Administration program to support postsecondary institutions' efforts to develop and evaluate new approaches that can expand college access and improve student learning while reducing costs
- All evaluations conducted by a third party and followed What Works Clearinghouse Design Standards

AMP-UP

- FITW grant was awarded to Bergen Community College
- Sub-award to Union County College
- Both colleges had different interventions
  - –Bergen – accelerated program and a summer bootcamp
  - –Union – co-requisite model

UCCC Intervention Description

- Random assignment took place with the aid of the testing center.
  - –Students assessed as needing developmental math were given information and offered random assignment into the study
  - –Testing center staff distributed sequentially numbered envelopes containing group assignments
- Students assigned to the intervention receive a waiver for DE math
  - –Intervention group received support texts/emails throughout the program
  - –Intervention group required to schedule tutoring appointment
  - –UCCC expanded the study into both fall and spring semesters
  - –As of 2018, UCCC has made co-requisite the official policy for all non-STEM students

Findings: Group Balance

Trait	Business-As-Usual Condition (N=827)	Intervention Condition (N=837)
% Female	53.6	50.1
% White/Asian	13.2	14.2
% Black Hispanic	71.3	71.8
% Other/Not Specified	15.5	14.0
% Pell*	37.9	43.3
Mean (sd) Age	23.0 (7.7)	22.7 (7.1)
Mean (sd) Math Placement Score	38.6 (13.8)	38.6 (13.8)

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Findings: Two-Year Outcomes

Outcome	Business-As-Usual Condition (N=827)	Intervention Condition (N=837)
# of terms enrolled	2.0 (1.6)	2.1 (1.5)
% Completed College-Level Math***	23.1	36.7
% Completed a Credential	5.9	8.1

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Next Steps

- Continue to collect follow-up data through year 5
  - –Cohorts 3 and 4
- Conduct analysis of Spring starters
- Conduct analysis of STEM starters (in year 5)
- Qualitative Data Collection and Analysis
- Final Reporting for grant program and submission to the WWC – Fall 2020

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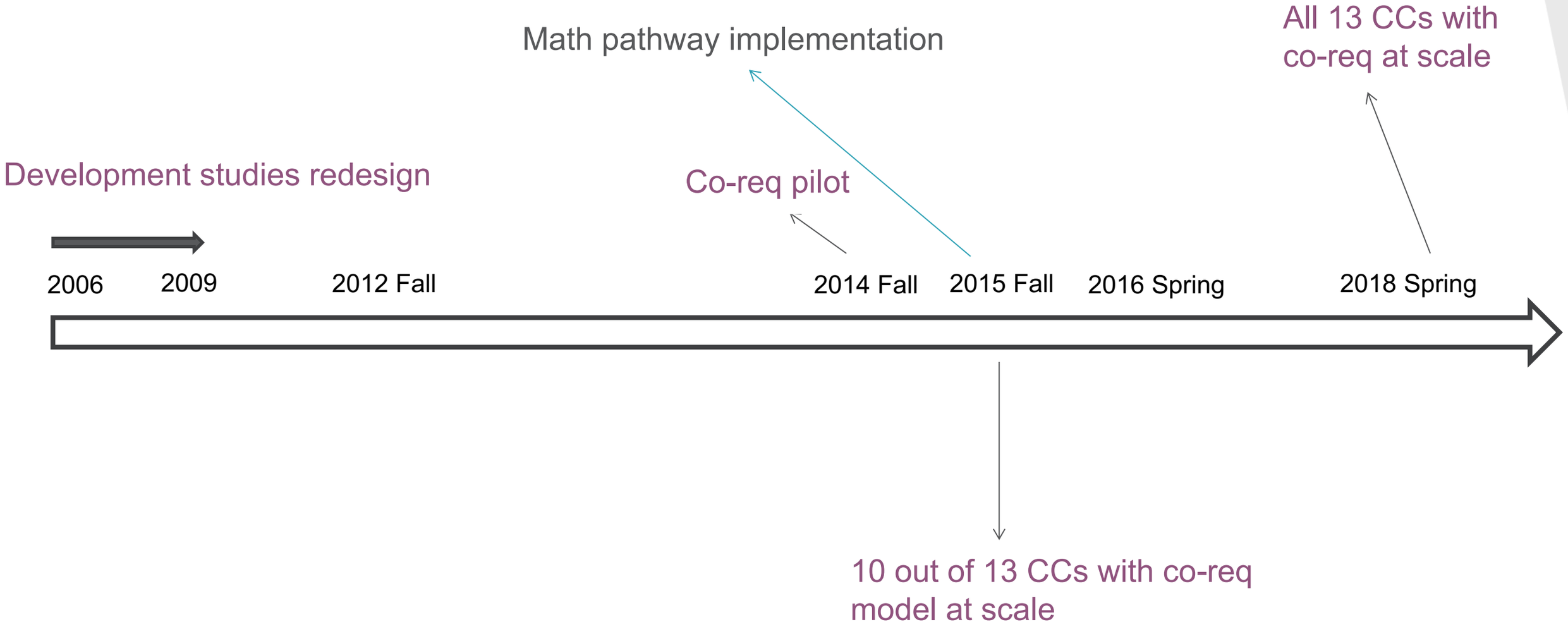
The Effects of Corequisite Remediation: Evidence from a Statewide Reform in Tennessee

