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City College · Mesa College · Miramar College
College of Continuing Education

Community of Brilliance

How much dual enrollment do students need?

Stephen Bass, Research and Planning Analyst
Dr. Hongling Yang, Research Associate
SDCCD II&E, OIER
sbass@sdccd.edu

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Introduction: Presentation Contents

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- Discussion

- Overall
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- Gender
- ECC Program
- *Pandemic Impact

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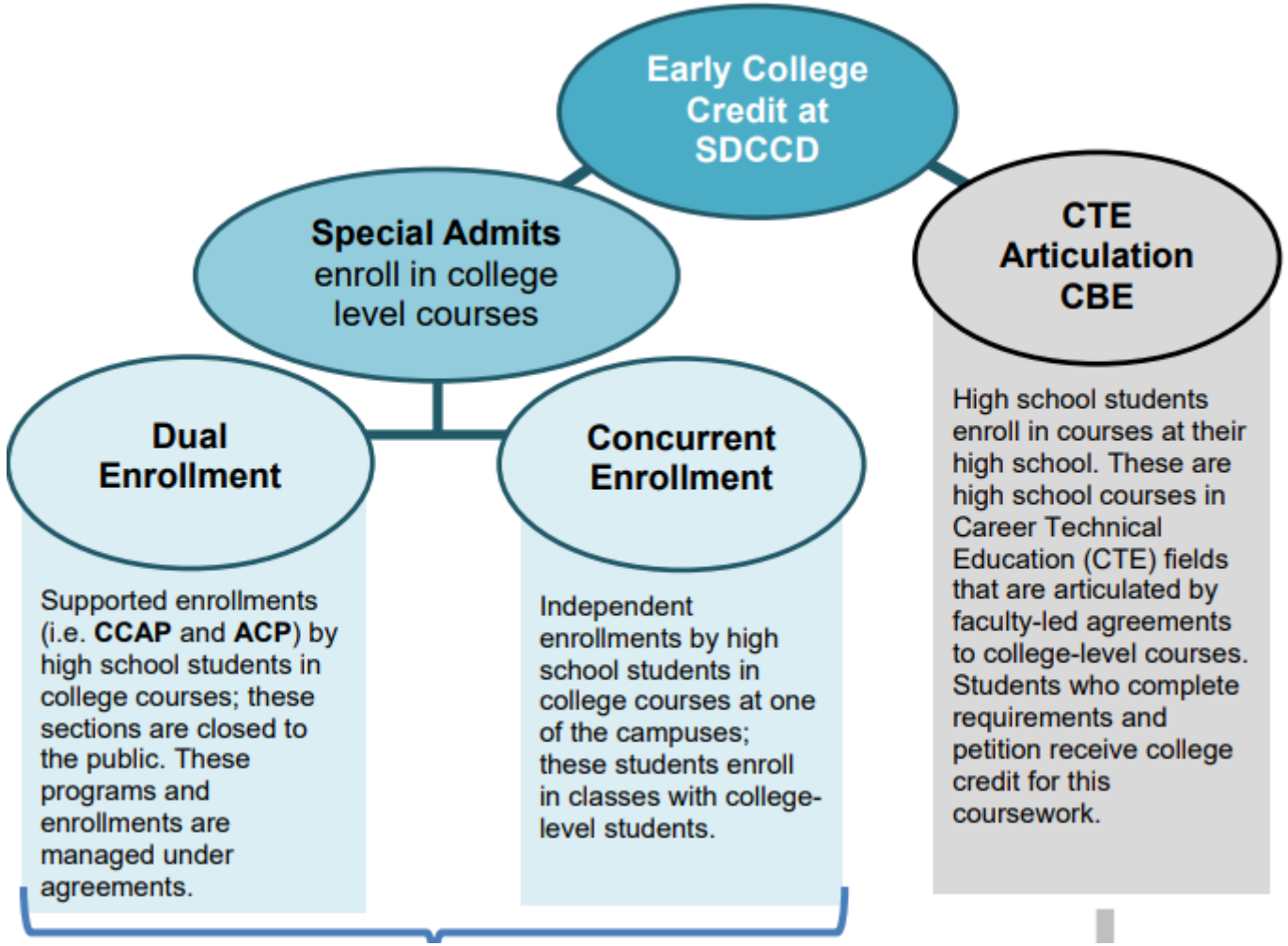
Introduction: Early College Credit at SDCCD

- First-time to college students at SDCCD include **those who earn Early College Credit (ECC)** through SDCCD
- **Entrants** are students who enroll as first-time to college students within one year of high school graduation – these include students with ECC and those without
- One way to evaluate the **impact** of ECC programs is to **compare outcomes of ECC Entrants to Entrants without ECC** ("Comparison Group") in their first year of college



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Introduction: Purpose and Population

