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Examining Arkansas' Ninth-Grade GPAs and Long-Term Outcomes

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Examining Arkansas' Ninth-Grade GPAs and Long-Term Outcomes

In this brief, we examine Arkansas' students' ninth-grade GPAs and their relationship to high school graduation and college enrollment. We follow seven cohorts of Arkansas first-time freshmen who were still enrolled in twelfth grade four years later. We find ninth-grade GPAs strongly influence future academic successes. We suggest policies to help all freshmen succeed.

Summary Points

- A one-point gain in freshman GPA is associated with a six percentage point increase in the likelihood of graduating high school.
- A one-point gain in freshman GPA is associated with a 26 percentage point increase in the likelihood of college enrollment.
- FRL students are the least likely to enroll in college.
- Bringing attention to Arkansas freshman GPAs might help reduce bias and lead to better academic outcomes for all students.
- Beneficial policies to help ninth-grade GPAs include: implementing an early warning indicator system; focusing on students with lower GPAs; forming mentor relationships for lower GPA students; hosting parent meetings for college opportunities; and a "no-zero" policy.

This Brief

Introduction

High school grade point averages (HSGPA) are becoming widely known to be a stronger predictor for success and college graduation than performance on exams like the ACT or SAT (Farmer & Hope, 2015; Komarraju et al., 2013). HSGPA can also predict a student's non-cognitive success adapting to the college setting and other life struggles (Kopotic, 2020).

A student's freshman year GPA could be an even 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 student's freshman GPA. Easton et al. (2017) report that freshman GPAs predict future academic success.

Ninth-grade is a transitional year for the majority of U.S. students. Ninth-grade GPAs and the freshman year are found to be significant predictors of future success, but research suggests that ethnic minorities may experience the highest chance of loss in the transition to high school. Sutton et al. (2018) report that white females experience the least disruption in the transition, while black males suffer the most academically in the transition. In particular, high-achieving white females continue to get ahead academically while the grades of high-achieving black males decline.

Interventions have been implemented in schools to help improve freshman GPAs. Allensworth et al. (2018) report positive results from constantly reviewing targeted students and following their progress. Teachers collaborated on how best to help the students, and schools monitored weekly attendance for at-risk students; these interventions combined to help at-risk students not fall as far behind academically.

Malecki and Demaray (2016) encourage schools to provide mentorship supports for lower-socioeconomic students as these programs are associated with higher academic performances in schools. Park and Denson (2013) suggest environments where teachers build relationships with their lower socioeconomic students because this will help fulfill lower SES students' need to belong.

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Early interventions for high school freshmen and college enrollment decisions are also associated with positive outcomes for students. Muntz (2000) finds parents and their involvement and influence to be key predictors of students enrolling in college. When high school counselors have conversations with families early in the student's high school years, the families have clearer ideas of what college possibilities look like for them. King (2012) suggests informational workshops about college for parents and communities early in the students' high school career can positively influence college-going rates.

Study Design

This study examines the relationship between ninth-grade GPAs and high school graduation and college enrollment for Arkansas students. In addition, this study examines the association of Arkansas' freshman GPAs with students' high school graduation and college enrollment while holding student demographic characteristics fixed. We examine the connection between students' ninth-grade GPAs and their future successes to determine how influential ninth-grade year is for students in Arkansas.

Our sample includes nearly 200,000 students from seven independent cohorts representing the graduating classes of 2013 through 2019. We limit our analytic sample to first-time, ninth-grade students enrolled in twelfth grade four years later. This limitation is necessary as we do not know from available data which students transferred to private or homeschool, moved out of state, dropped out, were incarcerated or passed away before the end of twelfth grade. This limitation resulted in differential attrition of specific populations of students from our analytic sample; White, non FRL status students and female students were over-represented in the analytic sample.

Table 1 presents summary information for the Class of 2019, the most recent group of students in our study. The analytic sample limitation reduces the sample by 15.6%, with differences between initial and analytical samples, which may lead to the underestimation of the impact of freshman GPAs on longer-term outcomes. Our estimates of the effects of freshman GPAs are a more conservative indicator of what is happening with Arkansas students.

To calculate freshman GPA, we assign letter values a GPA point: A-4, B-3, C-2, D-1, F, E, NC, or I-0. We added one point to the final grade for first-time ninth-grade students enrolled in Advanced Placement (A.P.) courses, as this is common practice for Arkansas. We average the point values to obtain the overall freshman GPAs.

