

# Early Momentum Factor Impacts on Transfer and Bachelor's Degree Attainment: A Replication Study

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## PURPOSE OF STUDY

**\*\*TO LEVERAGE THE AVAILABILITY OF MULTIPLE DATA SOURCES TO CARRY OUT EMPIRICAL ANALYSES THAT HELP IN THE DECISION-MAKING PROCESSES OF COLLEGE LEADERSHIP\*\***

- Using a combination of Lone Star College's administrative data and data from the National Student Clearinghouse, this study replicates a portion of a working paper by Lin, Fay, and Fink (2020) of the Community College Research Center (CCRC) at Teachers College, Columbia University.
- Focusing on credential-seeking, fall-entering, first-time-in-college student cohorts, and controlling for demographic and other factors, we examine the relationship between early momentum factors (e.g., completion of gateway English courses, completion of gateway math courses, and accumulation of 24 or more credit hours in the first academic year) and racial disparities in the odds of
  - transfer to a four-year university and
  - attaining a baccalaureate degree.
- We also examine the degree to which the relationship between momentum factors and the outcomes above depend on race/ethnicity and vice versa.

## BACKGROUND

- A major factor influencing students' likelihood of graduating from college is whether and when they overcome the hurdles of early academic milestones such as credit accumulation or passing gateway English and mathematics courses.
- Adelman (1999, 2006), for instance, hypothesized that the faster students can complete college credits, the more likely they are to graduate. That is, the momentum of amassing credits pushes students not to give up on attaining a postsecondary credential.
- McCormick (1999), in his study of university students, found that those who earned 30 or more credits in their first year were two times as likely to graduate as their peers who earned 20 or fewer credits in their first year of enrollment.
- This matters because completion of a degree is associated with higher earnings post-graduation and over the lifespan (Carnevale et al., 2017).
- Applying similar analyses in a community college context can be challenging since not all credentials offered at that level hold the same or similar economic benefit as a bachelor's degree.
- While the market value of a bachelor's degree is primarily determined by major, the value of lesser credentials tend to vary by length of program and by field.
- Also, some sub-baccalaureate degrees, particularly those outside health and STEM fields, are not designed to prepare students to directly enter the workforce but to transfer to a four-year university (Belfield & Bailey, 2017). Thus, the labor-market value is only a potentiality, to be realized at some distant point in the future.
- That there is a delayed labor-market value of community college transfer is not to say there is no present value of said transfer. The value of students being in a community college transfer program is that they are being prepared for success in the university-level bachelor's program.

## DATA AND METHOD

- While Lin et al. used nine years of data, this study used only five years of data for the analysis (2017–2021 AY).
- We use discrete-time survivor analyses to examine the relationship between early momentum factors and racial disparities in the odds of 1) transfer to a four-year university and 2) attaining a baccalaureate degree.
  - Early momentum factors included 1) completion of Gateway English courses, 2) completion of Gateway Math courses, and 3) accumulation of 24 or more credit hours in the first academic year.
  - Controls included demographic factors such as race/ethnicity, gender, economic disadvantage, academic disadvantage, and age group.
  - Also included was a binary control for first year course success rate of less than 70 percent (0 = No, 1 = Yes).
  - Time was treated discretely, with terms combined into intervals.
  - The models are parameterized without an intercept to highlight the odds of transferring or earning a bachelor's degree at each interval.
    - This is accomplished by defining a set of dummy variables corresponding to time period in our models such that:
 
$$\text{logit}(p_{ij}) = \alpha_1 D_{i1} + \alpha_2 D_{i2} + \alpha_3 D_{i3} + \alpha_4 D_{i4} + x'_{ij} \beta$$
      - The intercepts are transformed to the probability scale to obtain the baseline hazards.
      - x is included to account for additional observed sources of variation.
  - We also examine interaction effects to test whether the relationship between early momentum factors and either transfer to a 4-year university or associate's degree receipt depend on race/ethnicity or vice versa.
  - In models excluding interactions, the coefficients are exponentiated to show odds ratios for ease of interpretation.
  - Predictive margins of interaction effects are shown in graphical form for ease of interpretation.

## SUMMARY STATISTICS

Table 1. Summary Statistics by Transfer Status and Bachelor's Degree Attainment.