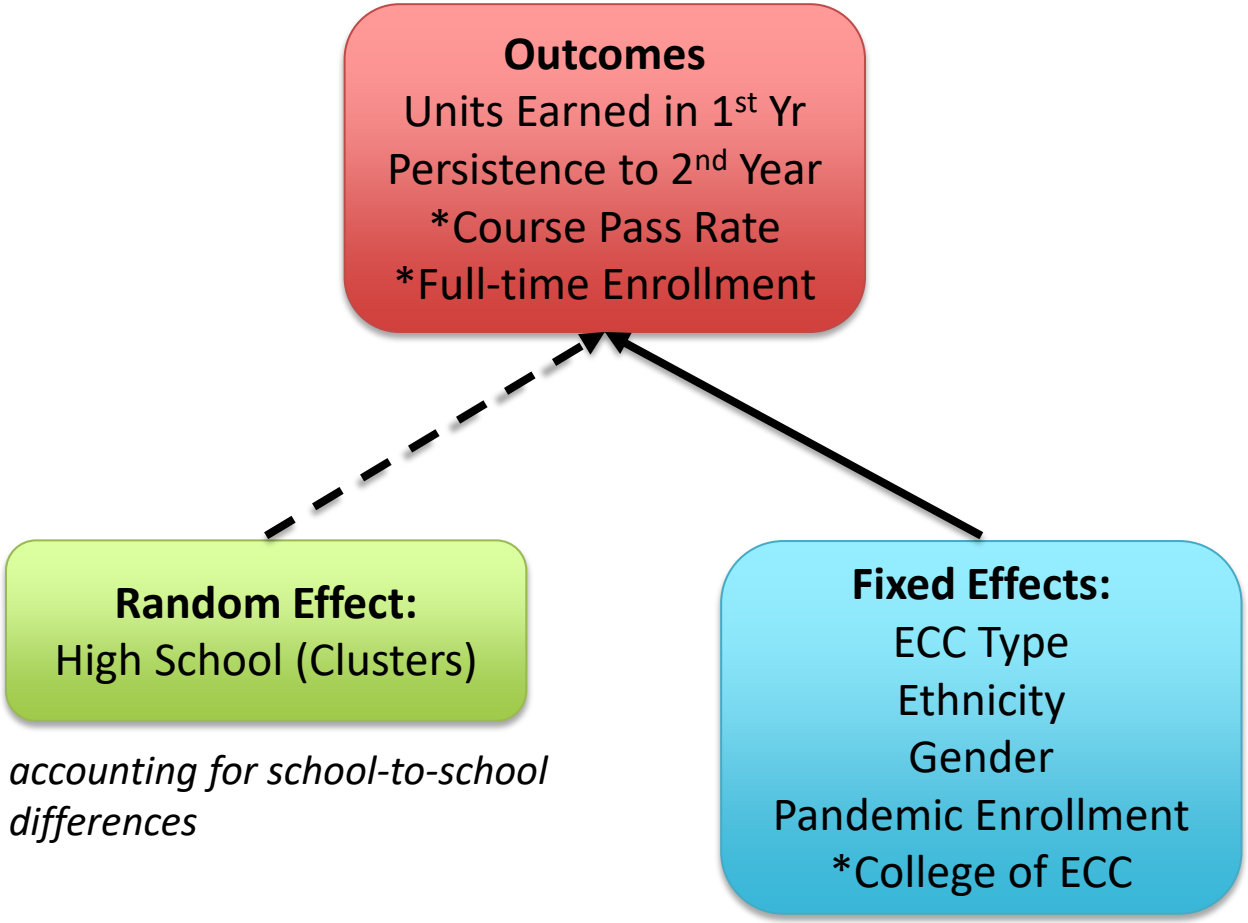
- **Purpose:** Evaluate the **impact** of **Early College Credit (ECC)** on **first-year** college outcomes
- Criteria: High school graduation followed by college enrollment (first-time students; Entrants) within one year
  - **ECC**: Earned early college credit from SDCCD before high school graduation (ACP, CCAP, Concurrent, or CTE Articulation CBE)
  - **Comparison**: Did not earn early college credit from SDCCD
- High School Graduation Years include:
  2019, 2020, 2021, 2022, 2023
- ECC Group includes only students from high schools with 5+ Entrants

Table 1. Unduplicated Headcount, Cohort Year

	High School Graduation Year				
	2019	**2020**	**2021**	**2022**	**2023**
Early College Credit	776	741	666	776	886
Comparison Group	1,387	2,305	2,034	2,138	2,176

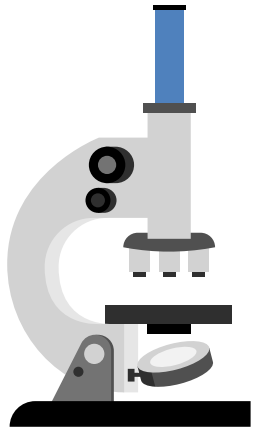
Introduction: Methodology Overview

- Generalized **mixed-effects models (GLMMs)** and **logistic regression** models.
- **High schools treated as random effects (clusters)** in that students from the same school are more similar to each other than to students from other schools.
- A key goal: testing the **Vision 2030 goal of 12+ college units for high school students**.
- **Explorations:**
  - "Is 12+ units enough for students to see more positive outcomes in college?"
  - "Is there a meaningful difference in college outcomes for students who earn less than 12 units?"



Introduction: Methodology Overview

- Outcomes not measured: Outcomes after 1st year of college; Completion (Degree, Certificate, Transfer)
- Momentum towards Completion is key advantage of ECC, and not one fully accounted for by this study
- We focus on how ECC may prepare students for establishing Momentum (units earned and persistence) in first year of college, not on overall degree attainment or transfer



High School & Early College Credit → High School Graduation → 1st Year in College Outcomes → 2nd, 3rd, 4th… Year in college outcomes → Completion

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Analysis 1: Average Units Earned in First Year, **ECC Program**

- **GLMM Finding:** after accounting for school-to-school differences and other factors, ECC students earned on average **3.85 more units** ($p < 0.001$) in their first year of college than comparison group

  e.g., Raw averages (before modeling)
  - ECC: 18.1
  - Comparison: 15.2
- **GLMM Finding:** By Program
  - Dual Enrollment: +3.84 units ($p < 0.001$)
  - CBE: +1.93 units ($p < 0.001$)
  - Concurrent Enrollment: +0.61 units ($p = 0.204$), *not statistically significant*
- **Conclusion:**
  - CBE and Dual Enrollment are strongly associated with higher first-year credit accumulation
  - Concurrent Enrollment does not show a measurable benefit

