12-15-2021

Examining Arkansas' Freshman GPAs and Long-Term Outcomes

Sarah R. Morris

Sarah C. McKenzie

Charlene A. Reid

Office for Education Policy
University of Arkansas

ARKANSAS EDUCATION REPORT
Volume 18, Issue 12

EXAMINING ARKANSAS' FRESHMAN GPAS AND LONG-TERM OUTCOMES

By:

Sarah R. Morris

Sarah C. McKenzie

Charlene A. Reid

December 15, 2021

Office for Education Policy
University of Arkansas
211 Graduate Education Building
Fayetteville, AR 72701
Phone: (479) 575-3773
Fax: (479) 575-3196
E-mail: oep@uark.edu

Table of Contents

I. INTRODUCTION

This study examines the Grade Point Averages (GPAs) of high school freshman in Arkansas and their relationship with later outcomes. Using de-identified student-level data from 2009-10 to 2018-19 from the Arkansas Department of Education, this research investigates trends in freshman GPAs, how these trends vary for different demographic and socioeconomic groups, and the relationship of freshman GPAs to high school graduation and college enrollment.

We follow seven cohorts of Arkansas first-time freshmen who were enrolled in twelfth grade four years later. Using regression analyses controlling only for student demographic characteristics, we find a one-point gain in freshman GPAs to be associated with a six percentage point increase in the likelihood of graduating high school. Although statistically significant, over 95% of Arkansas students currently graduate high school. Our more practical, significant finding is that a one-point gain in freshman GPA is associated with a 26-percentage point increase in the likelihood of college enrollment. This study follows Chicago's Consortium on School Research's findings and finds freshman GPAs strongly influence future academic successes. We discuss our findings on the importance of freshman GPAs, and we suggest policies to help all subgroups of freshmen succeed.

Prior Literature on GPAs and Later Outcomes

In recent years, high school grade point averages have been analyzed by researchers and found to be strong predictors of future outcomes like high school graduation, college enrollment, and college graduation (Allensworth & Clark, 2020; Belfield & Crosta, 2012; Bowers et al., 2013; Easton et al., 2017; Farmer & Hope, 2015). Furthermore, high school grade point average (HSGPA) is a stronger predictor for success and college graduation than performance exams like the ACT or the SAT, perhaps because a high GPA takes more discipline than a high test score

(Farmer & Hope, 2015; Komarraju et al., 2013). In addition, a HSGPA can predict a student's non-cognitive success adapting to the college setting and outer life struggles (Kopotic, 2020). Therefore, high school grades are becoming widely accepted as a better indicator of a student's future success than standardized test scores.

A student's freshman GPA might be a more powerful predictor of success than the four-year HSGPA. In 2017, The University of Chicago's Consortium on School Research designed a study to examine the importance of a students' freshman GPA. Easton et al. (2017) report that freshman GPAs are statistically valid and predict future academic success. In Chicago, students' freshman GPAs have indicated graduation prediction up to 80 percent accuracy (Allensworth et al., 2018).

Freshman year is typically a transition year for U.S. students. In many cases, students move to a different school beginning in ninth grade, disrupting their support and social networks (Seeskin et al., 2018). In addition, students are in a new environment with different academic expectations, often receiving less attention from their teachers (Seeskin et al., 2018). For example, in Seeskin et al.'s (2018) report, in the transition from eighth to ninth grade Chicago Public Schools' students' grades decline and behavior problems increase. Amidst this transition, students report depression, fewer friendships forming, and increased negative thoughts about their future success (Seeskin et al., 2018). Research suggests that these developmental challenges lead to a decline in the freshman students' academic performance (Andrew & Flashman, 2017; Felmlee et al., 2018; Rosenkranz et al., 2014).

Rosenkranz et al. (2014) report an abrupt attendance change; freshman students accrue almost four times as many unexcused absences as they did as eighth-graders. Increased absences, declining positive academic habits, and unsteady friendship groups can lead to class failure

(Seeskin et al., 2018). Although nearly all students experience drops in their GPAs in non-core courses (e.g. P.E., Health, Art) between eighth and ninth grade, students who struggle in eighth-grade core courses are more likely to fail a class during their freshman year. When students fail a course in high school, they must accumulate an additional credit to graduate in four years (Seeskin et al. 2018).

Beyond analyzing GPAs for all students, researchers examine freshman high school students' demographics, and salient associations emerge. Research suggests that ethnic minorities may experience the highest chance of loss in high school transition (Sutton et al., 2018). Seeskin et al. (2018) report that the GPA decline from eighth to ninth grade varies most for Black and Hispanic males. Sutton et al. (2018) report white and black males experience the steepest drops in their GPAs (0.12 and0 .16 points lower than white females), while the highest-achieving black males experience the greatest academic loss (earning a freshman GPA 0.20 lower than black females). High-achieving white females have the greatest continuing academic GPAs between middle and high school (Sutton et al., 2018). High-achieving white females continue to get ahead while high achieving black males fall behind.

Researchers also find gender, race/ethnicity, and socioeconomic status differences in longer-term outcomes such as high school graduation and college enrollment. Females graduate high school at higher rates than males (Autor et al., 2016), but white females are 5 to 6 percentage points less likely to graduate high school than black females (Clark & Shi, 2020). Students from more economically disadvantaged backgrounds are at a higher risk of having lower high school GPAs (Malecki & Demaray, 2006). Black students from disadvantaged backgrounds have educational gaps compared to white students (Autor et al., 2019). Autor et al. (2019) find a high school graduation gender gap within lower socioeconomic status families,

placing lower SES males even more disadvantaged for high school completion. In 2018, Hispanic and Black women's college enrollment was around 9 percentage points higher than their male counterparts. (Reeves et al., 2021).

Interventions

Interventions have been implemented in schools to help improve freshman GPAs. Allensworth et al. (2018) report Diplomas Now schools use a team to review targeted students' data, assign interventions to help these students, and follow progress for the struggling students. The teachers share information about the struggling students across platforms to guide one another to serve the student best (Allensworth et al., 2018). Allensworth et al. (2018) also suggest that schools set goals around attendance, monitor them weekly corresponding with their new, assigned interventions for students, and report the impacts.

Other ideas to intervene with low freshman GPAs and attendance include online portals for grades, enacting no zero policies, and school-wide summaries. For example, when schools utilize online portals, parents and students can track progress with real-time updates of ; A no zero policy helps students achieve in their classes without a zero bottoming out the 100-59 score scale; and parents to compare their child's progress compared school-wide if schools send out weekly progress reports on grades and attendance rates (Allensworth et al., 2018).

Seeskin et al. (2018) propose freshman Success meetings that focus on the support needed to help a student in the transitional period. The students would be organized randomly into groups to discuss what they need throughout the year, and the teachers can have the freedom to implement what they feel is essential to the student based on the following week. In addition,

these meetings allow teachers to monitor students with high freshman GPAs yet low attendance rates, as they are in danger of not graduating, too (Seeskin et al., 2020).