Table 1. Comparison of Initial and Analytic Sample, Class of 2019

Class of 2019	All 9th Graders	9th to 12th Graders (Analytic Sample)	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*

Descriptive Trend Analysis

We analyze descriptive trends in freshman GPAs, high school graduation, and college-going data. We present these figures below to illustrate the trends over time.

As presented in Figure 1, the average freshman GPA increases from Cohort 1 to Cohort 7. For our most recent 2019 graduates, the analytic sample average freshman GPA is 3.05. Females typically have the highest average freshman GPA, with White students close behind. Black students consistently have the lowest average freshman GPA at 2.70 for the most recent cohort.

Figure 1. Average Freshman GPA, by Cohort and Student Demographic Characteristics

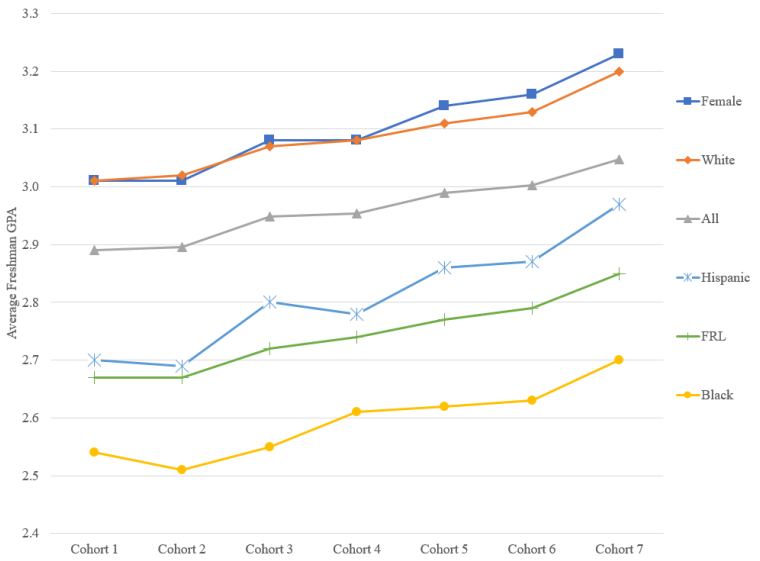
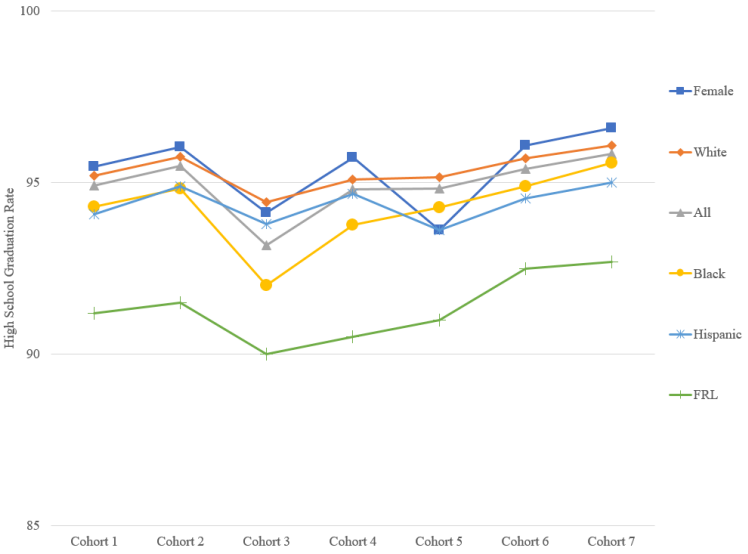


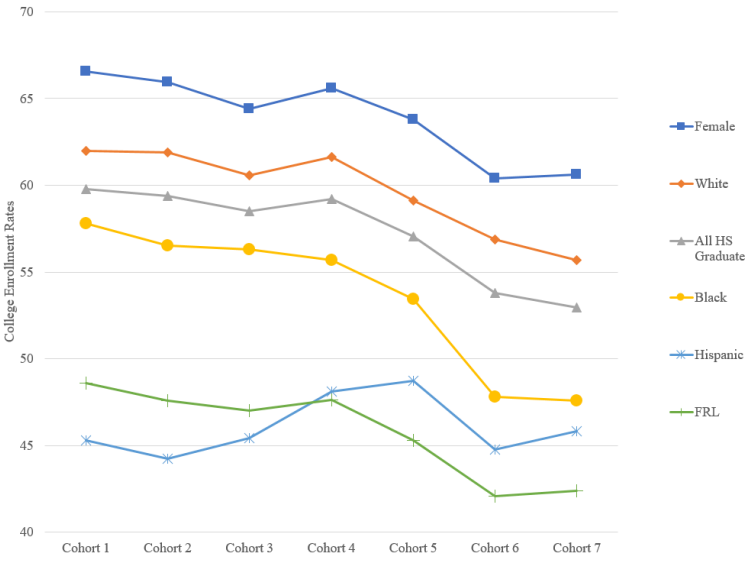
Figure 2: High School Graduation Rate, by Cohort and Student Demographics