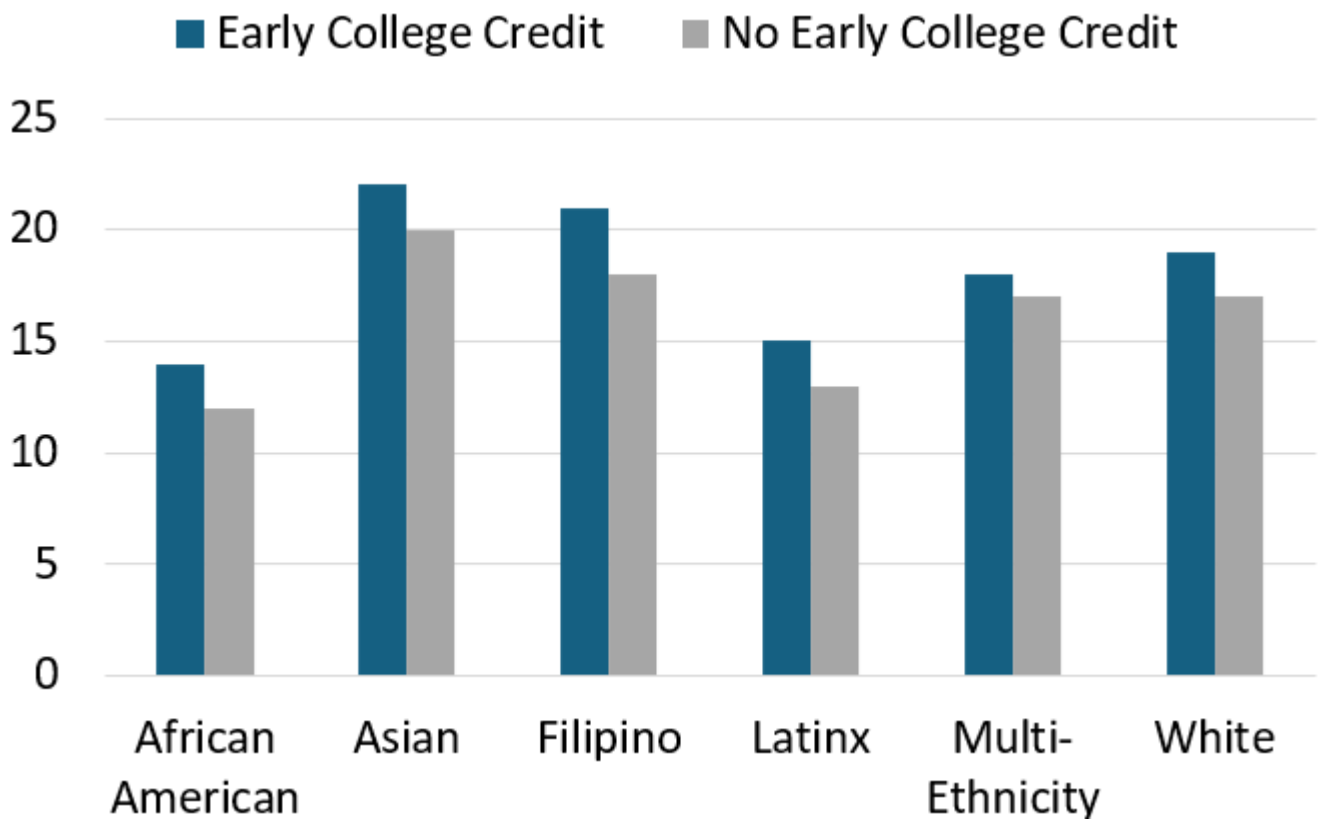
Table 2. Raw Average First-Year College Units by ECC Type

	High School Graduation Year				
	2019	**2020**	**2021**	**2022**	**2023**
All ECC	**17.2**	**17.9**	**17.4**	**18.4**	**18.1**
Comp. Group	13.7	14.6	13.7	14.4	15.2
CCAP	17.4	17.9	17.7	18.4	19.4
ACP	18.4	17.1	17.0	16.8	21.9
Dual Enrollment	17.4	17.6	17.5	18.3	19.5
Concurrent	15.7	17.7	17.8	19.9	19.0
Special Admit	17.2	17.9	17.6	18.4	19.4
CBE	---	21.2	18.3	20.1	17.8

Analysis 1: Average Units Earned in First Year, **Ethnicity**

- Across both Gender and Ethnicity, students with ECC earned more units (+3.43) than their peers without ECC.
- Gender: Male students earned 0.65 fewer units than female students.
- Ethnicity differences, compared to Asian: African American (-4.21), Latinx (-3.60), White (-2.06), Multi-Ethnicity (-2.31)
- Smaller groups showed non-statistically significant differences

Figure 1. Raw Average Units Earned, First-Year College, Ethnicity, ECC, HS Grad Yr 2023



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Analysis 1: Average Units Earned in First Year, **Ethnicity**

Table 3. Raw Average Units Earned, First-Year College, Ethnicity, HS Grad Yr

Ethnicity	Group	2019	2020	2021	2022	2023
African American	Comp.	12.4	12.4	12.8	12.0	11.7
	ECC	16.7	14.6	13.4	14.5	13.9
Asian	Comp.	19.2	19.2	20.0	19.4	20.3
	ECC	19.5	20.5	19.8	20.2	21.6
Filipino	Comp.	14.4	18.9	15.6	15.6	18.2
	ECC	19.8	20.4	21.6	20.8	20.9
Latinx	Comp.	12.1	12.7	11.7	12.1	13.3
	ECC	15.2	16.6	15.3	15.3	14.7
Multi-Ethnicity	Comp.	15.6	14.3	14.3	17.7	17.3
	ECC	17.4	17.3	16.8	18.9	18.0
White	Comp.	14.3	16.1	15.5	17.0	17.2
	ECC	17.5	18.0	16.0	19.8	19.4

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Analysis 1: Average Units Earned, ***College of ECC Credit Origin**

Disaggregating by the college where students earned ECC:

- Dual enrollment in all colleges is particularly impactful
- CBE benefits are strongest at Mesa and Miramar
- ***Note 1:*** This does not control for ECC Units Earned (see slide 15)
- ***Note 2***: Service areas may work like clusters that may need to be adjusted for with between-service area variation

Facts:
- *At many high schools, students earn more CCAP/ACP units than CBE units*
- *More ECC credits in high school often lead to more first-year college credits*

Table 4. Difference in First-Year college units in college of first enrollment, by ECC program type (Compared to Comparison Group)

College	CBE	Dual
City	+1.29	+3.60
Mesa	+2.32	+3.34
Miramar	+2.05	+3.99
Overall	+1.93	+3.84

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Analysis 2: **Persistence** from First-to-Second Year

- ECC students were **significantly more likely to persist into the second year** compared to students without ECC.
  - Odds of persistence for ECC students were approximately 30% higher (odds ratio ≈ 1.30, coefficient = 0.2641, p = 0.002)
- By Program, compared to no ECC
  - Dual Enrollment: **Significantly more likely to persist**, 56% higher odds (odds ratio ≈ 1.56, coefficient = 0.4433, p < 0.001)
  - CBE & Concurrent: not significantly more likely
    - CBE odds ratio ≈ 1.01, coefficient = 0.0140, p = 0.951
    - Concurrent Enrollment odds ratio ≈ 0.86, coefficient = -0.1453, p = 0.305

Students with early college credit were 130%, **or more than twice as likely**, to persist to a second year at SDCCD than first-time students without ECC.