Clark et al. (2016) report a positive association between a freshman mentorship program and graduation rates. Eleventh- and twelfth-grade students dedicated time in their school day to mentor freshman students. Giving these freshmen students a set-aside time to connect with their peers, adjust to their environment, and receive help on their academic tasks positively affected their GPAs and graduation rates.

A similar call is placed by Malecki and Demaray (2006), encouraging schools to provide social support programs for free or reduced lunch (FRL) students. These programs are associated with higher academic performances in high school, and schools should consider adding programs that allow more excellent social supports for students living in lower SES lives. Shoulders et al. (2019) also report teachers and counselors should give students with lower high school GPAs more attention and more academic assistance.

Moreover, Murnane recommends positive peer group influences that can help increase socioeconomic students' academic success. Park and Denson (2013) insist on an environment where teachers can build relationships with their lower socioeconomic students because this will help fulfill their need to belong. Having their teachers and administration realize and take the time to understand their different types of subgroup obstacles can help them succeed. As Park and Denson (2013) mention providing financial aid to these students for college is not the only solution—schools must meet the problem head-on by forming relationships and mentorship opportunities for these students.

In Chicago Public Schools (CPS), regular data reports flag at-risk freshman students with Early Warning Indicators (Allensworth et al., 2018). This Freshman OnTrack program is a strong predictor of high school graduation for CPS schools while the number of OnTrack students has increased 23 percentage points since 2009, graduation rates have risen (Seeskin et al., 2018). CPS students are on track if they have earned five credits and have no more than one core course failure their freshman year (Seeskin et al., 2020). During a student's freshman year, their teachers will reach out and develop strategies to get the student back on track (Allensworth et al., 2018).

Early interventions for high school freshmen and college enrollment decisions are also associated with positive outcomes. Muntz (2000) finds parents to be a key predictor of students enrolling in college. He finds when high school counselors have conversations with the families early in high school, the families have a clearer idea of what college possibilities look like for them. King (2012) finds college information workshops for parents and communities early on in the child's high school career to positively influence college-going rates.

HSGPAs in Arkansas

On a state level, high school GPAs are gaining attention when compared to SAT or ACT scores. For example, at the University of Central Arkansas, Smith and Zagurski (2013) increased the HSGPA requirements for the honors program. This requirement led to an increased retention rate in the program, and they found HSGPA was the only variable correlated to the retention and diversity of students.

At the University of Arkansas' Dale Bumpers College of Agriculture, Food and Life Sciences, researchers tracked graduation statuses of first-year students observed from 2001-2010. Shoulders et al. (2019) report that HSGPAs significantly ($p < .001$) differentiated between

graduates and non-graduates of the program. Each standard deviation increase in HSGPA was associated with a 224% increase in the likelihood of graduating. In their findings, students with higher HSGPAs were more likely to graduate.

Because of the inconsistencies in predicting future success using standardized testing results, more than 800 higher education institutions (including Texas Tech University, University of Arizona, and the University of Memphis) have chosen not to require the ACT or SAT as part of the college admission process (Smith & Zagurski, 2013). Instead, these institutions focus more on the HSGPA as a predictor of future success.

In the state of Arkansas, leaders tie HSGPA to accountability measures and scholarship opportunities for students. The US DOE approved Arkansas' ESSA plan in January 2018, where schools are held accountable for achievement, growth, teacher qualification, student grades, and more. This accountability connection should lead schools to feel more responsible for students' GPAs. Students can also be awarded high HSGPAs, as Arkansas students who maintain a 3.5-grade point average can be awarded the Governor's Distinguished Scholarship, earning $5,000 per semester for college.

This study:

This study examines the association of Arkansas' freshman GPAs with their high school graduation and college enrollment. In addition, this study examines the differences in student backgrounds and demographics like gender, race, and free or reduced lunch (FRL) status and the correlations those differences can have upon their high school graduation and college enrollment. Research on freshman students' GPAs in the state of Arkansas is limited, therefore, we wish to

examine the relationship between freshman GPAs and later student outcomes to see the level of influence the freshman year of high school has on the later success of Arkansas students.

This investigation specifically attempts to answer the following questions:

- What do freshman GPAs look like over time? Do freshman GPAs vary by student populations?

- What is the relationship between freshman GPAs and high school graduation for students in Arkansas? Are there differences in the relationship across different student populations?

- What is the relationship between freshman GPAs and high school graduation for students in Arkansas? Are there differences in the relationship across different student populations?

II. METHODS

Data and Sample

The Arkansas Department of Education provided anonymized student-level data for all Arkansas students from 2009-10 through 2018-19. Data include student demographic characteristics, student course grades, graduation indicators, and National Student Clearinghouse data on college enrollment.

Our sample of 238,933 students is ninth-grade students enrolled in twelfth grade four years later. The sample reflects seven independent cohorts of students from 2009-10 through 2018-19 (see Table 1).

Table 1: Cohort Grade by Academic Year

Year	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
Cohort 1	9th	10th	11th	12th						
Cohort 2		9th	10th	11th	12th					
Cohort 3			9th	10th	11th	12th				
Cohort 4				9th	10th	11th	12th			
Cohort 5					9th	10th	11th	12th		
Cohort 6						9th	10th	11th	12th	
Cohort 7							9th	10th	11th	12th

In our analytical sample we retained all first-time freshman students who were consistently enrolled in progressive grades and still enrolled four years later. This limitation is necessary to our study as our data do not identify which students moved out of state, transferred to private or home school, dropped out before the end of twelfth grade, were incarcerated or passed away. This limitation, however, resulted in differential attrition of specific populations of students from our analytic sample. White, non-FRL eligible students and female students were more likely to be included in our analytical sample. We conducted descriptive analyses for each of our cohorts to study the proportion of students identified by gender, participation in FRL, and race/ ethnicity.

Summary information for Cohort 7, the most recent student group analyzed in our study, is presented in Table 2. The analytic sample limitation reduces the sample by 15.6%, and there are differences between the initial sample and the analytical sample. There is differential attrition

in specific student populations, which may lead to the underestimation of the impact of freshman GPAs and longer-term outcomes. Therefore, our estimates of the relationship between freshman GPAs and student outcomes are a conservative measure, likely underestimating the relationship for all Arkansas students. Data for other cohorts are presented in Table A1.

Table 2: Initial and Analytic Sample Comparison, Cohort 7

Cohort 7	9th Grade (Initial)	9th-12th Grade (Analytic)	Difference
Total N	35,307	29,800	-5,507
% Female	48.67	49.33	0.66
% FRL	58.58	56.05	-2.53
% White	63.63	64.11	0.48
% Black	20.29	19.98	-0.31
% Hispanic	11.32	11.34	0.02
% Other races	4.76	4.57	-0.19
Mean Freshman GPA	*2.93*	*3.05*	*0.12*

We control for the student-level characteristics in our multivariate model to help adjust for the changes in demographic characteristics from the initial to the analytic sample. Our analyses do not include prior student achievement as we are examining in the relationships between high school graduation and college enrollment and freshman GPA, which reflects teacher perceptions of student performance in the totality of freshman courses.