In Figure 2, the high school graduation rates increase from Cohort 1 to Cohort 7. The 2019 analytic sample graduates have an average high school graduation rate of 95.8 percent. Females generally have the highest high school graduation rate while FRL students have the lowest high school graduation rate of 93 percent. The difference between the graduation rates is not sizeable as the majority of students in our sample, as well as in the state overall, graduate from high school.

College enrollment rates are presented in Figure 3. These rates are calculated using only the members of the analytic sample who graduated high school. The average college enrollment rate is 53 percent for the Class of 2019. Females consistently have the highest college-going rate while Hispanic and FRL students consistently have the lowest college enrollment rate.

Figure 3: College Enrollment Rates, by Cohort and Student Demographics



Student demographic characteristics correlate with freshman GPA and each other, so we conduct multivariate analyses to identify the unique contribution of freshman GPA and student demographic characteristics on high school graduation and college-going.

Multivariate Analyses

We control for the student level characteristics in our multivariate model to help alleviate the discrepancy of percent changes from the initial to the analytic sample. Our analyses do not include prior student achievement as we are interested in the relationship between freshman GPA and high school graduation and college enrollment.

We use ordinary least squares regression to examine the relationship between freshman GPA and student demographic characteristics. For the 2019 graduating class, being female is associated with a 0.32 point rise in freshman GPA and is statistically significant. FRL status students and Black students are both associated with about a 0.36 point drop in freshman GPA that are statistically significant.

To examine the relationship between student demographic characteristics and high school graduation, we construct a linear probability model. The model does not provide much practical significance as the low variance indicates student demographics have little to do with graduating high school in Arkansas; most students graduate high school in Arkansas. Being a female is only associated with a 1.5 percentage point increase in graduating high school.

Examining the relationships between college enrollment and student demographic characteristics provides more practical implications. Being a female is associated with a 15.2 percentage point higher probability of enrolling in college, while being an FRL status student is associated with a 24 percentage point lower likelihood of enrolling in college.

The results above are similar to the findings from our descriptive analyses. Females statistically have the highest freshman GPAs, high school graduation rates, and college enrollment rates. To examine freshman GPA's predictive power on high school graduation and college enrollment, we add freshman GPA to our linear probability models.

Freshman GPA explains more of the variance in high school graduation and college-going than demographics alone. In our model, freshman GPA is the best predictor of graduating high school and enrolling in college. A one-point overall increase in freshman GPA is associated with a 6 percentage point increase in the likelihood of graduating high school. Female students generally do not have a significant relationship for graduating high school when controlling for freshman GPA. Before adding freshman GPA as a control variable, being female was the best predictor of educational outcomes, but freshman GPA is a better predictor.

After including freshman GPAs along with student demographic characteristics, we find again that since most students are graduating high school, our associations with high school graduation are statistically significant but not practically significant.

Including freshman GPA shows more practical, translatable significance. Freshman GPA is the best predictor of college enrollment, holding included student demographic characteristics constant at the 99 percent confidence interval. Figure 4 below reports the associations.

A one-point rise in freshman GPA is associated with an increase of 26 percentage point likelihood of enrolling in college for the class of 2019 high school graduates. Being a female is only associated with a 7 percentage point increase in attending college, bringing more of the explanatory power to freshman GPAs. Being an FRL status student has a consistent 15 percentage point decrease in the likelihood in attending college. There is an 11 percentage point increase in the likelihood of enrolling in college for Black students after controlling for freshman GPA.