Florence Xiaotao Ran, Postdoctoral Research Associate, CCRC

Tennessee Postsecondary Reforms Context

- TN became the first state to implement co-req model system-wide in 2015



Research Questions

- What are the effects of corequisite remediation, compared to traditional prerequisite approach and direct placement into college-level courses without remediation?

- What is driving the effects in math, mainstream or math pathway approach?

- Is corequisite remediation a scalable approach to improve student outcomes in postsecondary institutions?

Gateway Course Outcomes

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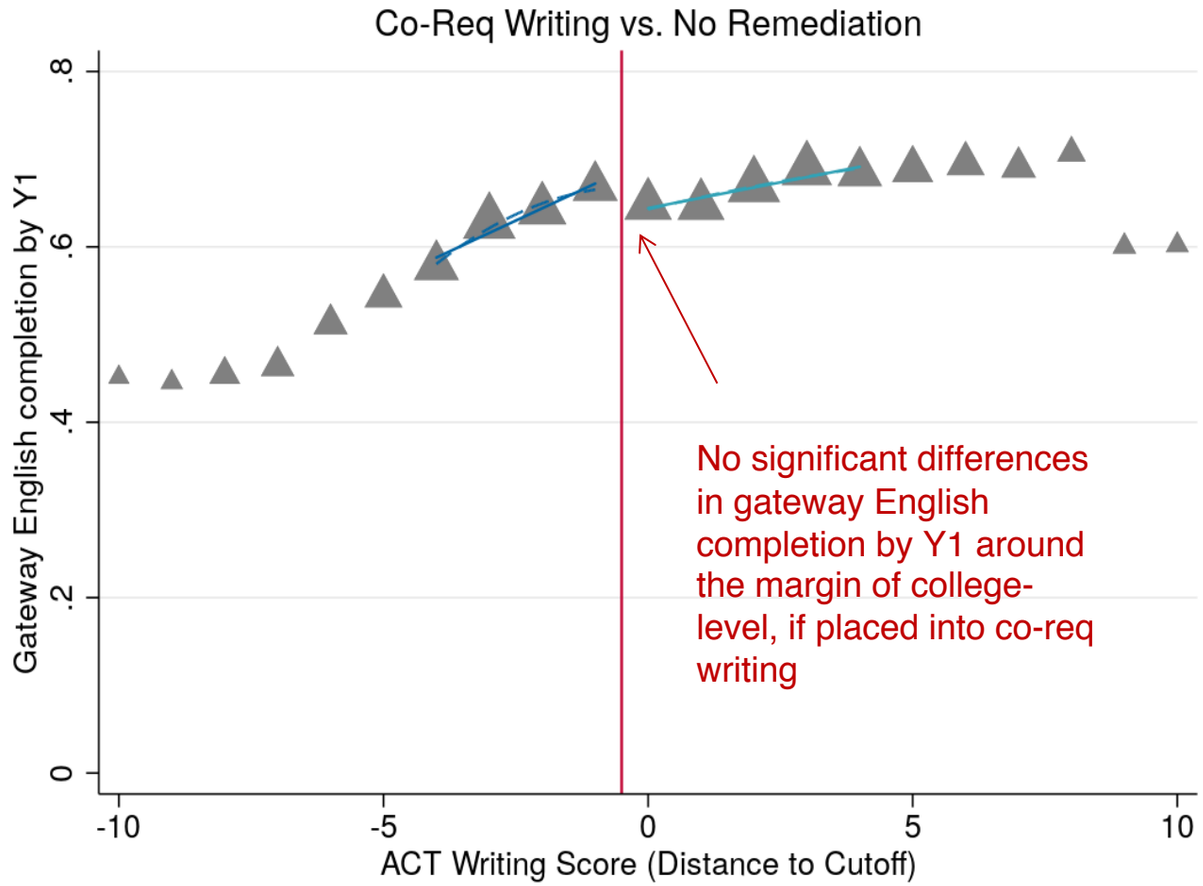
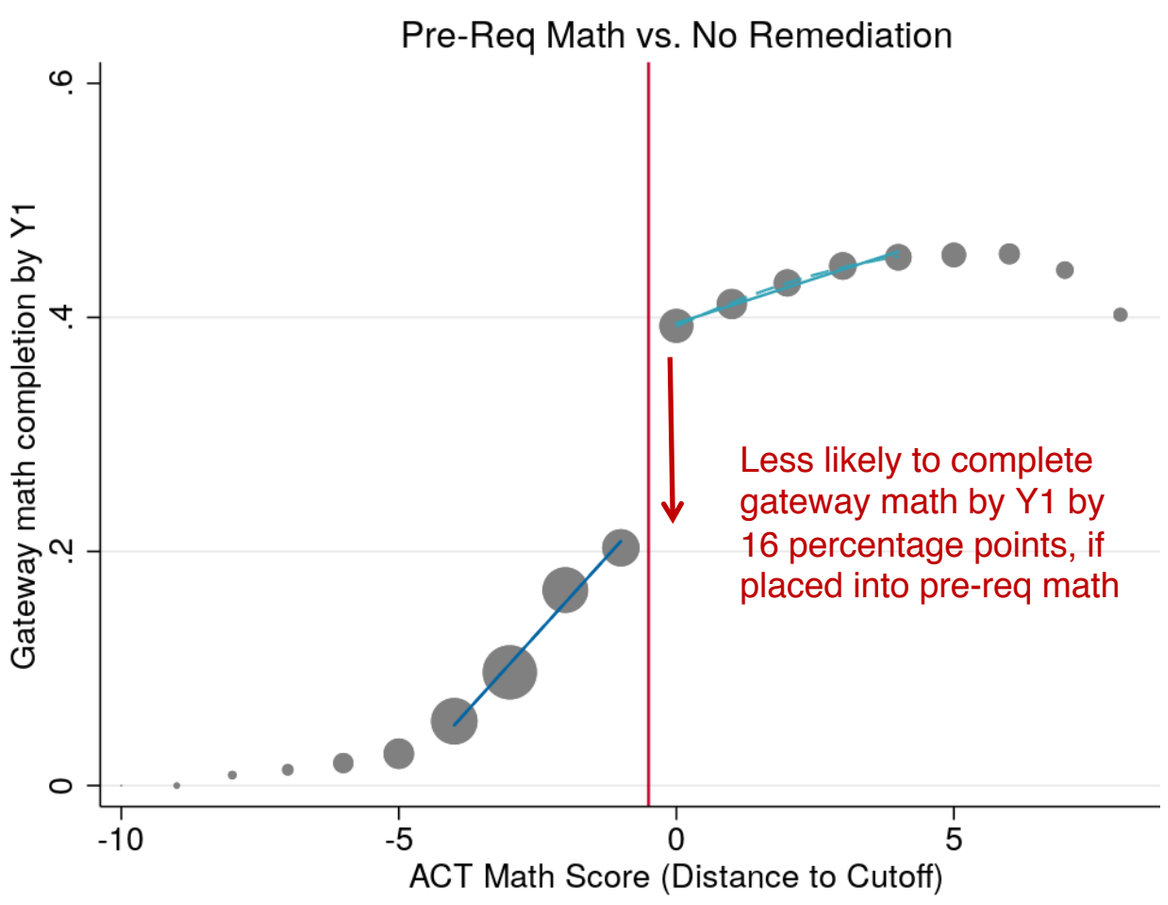
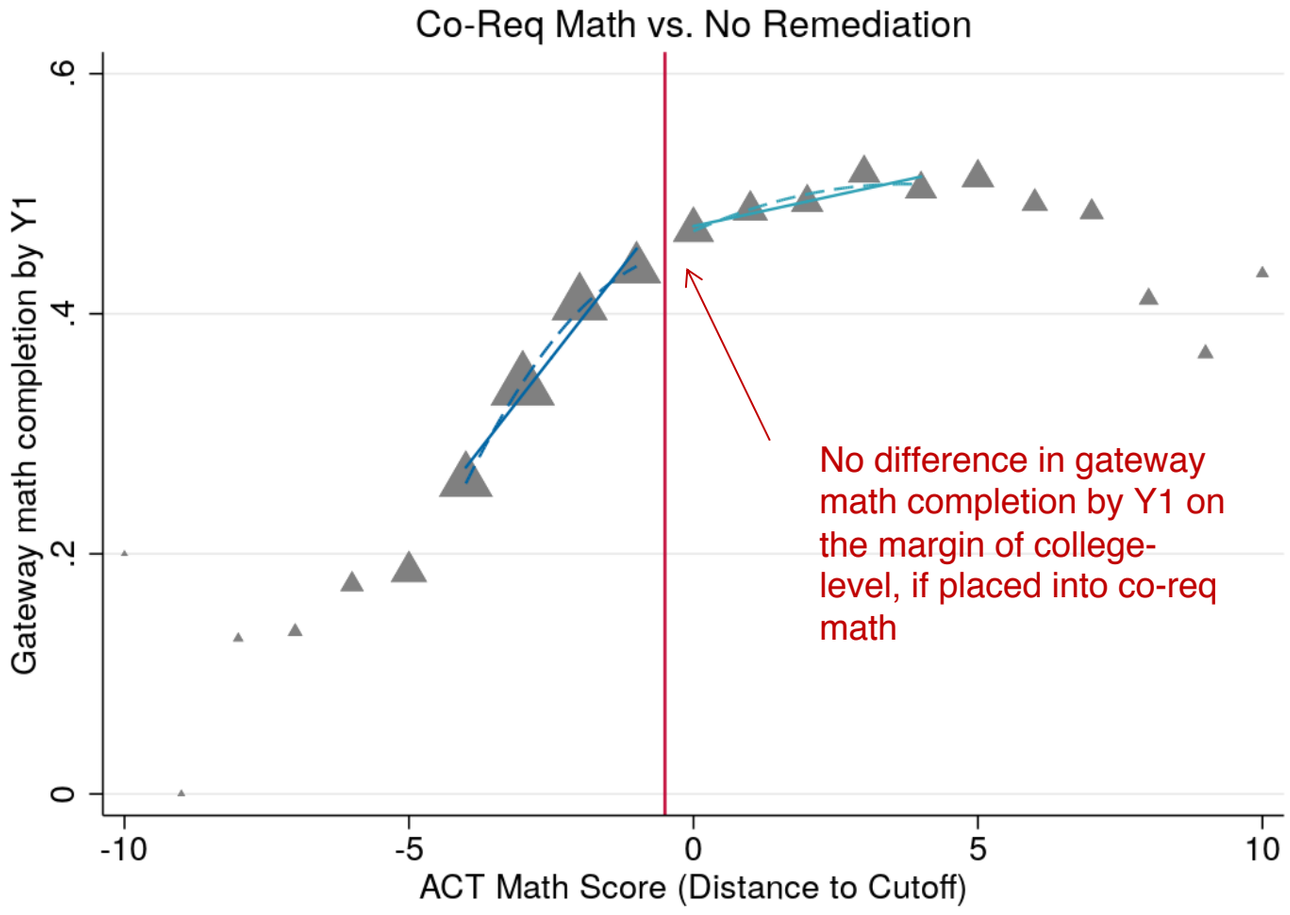
Impacts on Gateway Completion: English