Instrumentation

We labeled all letter values or numerical values as a GPA point: A-4, B-3, C-2, D-1, F, E, NC, or I-0. The data provided has student course grades labeled with either numerical value grades or grade letter values. We transformed the numerical grades into letter grades: A: 100-90; B: 89-80; C: 79-70; D: 69-60; and F: 59-0. For freshman enrolled in Advanced Placement (A.P.)

courses, we added one point to the course grade, as this is common practice for Arkansas. We averaged the course point values to average generate overall freshman GPAs.

We generated two binary variables for the outcomes of interest: high school graduation and college enrollment. A value of 1 indicates a student graduated high school with their ninth-grade cohort, or enrolled full time in a two- or four-year college in the fall following their spring high school graduation.

Empirical Approach

We analyzed descriptive trends in freshman GPAs, high school graduation, and college-going data to examine the differences between our initial and analytic samples. Next, we present this data to see the trends over time in freshman average GPA, graduation rates, and college-going rates between the initial and analytical samples. We then run multivariate regressions to examine the relationship between freshman GPA and the longer-term outcomes of high school graduation and college enrollment, including student demographic characteristics.

III. RESULTS

We composed three figures to acknowledge the differential attrition between the initial sample and the analytic sample of first-time freshmen that moved as a cohort through twelfth grade. As presented in Figure 1, the analytic sample has a higher average freshman GPA than the initial sample in all cohorts. We would expect this given that our analytic sample is more restricted. The average freshman GPA increases similarly over time for both the analytic and initial sample, and the difference between the two groups decreases slightly over time. High

school graduation rates are presented in Figure 2. As with freshman GPA, the analytic sample graduation rates are higher than the initial sample's, graduation rates increase over time, and the difference between the two samples' graduation rates decreases slightly over time. Lastly, college enrollment rates are presented in Figure 3. For this comparison we further restrict our analytic sample to high school graduates. The high school graduates' college going rates are higher than the initial analytic sample. Unlike freshman GPA and high school graduation rates, college-going rates have decreased over time. The difference between the two samples' graduation rates decreases slightly over time. As the trends are consistent over time, the differential attrition between the initial and analytic samples leads to a more conservative approach to analyzing the predictive power of freshman grade GPAs on high school graduation and college enrollment.

Figure 1: Freshman GPA, initial sample and analytic sample, by cohort

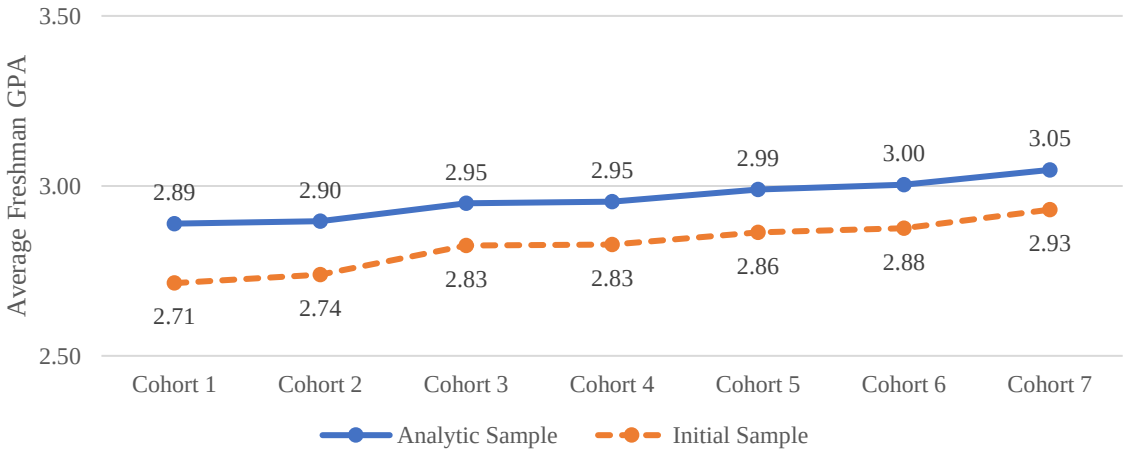


Figure 2: High School graduation rate, initial sample and analytic sample, by cohort

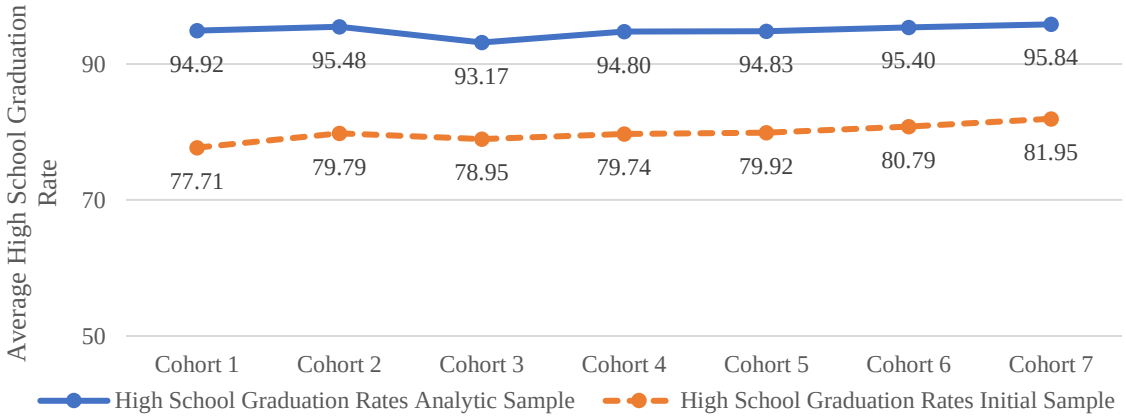
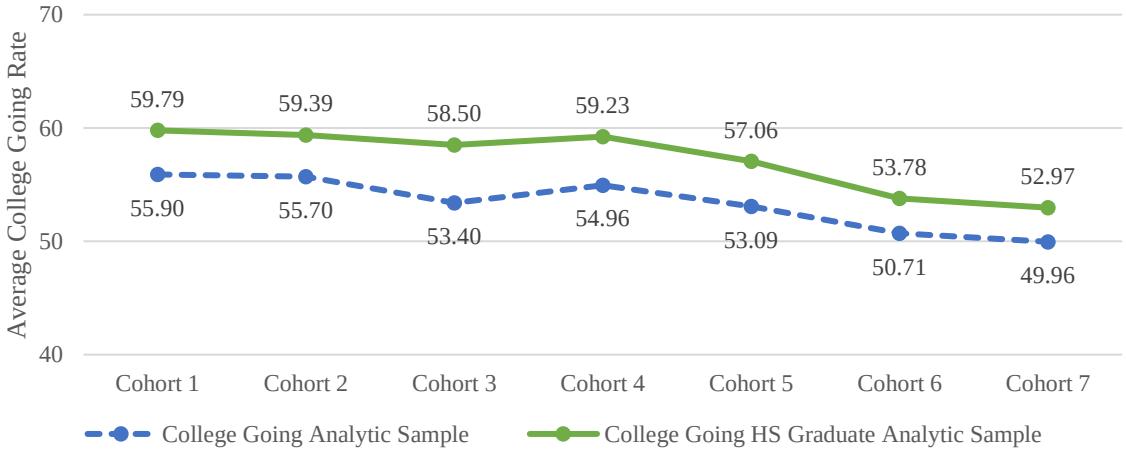