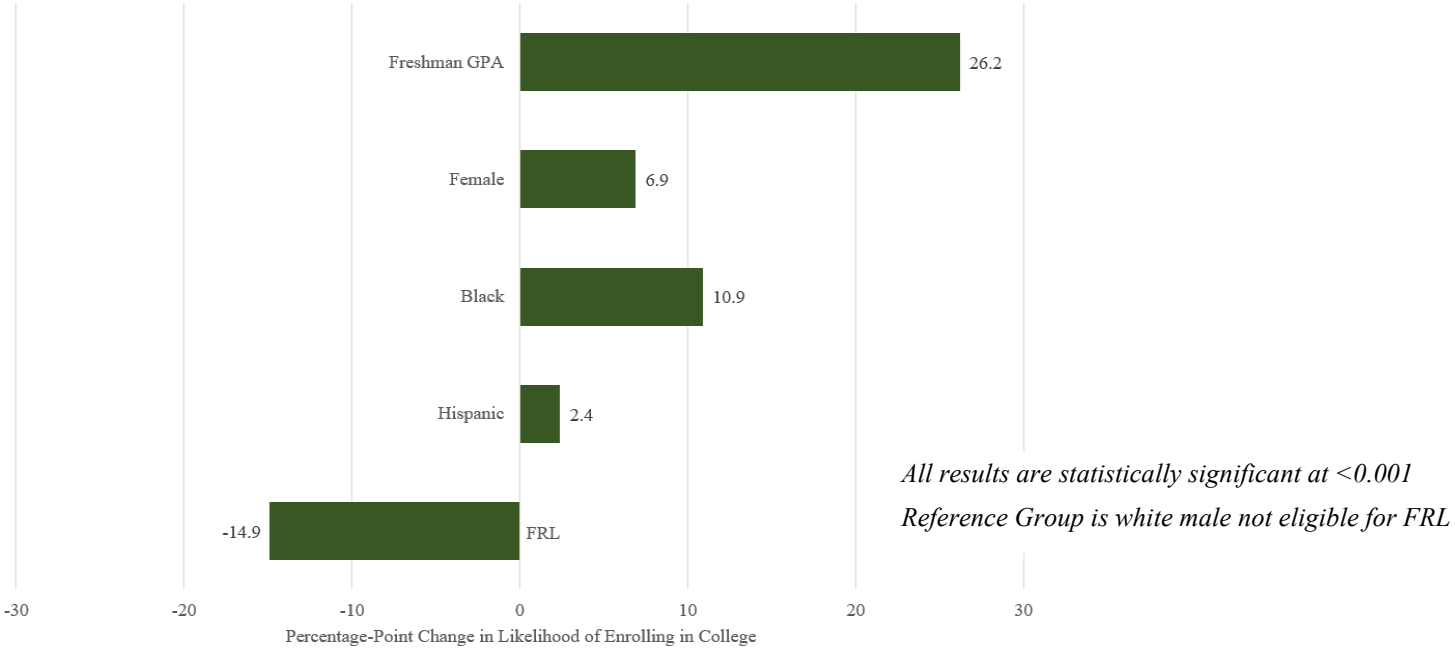
Discussion

This study analyzed the associations of freshman GPA with high school graduation and college enrollment for seven cohorts of Arkansas students. 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.

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, it is not practically significant as nearly all students in Arkansas graduate high school, between 92 to 96 percent of students in our sample.

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 40 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 more significant than the relationship between freshman GPA and high school graduation.

Figure 4. Estimated Change in Likelihood of Enrolling in College Related to Student Demographic Characteristics and Freshman GPA



Policy Implications

Arkansas leaders should implement policies that could benefit students' influential freshman year. Programs found to be effective for 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 mentorship environments for lower GPA students. Arkansas leaders should develop a state-wide early warning indicator system similar to Chicago Public Schools' Freshman OnTrack program.

With our findings for how freshman GPAs significantly predict college enrollment, we suggest early interventions to support students thinking about college like early college informational sessions for families and freshmen students. Arkansas leaders could implement a no zero policy to intervene with low freshman GPAs which prevents zeroes from bottoming out freshmen's scores.

We find FRL students are less likely to graduate high school by two percentage points and to enroll in college by 15 percentage points. We recommend schools provide social support programs for FRL students as they are associated with higher academic performances and more social supports for lower SES students .

Overall, grading practices in Arkansas districts should be evaluated by school leaders to ensure grading practices are fair and consistent. Bringing attention to freshman GPAs might help reduce potential bias towards student demographic subgroups and lead to better future academic outcomes for all students.

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