Impacts on Gateway Completion: Math





Math Pathways

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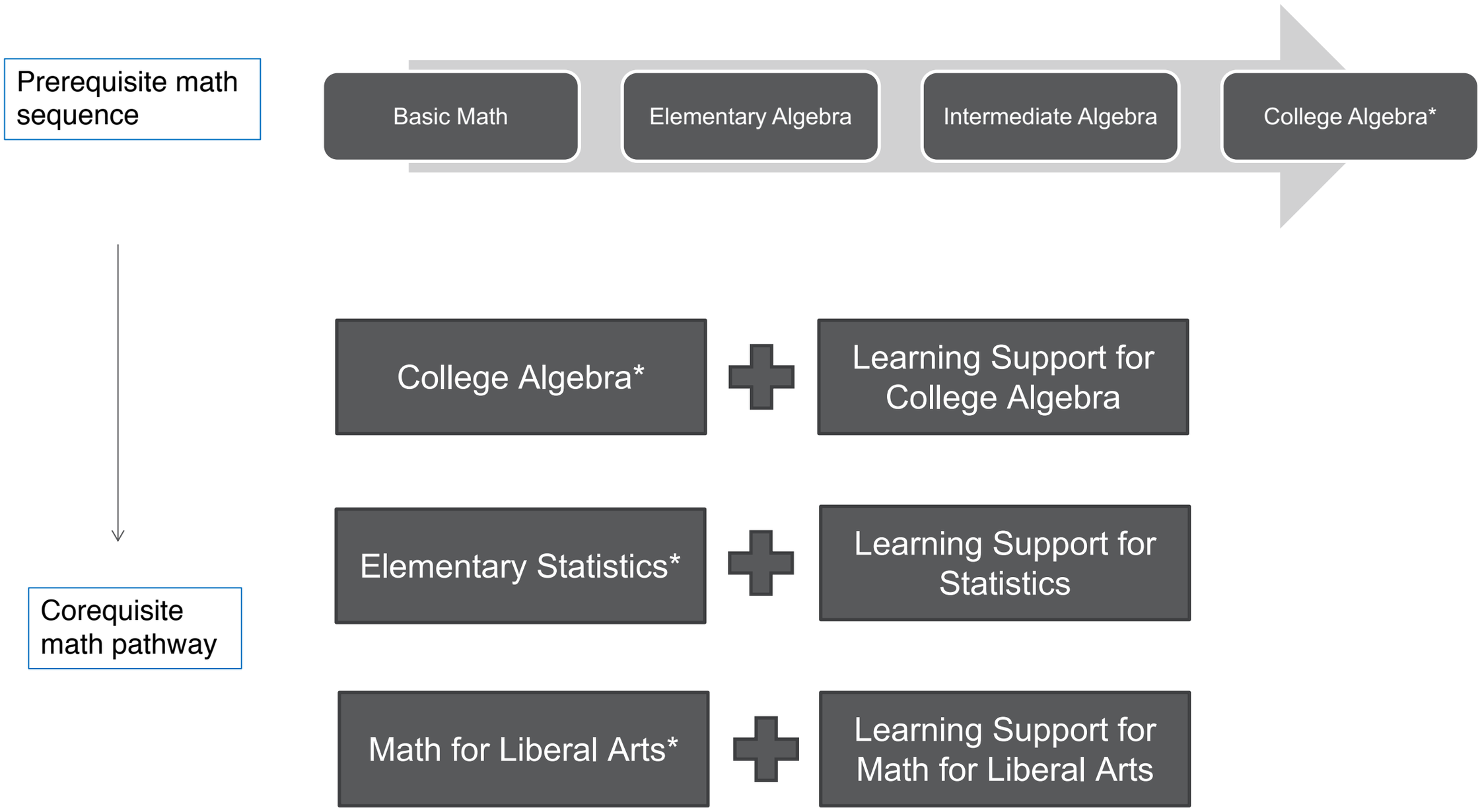
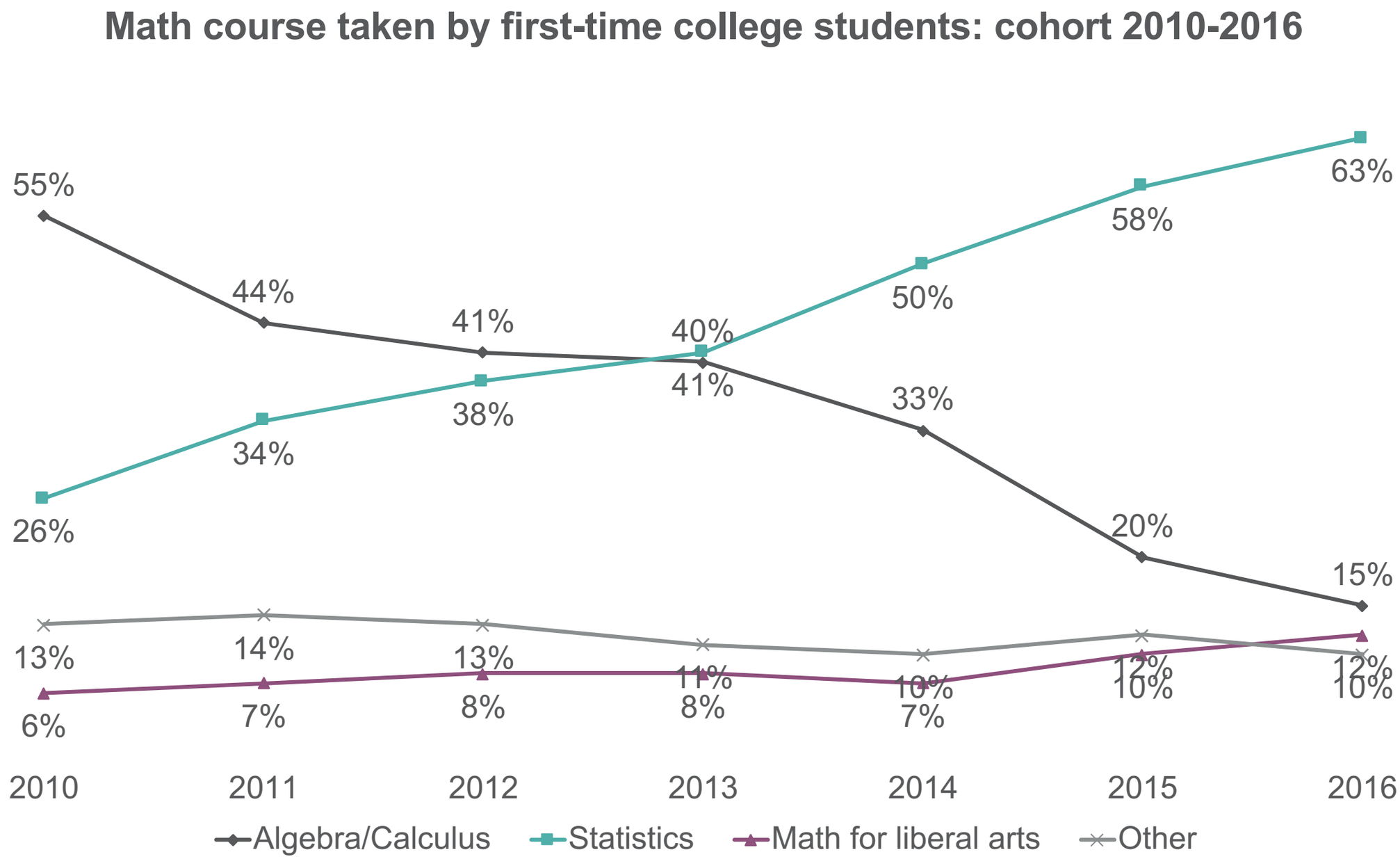
Math Pathway Reform