Figure 3: College-going rate, analytic sample and high school graduate sample, by cohort



Descriptive Trend Analyses

We present freshman GPA and high school graduation information for Cohort 7 by student demographic characteristics in Table 3. There is variation by student group in the likelihood of graduating high school. High school graduates are more likely to be female and white, with rates at 97 percent and 96 percent, respectively. Students participating in FRL are the least likely to graduate with the cohort at 94 percent. Freshman GPAs are higher for high school graduates when compared to the entire analytic sample. Black students have the lowest average freshman GPA, both in the full analytic sample and among those of high school graduates. All

subgroup freshman GPAs increased slightly for high school graduates, between 0.04 and 0.02 points. Information for Cohorts 1-6 is provided in Table A2 in the Appendix.

Table 3: Analytic sample and high school graduation, Cohort 7

Cohort 7	Total Students	Percentage of Total	Percentage of High School Graduates	High School Graduation Rate	Mean Freshman GPA	Mean Freshman GPA of High School Graduates
Female	14,701	48.67	49.71	96.58	3.21	3.23
Male	15,099	51.33	50.29	95.12	2.89	2.93
FRL	16,703	58.58	55.17	94.33	2.85	2.88
White	19,106	63.63	64.27	96.07	3.17	3.20
Black	5,953	20.30	19.92	95.57	2.67	2.70
Hispanic	3,379	11.32	11.24	95.00	2.94	2.97
Other Race	1,362	4.75	4.57	95.81	3.21	3.25
Total	29,800	100	100	95.84	3.05	3.08

Following high school graduation, about half of the students in our analytic sample enrolled in college. Presented in Table 4, fifty-three percent of high school graduates enroll in college the following Fall. Female students are the most likely to enroll in college at 61 percent, while FRL eligible students are the least likely at 42 percent. Freshman GPAs for high school graduates who enroll in college are about a third of a point higher than those for high school graduates who do not enroll. Information for Cohorts 1-6 is provided in Table A3 in the Appendix.

Table 4: High school graduates and college enrollment, Cohort 7

Cohort 7	Total Students Graduate High School	Percentage of Total	Percentage of College Enrollees	College Enrollment Rate	Mean GPA of College Enrollees
Female	14,198	49.71	56.86	60.61	3.46
Male	14,362	50.29	43.14	45.43	3.25
FRL	15,756	55.17	44.08	42.40	3.18
White	18,356	64.27	67.47	55.68	3.47
Black	5,689	19.92	17.93	47.58	2.97
Hispanic	3,210	11.24	9.75	45.82	3.27
Other Race	1,305	4.57	4.86	56.13	3.53
Total	28,560	100	100	52.97	3.37

While descriptive trends provide some insight into differences in high school graduation and college enrollment, student characteristics correlate with freshman GPA and with each other. To examine the unique contribution of freshman GPA and student demographics to high school graduation and college enrollment we conduct a series of multivariate regression analyses.

Multivariate Regression Analyses

We used an ordinary least squares (OLS) regression to examine the relationship between freshman GPA and student demographic characteristics. The unique contribution of the student characteristics is estimated using the OLS regression:

$$y_{ic} = \beta_0 + \boldsymbol{\chi_{ic}\beta} + \varepsilon_{ic}$$

Where:

- y_{ic} is the continuous dependent variable of interest, freshman overall GPA, for student $_i$ in cohort $_c$

- χ_{ic} is a vector of student-level characteristics for student $_i$ in cohort $_c$ (including gender, race/ethnicity, and participation in Free/Reduced Lunch Program)
- ε_{ic} is the random error for student $_i$ in cohort $_c$

As presented in Table 5, freshman GPA for females is statistically significantly higher than the GPA of males by a quarter to a third of a point. Conversely, FRL eligible students and Black students consistently obtain a statistically significantly lower freshman GPA of about .36 points lower than non-FRL eligible white males. Freshman GPA is inconsistently related to race for students who are Hispanic or of other race.

Table 5: Estimated demographic effects on freshman GPA, by cohort

VARIABLES	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Cohort 6	Cohort 7
isFemale	0.246***	0.251***	0.276***	0.264***	0.303***	0.328***	0.324***
	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
isFRL	-0.341***	-0.364***	-0.386***	-0.381***	-0.380***	-0.394***	-0.363***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
isBlack	-0.341***	-0.374***	-0.372***	-0.329***	-0.353***	-0.358***	-0.369***
	(0.012)	(0.011)	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)
isHispanic	-0.160***	-0.167***	-0.108***	-0.133***	-0.086***	-0.104***	-0.085***
	(0.017)	(0.017)	(0.016)	(0.015)	(0.014)	(0.014)	(0.014)
isOther	0.049*	0.090***	0.001	0.077***	0.073***	0.061***	0.087***
	(0.026)	(0.024)	(0.023)	(0.021)	(0.021)	(0.020)	(0.019)
Constant	3.017***	3.041***	3.089***	3.104***	3.119***	3.135***	3.170***
	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)
Observations	26,770	27,497	27,127	28,411	29,131	29,468	29,800
R-squared	0.138	0.153	0.163	0.159	0.169	0.178	0.173

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Our other outcomes of interest, high school graduation and college enrollment are binary; either a student did or did not graduate high school or enroll in college. To examine the relationship of freshman GPA to these outcomes, we use a linear probability model. This equation takes on the following form:

$$Pr(G_{ic} = 1|X_{ic}) = \beta_0 + \boldsymbol{X_{ic}\beta} + \varepsilon_{ic}$$

Where:

- G_{ic} is the binary variable of interest, graduated from high school or enrolled in college, for student $_i$ in cohort $_c$
- $\boldsymbol{X_{ic}}$ is a vector of student-level characteristics including the same characteristics identified in the prior model
- Our model will account for random errors at the student level (ε_{ic}).