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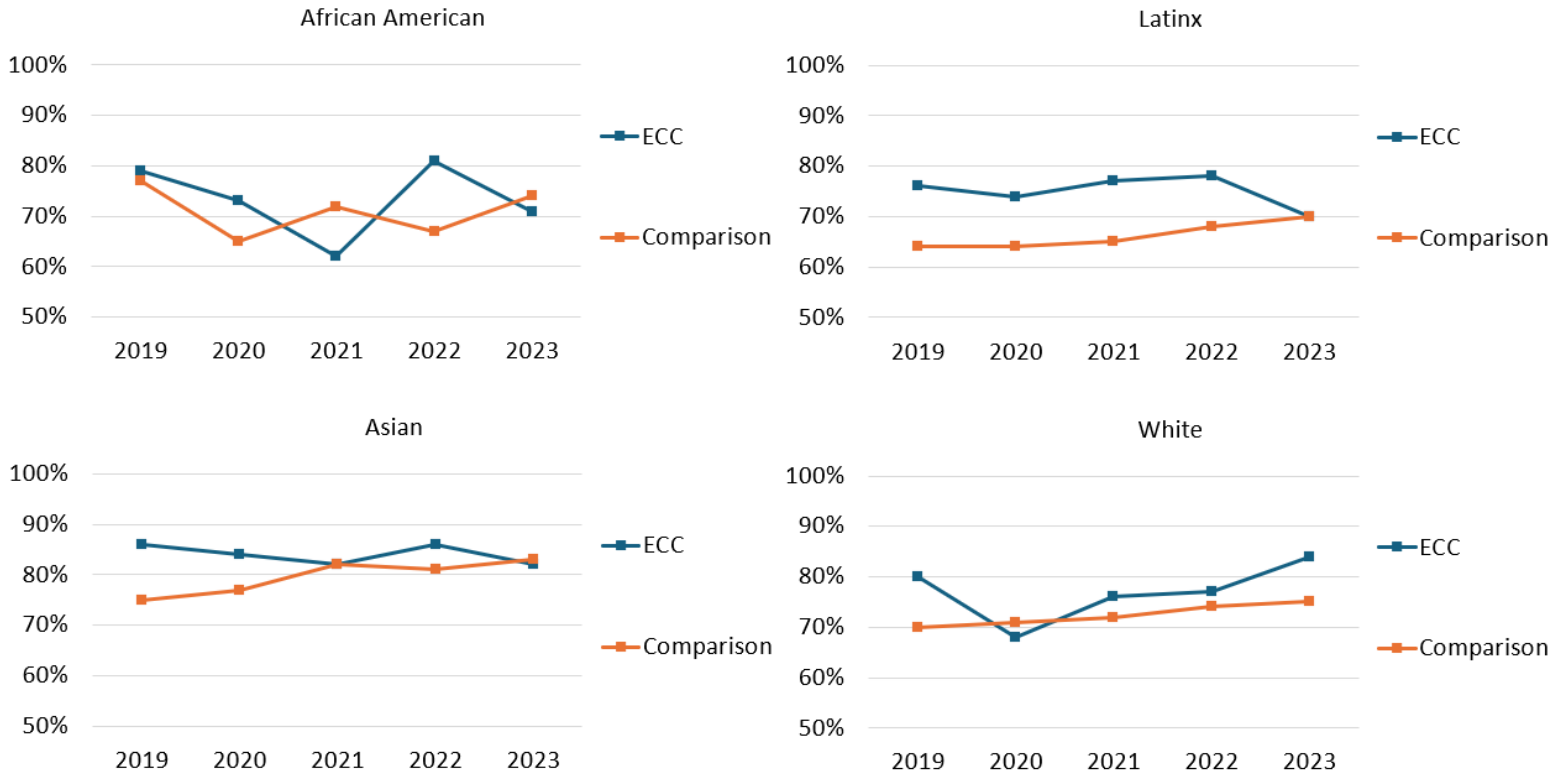
Analysis 2: **Persistence** from First-to-Second Year, **Ethnicity**

- Raw persistence rates show generally higher rates for ECC students
- Latinx students with ECC had higher persistence rates for all graduating classes
- African American and White students with ECC had lower persistence rates during Pandemic years

Figure 2. Raw Persistence Rates by Ethnicity



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Analysis 3: Impact of ECC Units on College Outcomes
Magic Dosage

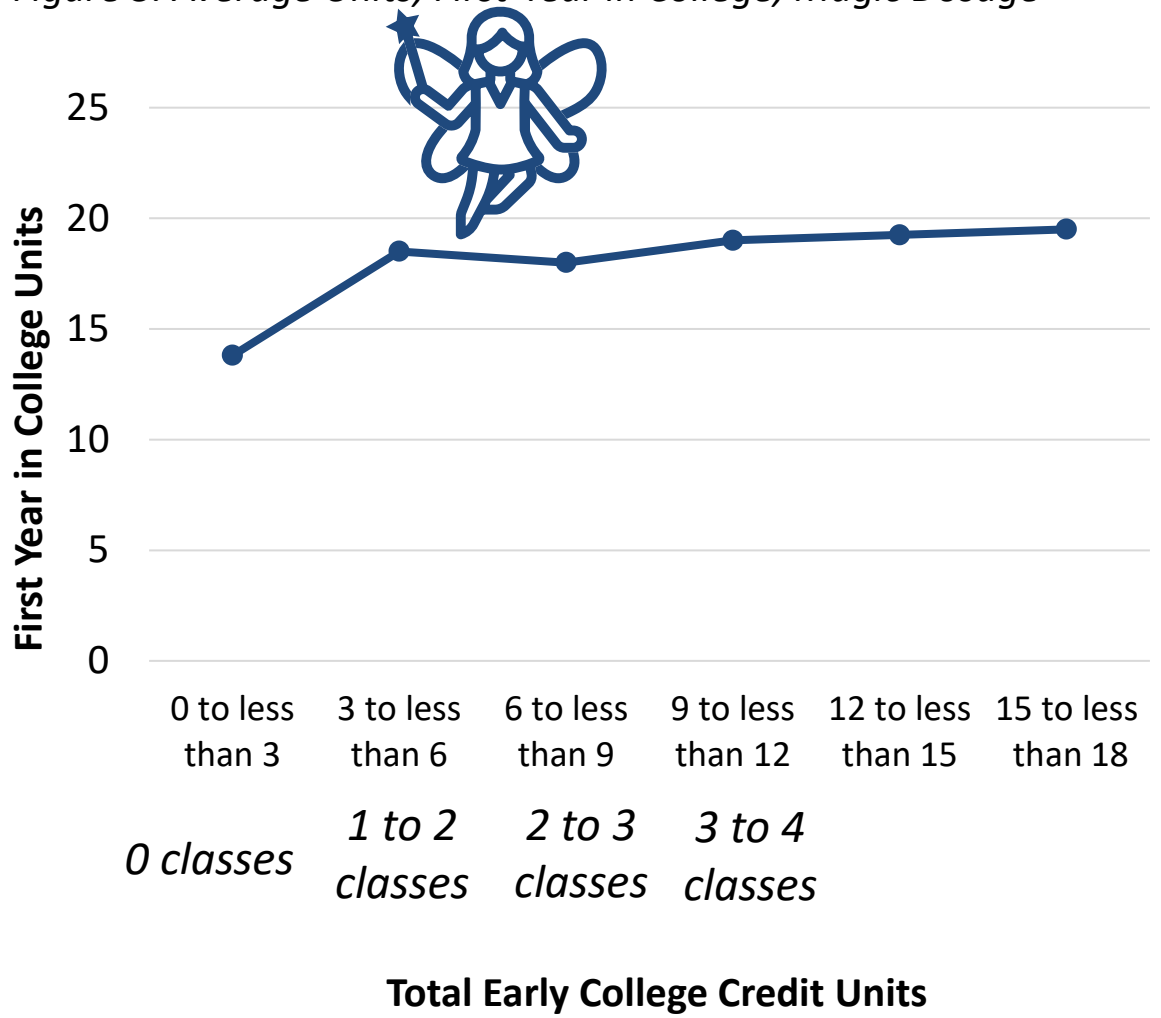
- **Research Question**: How much early college credit do students really need? *Is there a plateau point at which more early college credit doesn't necessarily mean more college units?*
- **Methodology**
  - Only ECC students
  - ECC credits divided into ranges: [0,3), [3,6), [6,9), [9,12), [12,15), [15,18), 18+
  - Reference group: [12,15)-unit group, testing Vision 2030 and CCRC recommendations
- Linear mixed-effects regression model accounts with high schools as clusters (random effect)
- Fixed effects include ECC type, ethnicity, gender, pandemic, college attending.
- Modeling implemented using Python (statsmodels).