Variable	Non-Transfer		Transfer		No BA/BS		Earned BA/BS	
	m	sd	m	sd	m	sd	m	sd
Gender								
Female	0.538	0.499	0.576	0.494	0.542	0.498	0.628	0.483
Male	0.462	0.499	0.424	0.494	0.458	0.498	0.372	0.483
Race/Ethnicity								
White	0.250	0.433	0.319	0.466	0.259	0.438	0.397	0.489
Black	0.163	0.370	0.145	0.352	0.163	0.369	0.078	0.268
Hispanic	0.492	0.500	0.398	0.489	0.477	0.499	0.369	0.483
Asian/Pacific Islander	0.054	0.225	0.098	0.297	0.061	0.238	0.113	0.317
Other Race	0.041	0.198	0.041	0.198	0.041	0.198	0.042	0.201
Age Group								
Under Age 25	0.147	0.355	0.085	0.279	0.137	0.344	0.082	0.274
Age 25 and Older	0.853	0.355	0.915	0.279	0.863	0.344	0.918	0.274
Economically Disadvantaged	0.370	0.483	0.317	0.465	0.365	0.481	0.236	0.425
Academically Disadvantaged	0.426	0.494	0.180	0.384	0.387	0.487	0.112	0.315
Completed Gateway English in First Year	0.393	0.488	0.574	0.495	0.423	0.494	0.587	0.493
Completed Gateway Math in First Year	0.203	0.402	0.396	0.489	0.234	0.423	0.436	0.496
Earned 24 or More Credits in First Year	0.362	0.480	0.542	0.498	0.387	0.487	0.661	0.473
Course Success Rate Less Than 70% in First Year	0.293	0.455	0.107	0.309	0.264	0.441	0.031	0.173

Note: These data represent 64,260 students who were enrolled at LSC in one of five fall cohorts (fall 2016, fall 2017, fall 2018, fall 2019 or fall 2020) as of the census date for the specific term.

## DISCRETE-TIME LOGISTIC REGRESSION MODELS

Table 2. Estimates from Discrete-Time Logit Model of Transfer and Bachelor's Receipt.

	Transfer Model	Bachelor's Receipt Model
Male	0.925***	0.752***
Race/Ethnicity (ref. = White)		
Black	1.115***	0.594***
Hispanic	0.675***	0.538***
Asian	1.044	0.845**
Other Race	0.771***	0.680***
Economic Disadvantage	0.929***	0.749***
Academic Disadvantage	0.542***	0.349***
25-Years and Older (ref. = Under 25 Years of Age)	1.467***	1.165*
Completed Gateway English in First Year	1.105***	1.032
Completed Gateway Math in First Year	1.296***	1.303***
Earned 24 or More Credits in First Year	1.878***	2.878***
Course Success Rate Less Than 70% in First Year	0.552***	0.229***
n (person terms)	1,006,075	548,762
log L	-60,955	-11,934
df	17	16

Note: Baseline hazards for intervals are excluded here. Coefficients, which have been exponentiated, can be interpreted as multiplicative effects. \*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001; two-tailed tests.

Holding other variables at fixed values:

- The effect of having completed Gateway English in one's first year of college is associated with a 1.105 times (or 10.5 percent) greater odds of transferring to a 4-year university. There is no statistically significant relationship between completing Gateway English and earning a bachelor's degree.
- The effect of having completed Gateway English in one's first year of college is associated with a roughly 30 percent greater odds of both transferring to a 4-year university and attaining a bachelor's degree.
- Earning 24 or more credits in the first year of college is associated with a 1.878 times (or roughly 88 percent) greater odds of transferring to a 4-year university and a 2.878 times (or 188 percent) greater odds of attaining a bachelor's degree after leaving Lone Star College.
- A course success rate of less than 70% in the first year of college is associated with lower odds of either transferring (about 45 percent lower) or attaining a bachelor's degree (about 77 percent lower).
- Black students have a slightly higher odds of transferring than do white students, while Hispanic and other race students have a much lower odds of transferring.
- Racial minorities have a lower odds of attaining a bachelor's degree than their white peers.
- Economically and academically disadvantaged students have a lower odds of either transferring or attaining a bachelor's degree.