As presented in Table 6, the selected student demographic characteristics explain between 0.8 percent and 1.7 percent of the variance in the likelihood of graduating high school. This low variance indicates that student demographic characteristics have a minimal relationship to graduating high school. The constant for graduating high school in Arkansas is high (95.5 percent), so this regression does not have strong practical translations. Females have only a 1.5 percent increase in the likelihood of graduating high school compared with males. Participating in the FRL program decreases the likelihood of graduation by 4.2 percent compared to non-FRL eligible, white, male students. Being a Black student is associated with a one percent increase in the probability of graduating high school compared to a non-FRL eligible, white, male student. As with freshman GPA, high school graduation is inconsistently related to race for students who are Hispanic or of other races. Therefore, differences in high school graduation may be related to the freshman GPAs or other factors not included in our model.

Table 6: Estimated demographic effects on high school graduation, by cohort

VARIABLES	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Cohort 6	Cohort 7
isFemale	0.013***	0.011***	0.020***	0.019***	0.024***	0.013***	0.014***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
isFRL	-0.049***	-0.050***	-0.054***	-0.056***	-0.048***	-0.042***	-0.042***
	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
isBlack	0.006	0.006	-0.042***	0.012***	0.006	0.011***	0.014***
	(0.004)	(0.004)	(0.006)	(0.004)	(0.004)	(0.004)	(0.004)
isHispanic	0.011*	0.016***	0.026***	0.023***	0.015***	0.007	0.010**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)
isOther	0.003	0.008	0.007	0.018**	0.009	0.004	0.008
	(0.008)	(0.008)	(0.009)	(0.007)	(0.007)	(0.007)	(0.006)
Constant	0.951***	0.955***	0.936***	0.943***	0.941***	0.956***	0.955***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Observations	26,770	27,497	27,127	28,411	29,131	29,468	29,800
R-squared	0.009	0.010	0.017	0.012	0.010	0.008	0.008

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

When considering the percentage of students that enroll in college, we further reduce our analytic sample to only those who graduated high school. Students who did not graduate high school would not have the opportunity to enroll in college, and so were excluded from the analytic sample for this analysis.

As presented in Table 7, student demographic characteristics explain between 7.3 and 8.4 percent of the variance in college enrollment. When compared to the reference group, non-FRL eligible white males, females in Cohort 7 have a 15.2 percentage point higher probability of enrolling in college and a FRL-eligible student has a 24 percentage point lower likelihood of enrolling in college. This was the largest percentage point difference seen within the analysis. Apart from the two most recent cohorts, being a Black student was a significant, positive predictor of the likelihood of going to college. As with freshman GPA and high school graduation, college enrollment is inconsistently related to race for students who are Hispanic or of other races.

Table 7: Estimated Demographic Effects on College Enrollment, by cohort

VARIABLES	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Cohort 6	Cohort 7
isFemale	0.138***	0.135***	0.120***	0.131***	0.137***	0.136***	0.152***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
isFRL	-0.224***	-0.241***	-0.237***	-0.250***	-0.260***	-0.254***	-0.239***
	(0.007)	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)
isBlack	0.046***	0.042***	0.052***	0.035***	0.041***	0.006	0.011
	(0.008)	(0.008)	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)
isHispanic	-0.066***	-0.066***	-0.046***	-0.024**	0.010	-0.018*	0.001
	(0.012)	(0.012)	(0.012)	(0.011)	(0.011)	(0.010)	(0.010)
isOther	0.025	0.043***	0.029*	0.057***	0.061***	0.036***	0.039***
	(0.017)	(0.016)	(0.016)	(0.015)	(0.015)	(0.014)	(0.014)
Constant	0.633***	0.641***	0.638***	0.649***	0.626***	0.606***	0.581***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Observations	25,029	25,788	24,762	26,367	27,102	27,785	28,107
R-squared	0.073	0.080	0.073	0.081	0.084	0.083	0.079

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

We add freshman GPA to the linear probability model to examine freshman GPA's predictive power on high school graduation and college enrollment. This equation takes on the following form:

$$Pr(G_{ic} = 1|X_{ic}) = \beta_0 + \boldsymbol{X_{ic}\beta_1} + \boldsymbol{OverallGPA_{(ic)}\beta_2} + \varepsilon_i$$

Where:

- G_{ic} is the binary variable of interest, graduated from high school or enrolled in college, for student $_i$ in cohort $_c$
- $\boldsymbol{X_{ic}}$ is a vector of student-level characteristics including the same characteristics identified in the prior model
- $\boldsymbol{OverallGPA_{(ic)}}$ is the freshman GPA for student $_i$ in cohort $_c$
- Our model will account for random errors at the student level (ε_{ic}).

Adding freshman GPA to the model increases the variance explained in the likelihood of graduating high school. Student demographic characteristics accounted for only 0.8 to 1.2 percent, while this model accounts for 3.7 to 5.4 percent of the variance. When comparing the constants from the model limited to student demographics, the constant has decreased with freshman GPA included. This decrease is due to freshman GPA's weight upon graduating high school, holding student demographic characteristics fixed. In our model, students' freshman GPA is the best predictor of graduating high school.

A one-point increase in overall freshman GPA is associated with a 6 percentage point increase in the likelihood that a student will graduate high school, holding all else equal at the 99 percent confidence level. When we add freshman GPA into the model, being female is no longer a consistently significant predictor for graduating high school. FRL eligiblity is a strong predictor of not graduating high school, reducing the likelihood by 2 percentage points, holding all else equal at the 99 percent confidence level. Hispanic and Black students have a positive coefficient for graduating high school compared to non-FRL eligible, white, male students. These results indicate that most students from the analytic cohorts are graduating high school, and that there are not serious systemic differences in Arkansas based on student characteristics in grades 9-12.

Table 8: Estimated freshman GPA and demographic effects on high school graduation, by cohort

VARIABLES	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Cohort 6	Cohort 7
OverallGPA	0.061***	0.058***	0.079***	0.076***	0.065***	0.059***	0.058***
	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
isFemale	-0.002	-0.004	-0.002	-0.001	0.005	-0.006**	-0.005*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
isFRL	-0.028***	-0.029***	-0.024***	-0.028***	-0.023***	-0.019***	-0.021***
	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
isBlack	0.027***	0.028***	-0.013**	0.037***	0.029***	0.032***	0.036***
	(0.004)	(0.004)	(0.006)	(0.004)	(0.004)	(0.004)	(0.004)
isHispanic	0.021***	0.026***	0.035***	0.033***	0.021***	0.013***	0.015***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)
isOther	0.000	0.002	0.007	0.012	0.004	0.0004	0.002
	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)	(0.006)	(0.006)
Constant	0.768***	0.779***	0.692***	0.708***	0.739***	0.772***	0.771***
	(0.009)	(0.008)	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)
Observations	26,770	27,497	27,127	28,411	29,131	29,468	29,800
R-squared	0.039	0.038	0.054	0.052	0.040	0.038	0.037

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Including freshman GPA in our model for college enrollment results in more practical, translatable significance. As presented in Table 9, freshman GPA is the best predictor of college enrollment, holding student demographic characteristics constant at the 99 percent confidence interval. For Cohort 7 students, a one-point rise in freshman GPA is associated with a 26 percentage point increase in the likelihood of enrolling in college. Being a female is associated with a 7 percentage point increase in attending college, holding other demographic characteristics equal at the 99 percent confidence interval and controlling for freshman GPA. Students eligible for the FRL program have a consistent 14-15 percentage point decreased likelihood of attending college compared to not being an FRL eligible student. There is an 11 percentage point increase in the likelihood of enrolling in college for Black students after controlling for freshman GPA and other demographic characteristics. The relationship with college enrollment is inconsistently related to race for students who are Hispanic or of other races.