Analysis 3: Impact of ECC Units on College Outcomes, Overall

Magic Dosage

- Students with low ECC earned significantly fewer college units during their first year
  - [0, 3) ECC credits: 6.26 fewer units ($\beta = -6.259$, $p < .001$)
  - [3, 6) ECC credits: 3.90 fewer units ($\beta = -3.901$, $p < .001$)
- **No statistically significant differences** in first-year unit accumulation among students earning **between 6 and 18 ECC units**
- **Plateau Point = 6 units**. After 6 units, more early college credit is not meaningfully related to more first-year in college units.

Figure 3. Average Units, First-Year in College, Magic Dosage



Analysis 3: Impact of ECC Units on College Outcomes, Overall
Magic Dosage

CBE Linked to Higher First-Year Average Units Earned

- Recall: Dual enrollment students tend to earn more units in 1st year college than CBE students **(3.84 vs. 1.93 in Slide 5),** partly because of more ECC credits earned through CCAP and ACP classes
- After controlling for total ECC credits earned, students who earned ECC through **Credit by Exam (CBE) earned 1.37 more first-year college units than comparable peers whose ECC credits came from concurrent or dual enrollment**
  - ($\beta = 1.368$, $p = 0.003$)
- Neither concurrent enrollment nor dual enrollment participation alone showed statistically significant effects once ECC credit load and other factors were accounted for

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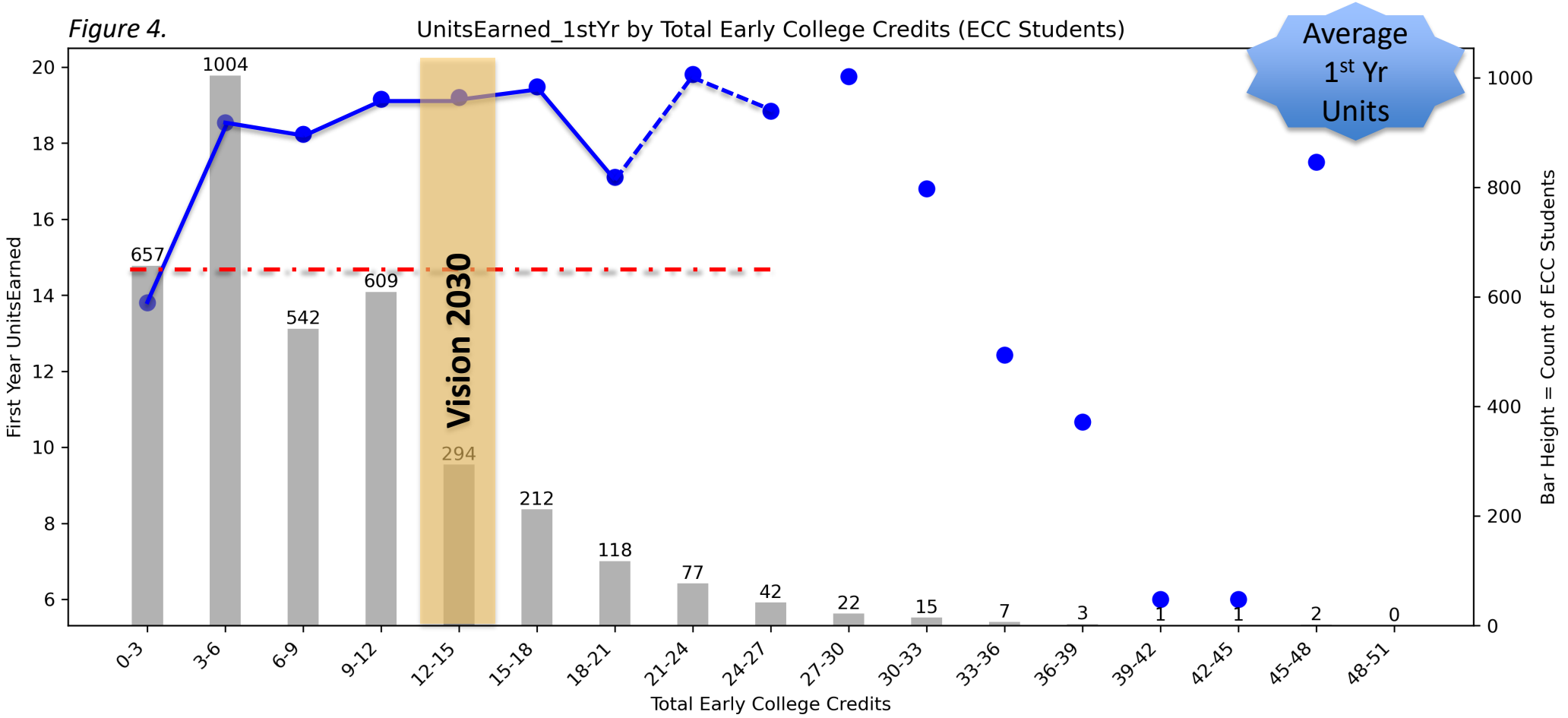
Analysis 3: Impact of ECC Units on College Outcomes, Overall

Magic Dosage

- No significant differences among [6,18) ECC unit groups, suggesting diminishing returns beyond 6 ECC units

Figure 4.