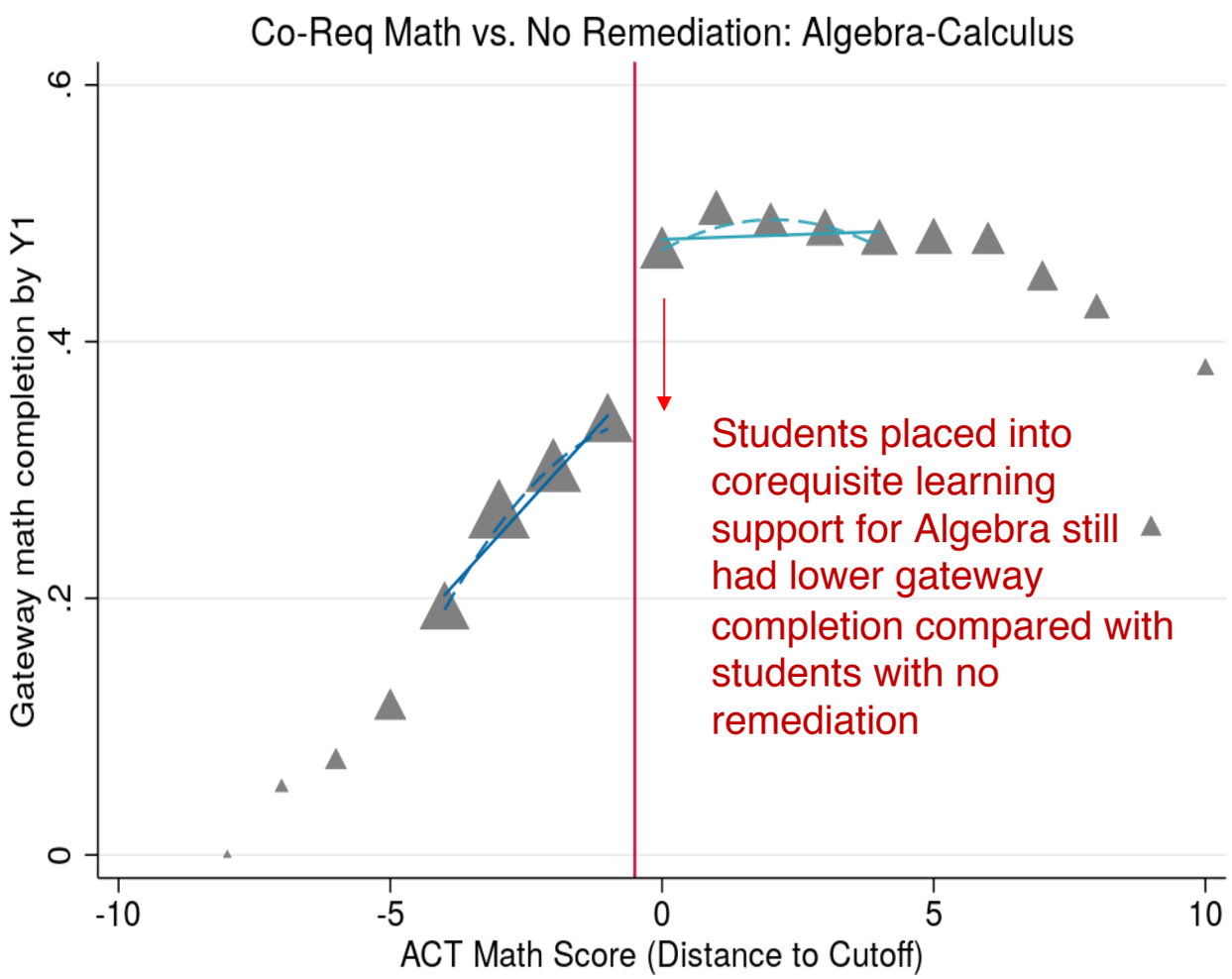


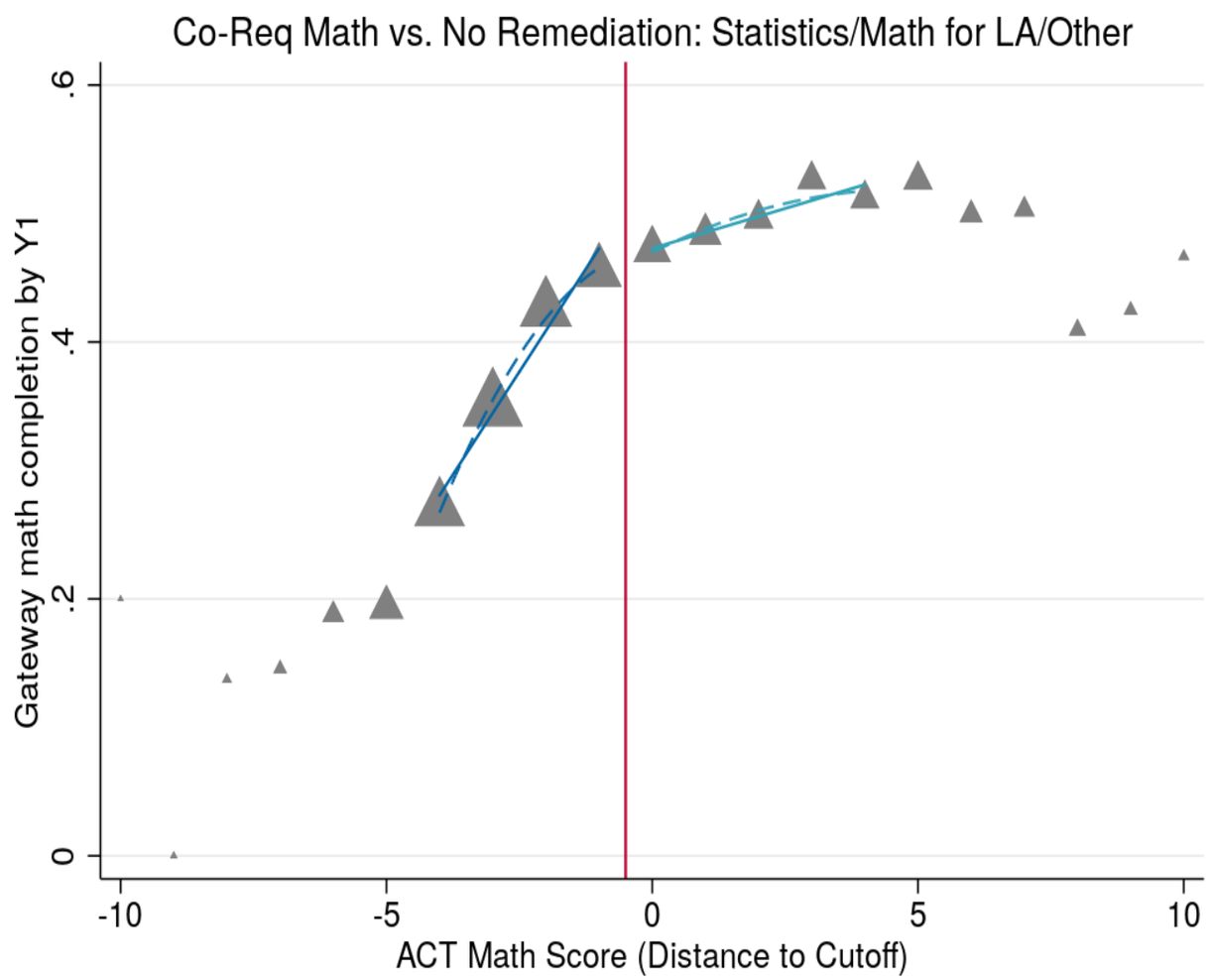
Note: * represents gateway math

Enrollment in Different Types of Math Overtime



Effects on Gateway Completion by Math Pathway





Longer-term Outcomes

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Enrollment & Performance in Next College-Level Math and English

- Students placed into co-req:
  - At least equally likely to enroll in next college-level courses, compared with students placed into either pre-req or no remediation
  - Perform equally well in the next courses conditional on enrollment

- Lessen the concern that instructors would lower the standard when more students were allowed to take college-level coursework

Persistence, Transfer, & Credential Completion

- No significant impacts on
  - College-level credits accumulation
  - Enrollment persistence Y2 & Y3
  - Transfer to four-year colleges by Y3
  - Credential attainment by Y3

- We only have data up to three years after initial enrollment for one post-reform cohort

Policy Implication

- Prerequisite remediation hurts students
- Students benefit from starting in college-level coursework early on
- Students on the margin of college threshold can succeed in gateway and follow-on courses if allowed to enroll
- Students not interested in pursuing a STEM degree benefit from taking math course aligned with program requirement
- Compared to interventions that were able to improve longer-term outcomes?

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Discussion Questions

- What portion of the student population does your sample represent?
- To what are you comparing your reform model?
- What are the core components of your reform model?
- How will students benefit from your reform model?
- What are the institutional costs (or savings) and challenges (or opportunities) associated with implementing your reform model?

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Thank you!

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