Table 9: Estimated freshman GPA and demographic effects on college enrollment, by cohort

VARIABLES	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Cohort 6	Cohort 7
OverallGPA	0.244***	0.245***	0.253***	0.264***	0.262***	0.263***	0.262***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
isFemale	0.080***	0.074***	0.054***	0.063***	0.061***	0.052***	0.069***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
isFRL	-0.145***	-0.156***	-0.145***	-0.156***	-0.164***	-0.156***	-0.149***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
isBlack	0.129***	0.134***	0.142***	0.121***	0.133***	0.100***	0.109***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
isHispanic	-0.024**	-0.024**	-0.014	0.013	0.034***	0.012	0.024***
	(0.011)	(0.011)	(0.011)	(0.010)	(0.010)	(0.009)	(0.009)
isOther	0.010	0.020	0.025*	0.038***	0.040***	0.019	0.015
	(0.016)	(0.015)	(0.015)	(0.014)	(0.013)	(0.013)	(0.013)
Constant	-0.109***	-0.110***	-0.153***	-0.179***	-0.200***	-0.225***	-0.256***
	(0.014)	(0.013)	(0.014)	(0.014)	(0.014)	(0.013)	(0.013)
Observations	25,029	25,788	24,762	26,367	27,102	27,785	28,107
R-squared	0.189	0.198	0.191	0.207	0.207	0.208	0.199

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

IV. DISCUSSION

This study analyzed the associations of freshman GPA with high school graduation and college enrollment for seven cohorts of Arkansas students. We note that our analytic cohort samples are limited to first-time freshmen who continued schooling through their twelfth-grade year. Although there was unequal attrition of certain types of students, this analytical sample can lead to a conservative estimate of the predictive power of freshman GPAs on high school graduation and college enrollment.

Freshman GPAs in Arkansas

Evaluations of freshman GPAs in Arkansas are limited as most have focused on overall High School GPAs. Prior research conducted only assumes the power of overall High School GPAs. At the University of Central Arkansas, Smith and Zagurski (2013) found HSGPA to be the only variable correlated with the retention and diversity of students.

The University of Arkansas' Dale Bumpers College of Agriculture, Food and Life Sciences finds similar relationships with HSGPAs. Shoulders et al. (2019) report that HSGPAs significantly ($p < .001$) differentiated between graduates and non-graduates of the program. Students with higher HSGPAs are more likely to graduate college.

Our study examined freshman GPAs to see if they could predict high school graduation and the likelihood of college enrollment.

We find a one-point freshman GPA increase is associated with a 6 to 8 percentage point increase in the likelihood of graduating high school after controlling for student demographic characteristics. Although, this finding was statistically significant with a p-value < 0.001, it does not bring much practical significance as nearly all students in Arkansas graduate high school—

between 92 to 96 percent of students in our sample. Our findings, however, are similar to Chicago's Consortium on School Research, controlling for student characteristics limited to the analytic sample—freshman GPAs are associated with high school graduation.

We find a one point increase in freshman GPA is associated with a 26 percentage point increase in the likelihood of enrolling in college. This finding was statistically significant at the 99 percent confidence level, and only 50 to 60 percent of Arkansas high school graduates enroll in college. This finding is similar to Chicago's Consortium's findings as the relationship between freshman GPA and college-going is more linear and a higher rate than the relationship between freshman GPA and high school graduation.

Limitations and future directions

Some limitations arose across our study. First, we had to limit our analytic sample to students who continued their education through twelfth grade in order to examine outcomes of interest. From our data, we cannot determine which students moved to private or home school, moved out of state, dropped out, passed away, or were incarcerated before the end of twelfth grade. More research is needed to determine the relationship of freshman GPA to outcomes of the students that are not included in our analytic sample.

In addition, we limited our variables to freshman GPA and student demographic characteristics. To focus on the predictive power of only these variables we did not include prior student achievement on standardized assessments in our models. We designed our analysis to examine freshman GPAs independent of prior achievement because we believe grades are capturing something different than prior achievement in reading and mathematics. Freshman

GPAs are more holistic as they include teacher perceptions of student performance in the variety of freshman courses. Future research could examine the value of including prior student achievement in analyses of freshman GPAs, high school graduation, and college enrollment.

Given the predictive power of freshman GPAs with long-term outcomes, further research should be conducted to analyze the classes freshmen are failing to see if there are connections between where and when these students fail and how they are related to the long-term student success.

Policy Recommendations

Moving forward, Arkansas leaders can suggest policies that could benefit students' GPAs during the influential freshman year. Programs found to be effective for improving freshman achievement include teacher teams and professional learning communities (PLCs) reviewing student data while monitoring the early warning indicators, arranging Freshman Success meetings, focusing on students with lower GPAs, and forming relationships in mentorship environments for lower GPA students (Allensworth et al., 2018; Clark et al., 2016; Park & Denson, 2013; Shoulders et al., 2019; Seeskin et al., 2018). Moreover, Arkansas education leaders should consider developing a state-wide early warning indicator system similar to Chicago Public Schools' Freshman OnTrack program to help school leaders easily identify students who might benefit from additional supports.

In relation to our findings of how significantly freshman GPAs predict college enrollment, we suggest early interventions to support students considering enrolling in college. Counselors should discuss college options with parents and guardians of freshman students early

in high school. Raising awareness about college and financial options can help students who might not have considered attending college, and intervening early can help students and families have time to make appropriate decisions (King, 2012; Muntz, 2000).

Arkansas leaders might consider enacting a "no-zero" policy to prevent zeroes from bottoming out student grades (Allensworth et al., 2018). Feldman (2018) pushes this concept further with "Minimum Grading" for equity practices. Adjusting grading scales from 0-100 to 50-100, allows students' grades to more accurately reflect the learning. When zeroes are entered as grades, they disproportionately punish students. Thus, 50-100 minimum grading policies contribute to equitable classrooms and school cultures that better support learning (Feldman, 2018).

We find FRL students are less likely to graduate high school by two percentage points and go to college by 15 percentage points. We recommend schools provide social support programs for FRL students as they are associated with higher academic performance for lower SES students (Malecki & Demaray, 2006). As FRL students have lower GPAs and are at greater risk of not graduating high school and enrolling in college, they should be given more attention, more academic assistance, and be placed in positive peer groups (Shoulders et al., 2019; Murname, 2013). School personnel should invest in forming relationships and mentorship programs with these students (Park & Denson, 2013).