Bar height represents the count of students taking Early College Credits in each bin

Analysis 3: Impact of ECC Units on College Outcomes, Ethnicity

Magic Dosage

- **The plateau point is the same** (3-6 units, 1-2 classes) for **Asian, Filipino, Multi-Ethnicity, and White Students**
- **The plateau point is higher for Latinx students: 6-9 units** (2-3 classes)
- There were not enough students in each of the unit categories to determine a plateau point for African American, Native American, and Pacific Islander students

Figure 5.

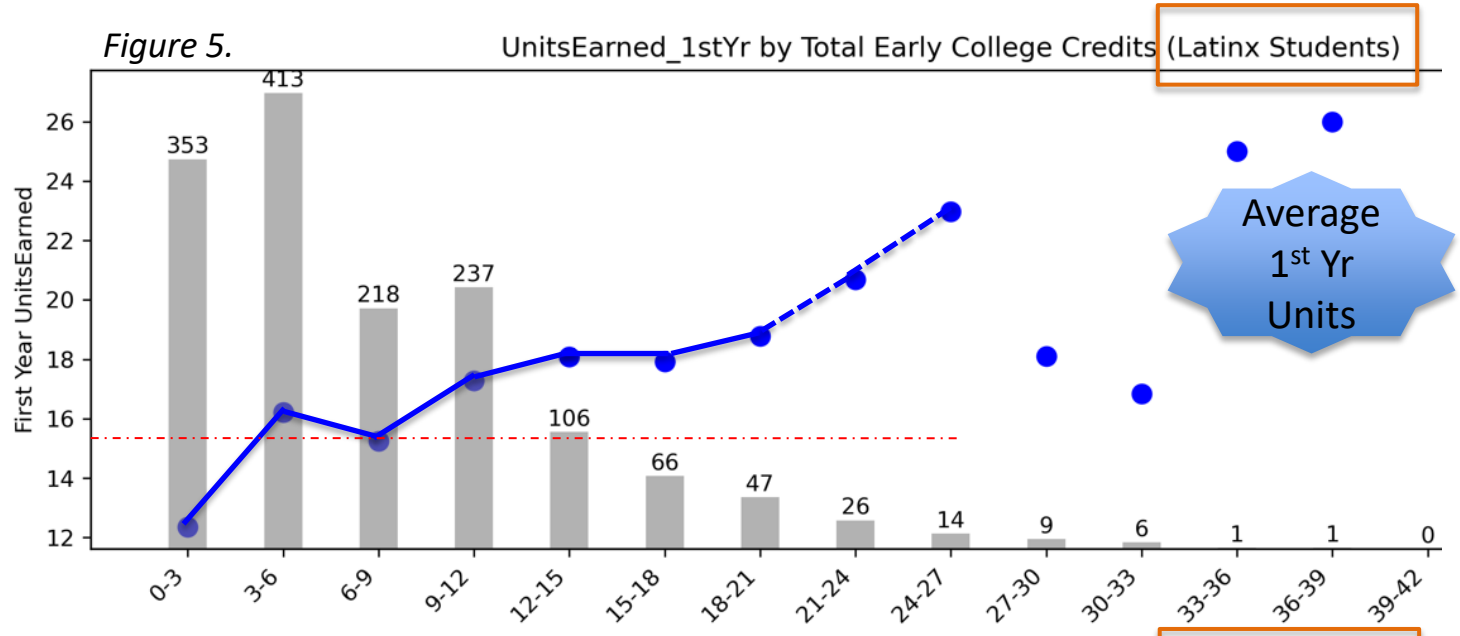
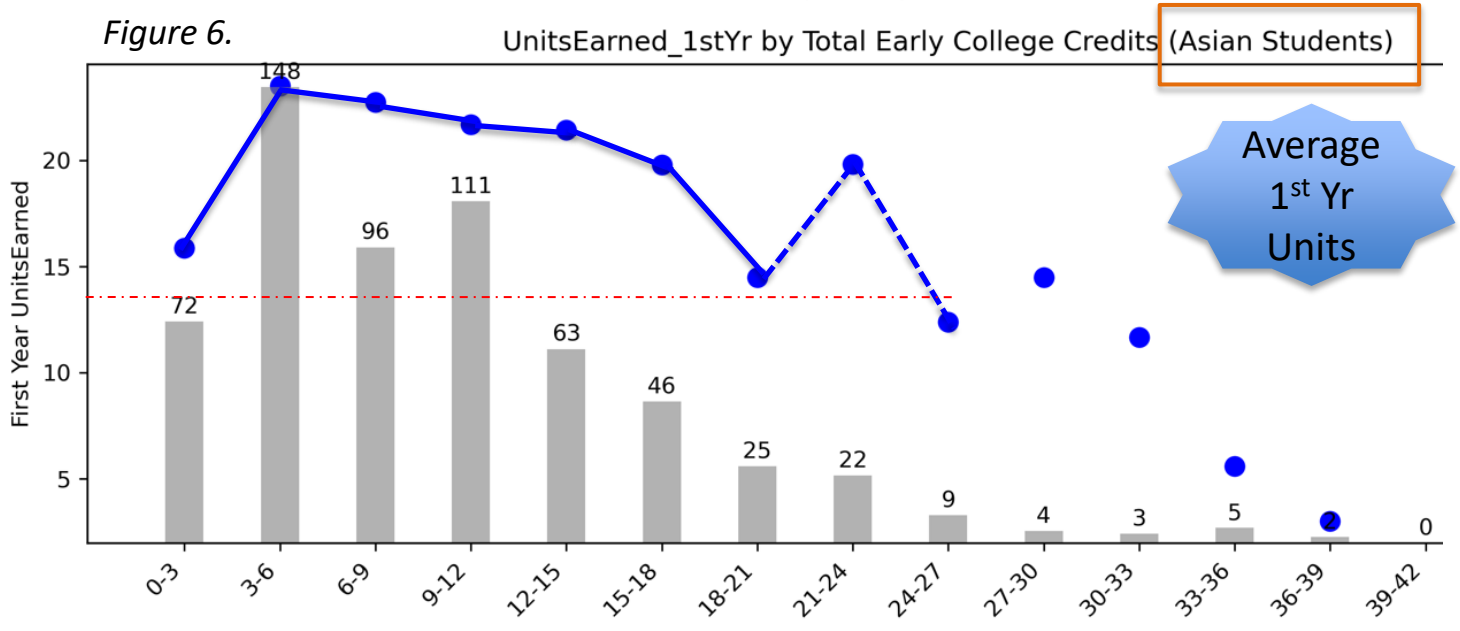