## RACE x EARLY MOMENTUM FACTOR INTERACTIONS

Figure 1. Predictive Margins on Likelihood of Transfer to Senior Institution by Select Early Momentum Factors

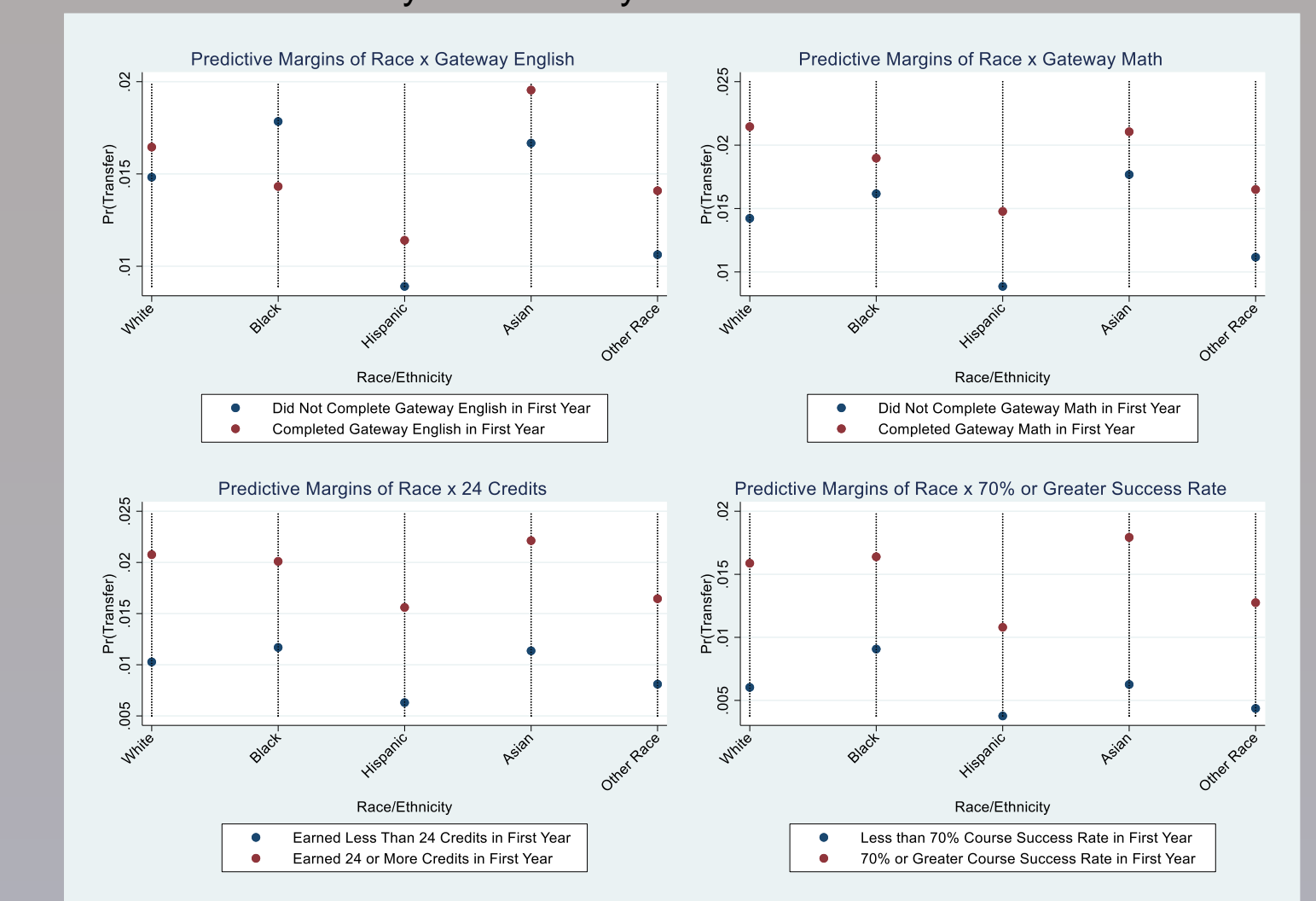
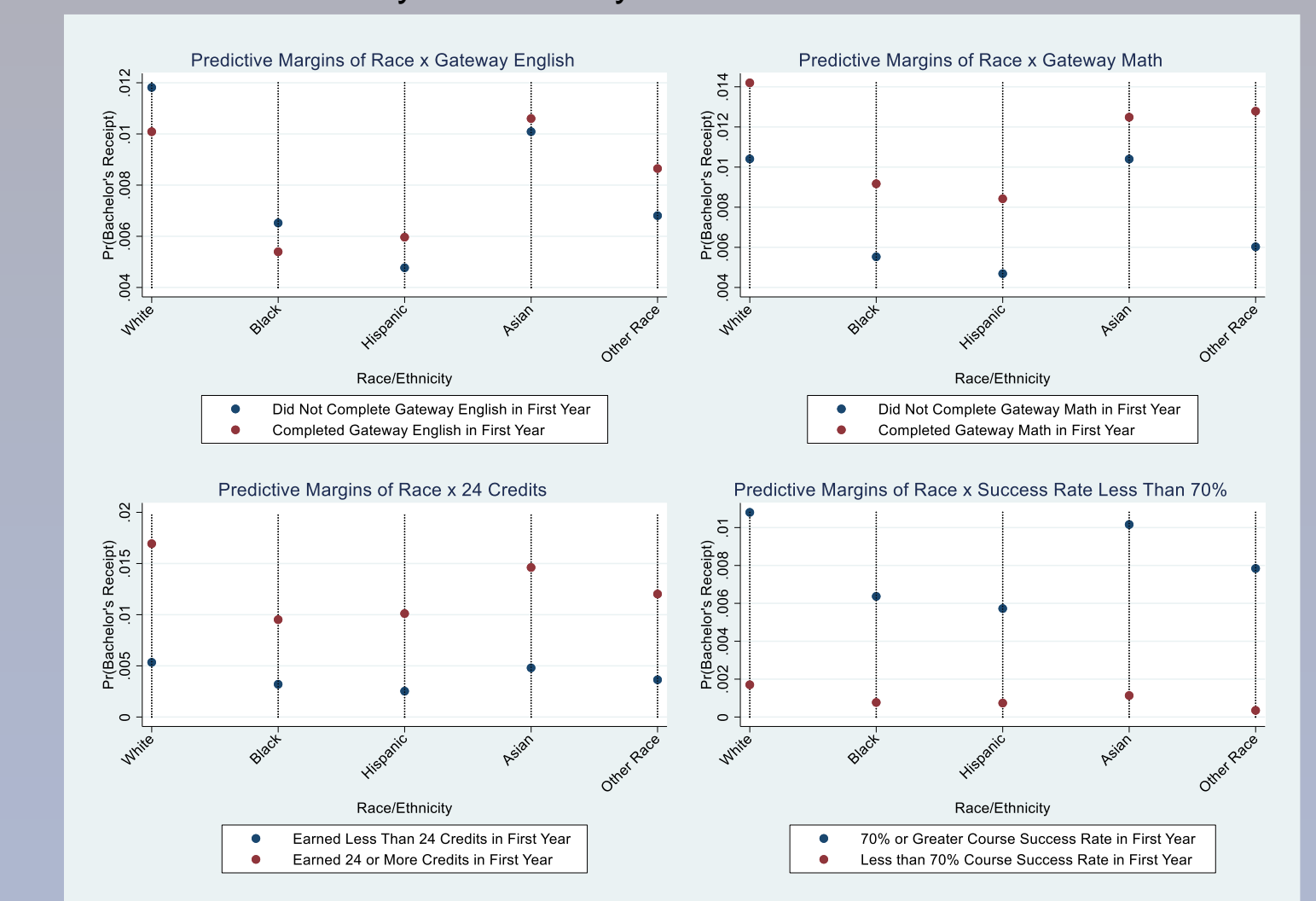


Figure 2. Predictive Margins on Likelihood of Bachelor's Degree Receipt by Select Early Momentum Factors.



- With respect to the odds of transferring from Lone Star College to a 4-year university, all racial/ethnic groups seem to benefit equally well from earning 24 credits or achieving a course success rate of greater than 70% in their first year.
  - White students tend to benefit less than their peers from completing Gateway English, though non-completing whites still have higher odds of transferring than either blacks or Hispanics.
  - Black students benefit less than their peers from completing Gateway Math, with very little difference in the odds of transferring between the completers and non-completers.
- With respect to the odds of going on to receive a bachelor's degree, having a course success rate of greater than 70% in the first year is important for all races/ethnicities, though the biggest impacts are for whites and Asians.
  - The predictive margins for the interaction effects of Race/Ethnicity and completing Gateway English on the likelihood of attaining a bachelor's degree are very small by comparison.

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