Overall, grading practices in Arkansas districts need to be evaluated by state and school leaders to ensure grading practices are fair and consistent. Bringing attention to the importance of freshman GPAs could help reduce possible bias towards student demographic subgroups and lead to better future academic outcomes for all students.

REFERENCES

Allensworth, E. M., & Clark, K. (2020). High school GPAs and ACT scores as predictors of college completion: Examining assumptions about consistency across high schools. *Educational Researcher, 49*(3), 198–211. https://doi.org/10.3102/0013189X20902110

Allensworth, E. M., Nagaoka, J., & Johnson, D. W. (2018). High school graduation and college readiness indicator systems: What we know, what we need to know. Chicago, IL: University of Chicago Consortium on School Research. https://consortium.uchicago.edu/sites/default/files/2018-10/High%20School%20Graduation%20and%20College-April2018-Consortium.pdf

Andrew, M., & Flashman, J. (2017). School transitions, peer influence, and educational expectation formation: Girls and boys. *Social Science Research, 61*, 218-233. https://doi.org/10.1016/j.ssresearch.2016.06.016

Autor, D., Figlio, D., Karbownik, K., Roth, J., & Wasserman, M. (2016). School quality and the gender gap in educational achievement. *The American Economic Review, 106*(5), 289-295. https://doi.org/10.1257/aer.p20161074

Autor, D., Figlio, D., Karbownik, K., Roth, J., & Wasserman, M. (2019). Family disadvantage and the gender gap in behavioral and educational outcomes. *American Economic Journal: Applied Economics, 11*(3), 338-381. https://doi.org/10.1257/app.20170571

Belfield, C. R., & Crosta, P. M. (2012). Predicting success in college: the important of placement

tests and high school transcripts. (Community College Research Center Working Paper No. 42). Teachers College, Columbia University: New York City, New York.

Bowers, A.J., Sprott, R., & Taff, S.A. (2013). Do we know who will drop out?: A review of the predictors of dropping out of high school: Precision, sensitivity, and specificity. *The High School Journal 96*(2), 77-100. doi:10.1353/hsj.2013.0000

Clark, B., & Shi, Y. (2020). Low-income female students and the reversal of the black-white gap in high school graduation. *AERA Open*. https://doi.org/10.1177/2332858420915203

Clark, N. C., Heilmann, S. G., Johnson, A., & Taylor, R. (2016). Impact of formal mentoring on freshmen expectations, graduation rates, and GPAs. *Leadership and Research in Education, 3*(1), 52. https://tinyurl.com/yjta9elm

Easton, J.Q., Johnson, E., & Sartain, L. (2017). The predictive power of ninth-grade GPA. Chicago, IL: University of Chicago Consortium on School Research. https://consortium.uchicago.edu/sites/default/files/201810/Predictive%20Power%20of%20Ninth-Grade-Sept%202017-Consortium.pdf

Farmer, E. D., & Hope, W. C. (2015). Factors that influence african american male retention and graduation: The case of gateway university, a historically black college and university. *Journal of College Student Retention: Research, Theory & Practice, 17*(1), 2–17. https://doi.org/10.1177/1521025115571074

Feldman, J. (2018). *Grading for equity: What it is, why it matters, and how it can transform schools and classrooms.* SAGE Publications.

Felmlee, D., McMillan, C., Inara Rodis, P., & Osgood, D. W. (2018). Falling behind: Lingering costs of the high school transition for youth friendships and grades. *Sociology of Education, 91*(2), 159 182. https://doi.org/10.1177/0038040718762136

King, S. B. (2012). Increasing college-going rate, parent involvement, and community participation in rural communities. *The Rural Educator, 33*(2). https://doi.org/10.35608/ruraled.v33i2.415

Kopotic, K. (2020). From start to finish: Predicting enrollment and attainment in Arkansas postsecondary education (Order No. 27959327). Available from Dissertations & Theses @ University of Arkansas Fayetteville; *ProQuest Dissertations & Theses Global*. (2407620650). https://www.proquest.com/dissertations-theses/start-finish-predicting-enrollment-attainment/docview/2407620650/se-2?accountid=8361

Komarraju, M., Ramsey, A., & Rinella, V. (2013). Cognitive and non-cognitive predictors of college readiness and performance: Role of academic discipline. *Learning and Individual Differences, 24*, 103-109. https://doi.org/10.1016/j.lindif.2012.12.007

Malecki, C. K., & Demaray, M. K. (2006). Social support as a buffer in the relationship between socioeconomic status and academic performance. *School Psychology Quarterly, 21*(4), 375-395. https://doi.org/10.1037/h0084129

Muntz, P. (2000). Going to college: How social, economic, and educational factors influence the decisions students make. *Journal of College Admission,* (168), 30. https://www.proquest.com/trade-journals/going-college-how-social-economic-educational/docview/219102757/se-2?accountid=8361

Murnane, R. J. (2013). U.S. high school graduation rates: Patterns and explanations. *Journal of Economic Literature, 51*(2), 370-422. doi: http://dx.doi.org/10.1257/jel.51.2.370

Nagaoka, J., Mahaffie, S., Usher, A., & Seeskin, A. (2020). The educational attainment of Chicago public schools students: 2019. Chicago, IL: University of Chicago Consortium on School Research. https://consortium.uchicago.edu/sites/default/files/2021-02/The%20Educational%20Attainment%202019-Dec%202020-Consortium.pdf

Park, J. J., & Denson, N. (2013). When race and class both matter: The relationship between socioeconomic diversity, racial diversity, and student reports of Cross–Class interaction. *Research in Higher Education, 54*(7), 725-745. https://doi.org/10.1007/s11162-013-9289-4

Reeves, R. V., Buckner, E., & Smith, E. (2021). The unreported gender gap in high school graduation rates. Washington: The Brookings Institution. https://www.proquest.com/blogspodcasts-websites/unreported-gender-gap-high-school-graduation/docview/2478333437/se-2?accountid=8361

Rosenkranz, T., de la Torre, M., Stevens, W.D., & Allensworth, E.M. (2014). Free to fail or on

track to college: Why grades drop when students enter high school and what adults can do about it. Chicago, IL: University of Chicago Consortium on School Research. https://consortium.uchicago.edu/sites/default/files/2018-10/FoF%20Why%20Grades%20Drop.pdf

Seeskin, A., Mahaffie, S., & Usher, A. (2020). The forgotten year: Applying lessons from freshman success to sophomore year. Chicago, IL: University of Chicago Consortium on School Research. https://consortium.uchicago.edu/sites/default/files/2020-08/The%20Forgotten%20Year-Aug2020-Consortium.pdf

Seeskin, A., Nagaoka, J., & Mahaffie, S. (2018). Hidden risk: Changes in GPA across the transition to high school. Chicago, IL: University of Chicago Consortium on School Research. https://eric.ed.gov/?id=ED593622