Figure 6.



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Analysis 3:
Impact of ECC Units on College Outcomes, Gender
Magic Dosage

- The **plateau point is the same** (3-6 units, 1 class) for Male and Female students
- There were not enough students in each of the unit categories to determine a plateau point for Non-Binary students

Figure 7.

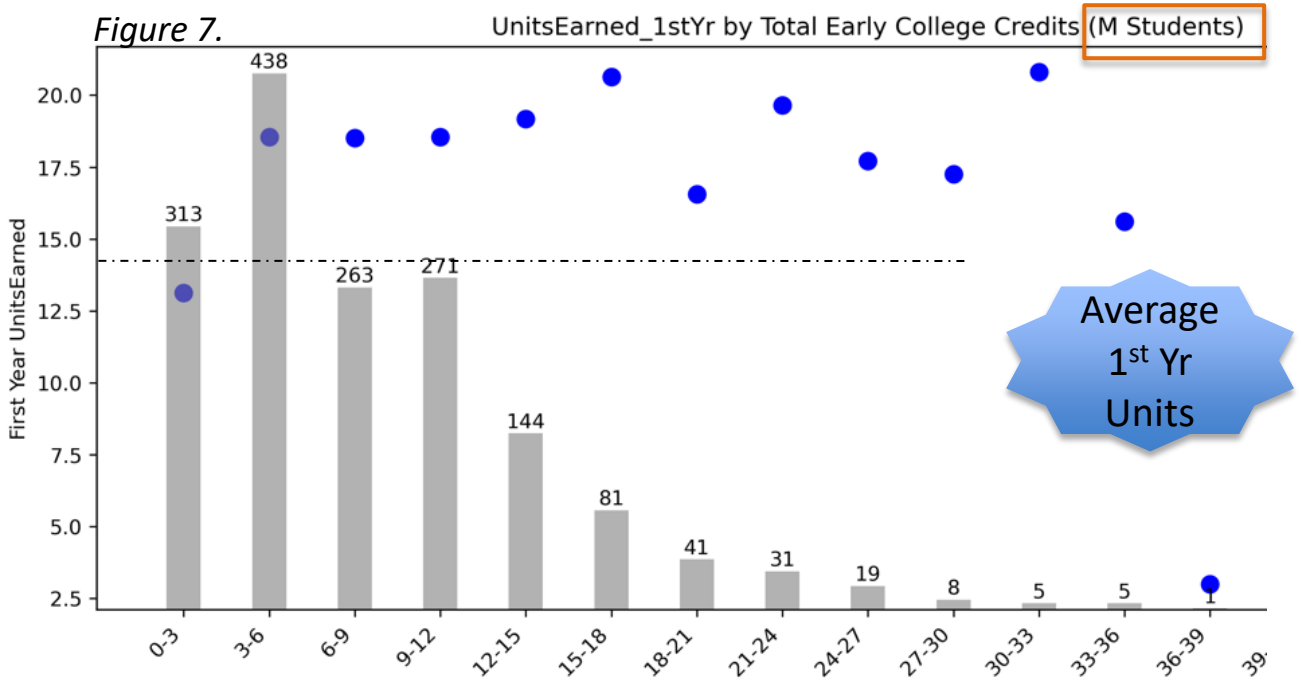
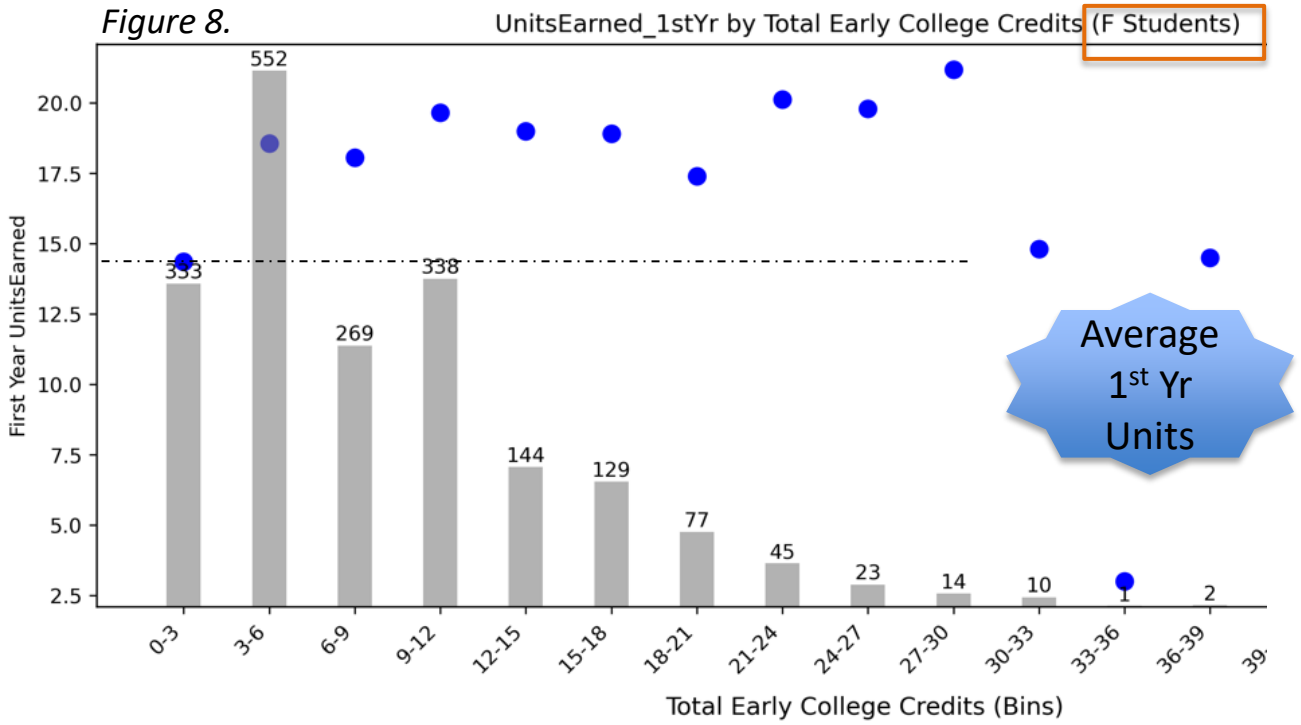


Figure 8.



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Passed Sensitivity Check: Alternative Binning

- Alternative division of ECC total credits: [0,4), [4,8), [8,12), [12,16), [16,20), 20+
- **Findings confirm core trend: moderate ECC load is optimal**
  - Plateau point was [4,8), and we selected 3-unit cut-rates for better resolutions

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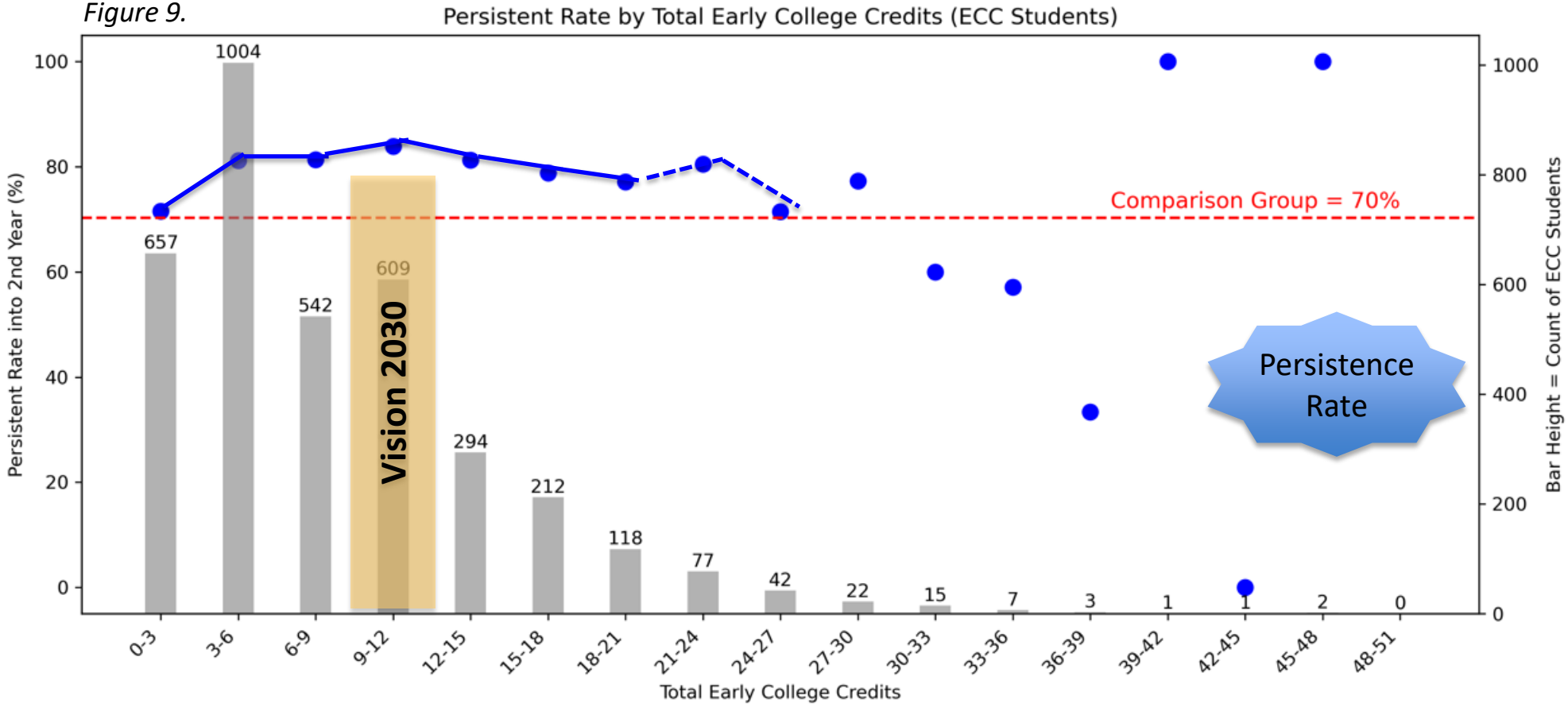
Analysis 3: Impact of ECC Units on College Outcomes—Persistence into 2nd Yr

*Preliminary **Magic Dosage***

- Magic Dosage analysis for Persistence under way, preliminary exploration shows a similar plateau point in the data

Figure 9.



Bar height represents the count of students taking Early College Credits in each bin

Analysis 3: Impact of ECC Units on College Outcomes
Magic Dosage

- Findings
  - **Plateau Point = 6 units**. After 6 units, more early college credit is not meaningfully related to more first-year in college units.
  - For Latinx students, Plateau Point = 9 units
  - No difference between female and male students
  - CBE Linked to Higher First-Year Average Units Earned
  - The 6-unit dosage applies to first-to-second year persistence, as well

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Conclusions: Key Findings

- ECC students outperform peers in units earned, course success, full-time enrollment, and persistence.
- Dual Enrollment shows strongest outcomes.
- Moderate ECC load (6-18 units) yields best results.
- Equity gaps persist but ECC improves outcomes across all groups.
- Pandemic negatively impacted outcomes.

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Conclusions: Discussion Questions

- **How can ECC programs be expanded to address equity gaps?**
- **Should ECC programs target moderate credit loads?**
- How can findings inform collaboration with high schools?
- What additional data is needed to refine dosage analysis?
- How might these findings relate to certificate, degree, and transfer completion rates?
- Are there any relevant lessons to today's programming about different experiences of students through the pandemic?
- **How can ECC support be aligned with retention programs?**