Shoulders, C. W., Edgar, L. D., & Johnson, D. M. (2019). The relationship between student admissions data and six-year degree completion. *Journal of Human Sciences and Extension, 7*(1). https://www.jhseonline.com/article/view/810

Smith, P. J., & Zagurski, J. T. V. (2013). Improving retention and fit by honing an honors admissions model. *Journal of the National Collegiate Honors Council, 14*(2), 55. https://digitalcommons.unl.edu/nchcjournal/396/

Sutton, A., Langenkamp, A. G., Muller, C., & Schiller, K. S. (2018). Who gets ahead and who falls behind during the transition to high school? Academic performance at the

intersection of race/ethnicity and gender. *Social problems, 65*(2), 154–173. https://doi.org/10.1093/socpro/spx044

APPENDIX

Table A1. Initial and Analytic Sample Comparison, all Cohorts

	Sample	Number	% Female	% FRL	% White	% Black	% Hispanic	% Other Races	Mean Freshman GPA
Cohort 1	Initial	33,297	49.15	54.31	66.99	21.27	8.28	3.47	2.71
	Analytic	26,770	50.58	50.3	68.31	20.33	8.06	3.29	2.89
	Difference	*6,527*	*-1.43*	*4.01*	*-1.32*	*0.94*	*0.22*	*0.18*	*-0.18*
Cohort 2	Initial	33,509	49.42	54.87	66.98	20.81	8.53	3.67	2.74
	Analytic	27,497	50.36	51.14	68.09	20.12	8.26	3.53	2.90
	Difference	*6,012*	*-0.94*	*3.73*	*-1.11*	*0.69*	*0.27*	*0.14*	*-0.16*
Cohort 3	Initial	32,374	49.32	54.86	68.89	18.3	8.99	3.81	2.83
	Analytic	27,127	49.84	52.03	69.29	18.16	8.91	3.63	2.95
	Difference	*5,247*	*-0.52*	*2.83*	*-0.40*	*0.14*	*0.08*	*0.18*	*-0.12*
Cohort 4	Initial	34,228	49.55	56.73	65.32	21.25	9.26	4.18	2.83
	Analytic	28,411	50.2	53.77	65.93	20.9	9.12	4.05	2.95
	Difference	*5,817*	*-0.65*	*2.96*	*-0.61*	*0.35*	*0.14*	*0.13*	*-0.13*
Cohort 5	Initial	34,984	49.14	56.72	65.11	20.56	10.08	4.25	2.86
	Analytic	29,131	49.84	53.73	65.62	20.13	10.17	4.08	2.99
	Difference	*5,853*	*-0.70*	*2.99*	*-0.51*	*0.43*	*-0.09*	*0.17*	*-0.13*
Cohort 6	Initial	35,234	49.11	57.71	63.92	20.46	11.02	4.6	2.88
	Analytic	29,468	50.08	55.06	64.54	20.15	10.85	4.45	3.00
	Difference	*5,766*	*-0.97*	*2.65*	*-0.62*	*0.31*	*0.17*	*0.15*	*-0.13*
Cohort 7	Initial	35,307	48.67	58.58	63.63	20.29	11.32	4.76	2.93
	Analytic	29,800	49.33	56.05	64.11	19.98	11.34	4.57	3.05
	Difference	*5,507*	*-0.66*	*2.53*	*-0.48*	*0.31*	*-0.02*	*0.19*	*-0.12*

Table A2. Comparison of High School Graduation Rates between Initial and Analytic Sample, all Cohorts

	Sample	Total %	% Female	% Male	% FRL	% White	% Black	% Hispanic	% Other Races
Cohort 1	Initial	77.71	80.19	75.31	71.06	78.96	74.93	76.16	74.20
	Analytic	94.92	95.46	94.36	92.97	95.19	94.30	94.07	95.12
	Difference	*17.21*	*15.27*	*19.05*	*21.91*	*16.23*	*19.37*	*17.91*	*20.92*
Cohort 2	Initial	79.79	81.55	78.07	73.58	80.75	77.71	78.36	77.50
	Analytic	95.48	96.03	94.92	93.57	95.74	94.83	94.89	95.57

	Difference	*15.69*	*14.48*	*16.85*	*19.99*	*14.99*	*17.12*	*16.53*	*18.07*
Cohort 3	Initial	78.95	80.43	77.50	73.13	80.18	74.43	79.82	76.18
	Analytic	93.17	94.11	92.24	90.56	94.42	87.90	93.8	94.02
	Difference	*14.22*	*13.68*	*14.74*	*17.43*	*14.24*	*13.47*	*13.98*	*17.84*
Cohort 4	Initial	79.74	81.49	78.03	74.44	80.33	78.12	79.77	78.69
	Analytic	94.80	95.73	93.86	92.73	95.08	93.77	94.68	95.74
	Difference	*15.06*	*14.24*	*15.83*	*18.29*	*14.75*	*15.65*	*14.91*	*17.05*
Cohort 5	Initial	79.92	81.85	78.06	74.69	80.46	78.59	80.18	77.47
	Analytic	94.83	93.61	93.61	93.12	95.15	94.27	93.62	95.46
	Difference	*14.91*	*11.76*	*15.55*	*18.43*	*14.69*	*15.68*	*13.44*	*17.99*
Cohort 6	Initial	80.79	82.77	78.87	76.13	81.5	79.81	79.43	78.47
	Analytic	95.40	96.09	94.70	93.77	95.70	94.90	94.53	95.35
	Difference	*14.61*	*13.32*	*15.83*	*17.64*	*14.20*	*15.09*	*15.10*	*16.88*
Cohort 7	Initial	81.95	83.51	80.47	77.53	82.46	81.23	81.59	79.15
	Analytic	95.84	96.58	95.12	94.33	96.07	95.57	95.00	95.81
	Difference	*13.89*	*13.07*	*14.65*	*16.80*	*13.61*	*14.34*	*13.41*	*16.66*

Table A3: Comparison of College Enrollment Rates between Analytic Sample and High School Graduate Analytic Sample, all Cohorts

	% of HS Grads	% Female	% Male	% FRL	% White	% Black	% Hispanic	% Other Races	Mean Freshman GPA
Cohort 1	59.79	66.54	52.78	48.63	61.98	57.79	45.31	61.45	3.17
Cohort 2	59.39	65.93	52.68	47.56	61.89	56.52	44.26	62.43	3.18
Cohort 3	58.50	64.39	52.53	47.04	60.58	56.29	45.43	61.34	3.25
Cohort 4	59.23	65.61	52.66	47.64	61.63	55.68	48.11	63.11	3.25
Cohort 5	57.06	63.80	50.19	45.27	59.14	53.45	48.74	61.85	3.29
Cohort 6	53.78	60.40	47.05	42.11	56.87	47.80	44.77	57.71	3.33
Cohort 7	52.97	60.61	45.43	42.40	55.68	47.58	45.82	56.13	3.37