

Using High School Data to Explore Early College Success on Pohnpei, Federated States of Micronesia

Appendix A. About the study

Appendix B. Methods

Appendix C. Supporting analysis

Appendix D. Sensitivity analyses

See <https://go.usa.gov/x6TNx> for the full report.

Appendix A. About the study

Because the College of Micronesia–FSM is the only public postsecondary institution in the Federated States of Micronesia and does not have the capacity to enroll all high school graduates and GED holders (College of Micronesia–FSM, 2020b), students must meet multiple standards to enroll and to enter specific academic programs. Applicants must have graduated from high school with a minimum grade point average of 2.0 or obtained a GED with a minimum score of 35 on each section and an average score of 45 across all five sections (College of Micronesia–FSM, 2020a).¹ In addition, applicants must have taken the entrance test, the College of Micronesia–FSM Entrance Test (COMET),² which includes a reading comprehension section, a math section, and an essay section (College of Micronesia–FSM, 2020c). The results of the test are used in conjunction with other admission requirements such as high school grade point average to determine student admission to a two-year associate degree program, Achieving College Excellence (ACE) (a series of developmental courses),³ or a one-year nondegree certificate program (College of Micronesia–FSM, 2020c).

Degree programs allow for specialization in the arts, sciences, or applied sciences and require 29 general course credits in English communication skills, math, social sciences, computer applications, exercise sports sciences, humanities, and natural sciences (College of Micronesia–FSM, 2020e; Simion & Hayes, 2015). Students can be admitted to a degree program and simultaneously placed in developmental courses in math, reading, and writing, based on their COMET subtest scores.⁴ Developmental courses are not credit bearing and do not count toward a degree.

Students admitted to ACE are required to complete a series of dedicated developmental courses before continuing to a degree program. Unlike students admitted directly to a degree program, who might take developmental courses alongside other credit-bearing courses, ACE requires students to master two levels of developmental

¹ Some students in the study sample were admitted despite having a high school grade point average of less than 2.0; this is because the college occasionally admits such students on a case-by-case basis.

² Students take the COMET before officially applying to the college, so students do not need to have a high school grade point average of at least 2.0 to take it.

³ Students admitted to ACE are conditionally admitted to a degree program and may continue to a degree program after successful completion of the developmental courses.

⁴ Though the admission result and course placement both use the COMET, they follow different sets of rules based on the subtest scores.

math and two levels of developmental English for no credit in two six-week sessions before enrolling in credit-bearing college-level courses (College of Micronesia–FSM, 2020e). Students can be placed directly in the second level of either subject and can be required to complete only one session. ACE also offers weekly seminars to prepare first-year students for college. Students who do not pass the ACE courses are admitted to a certificate program instead of a degree program. Students admitted to ACE take its dedicated developmental courses in lieu of the developmental courses that students directly admitted to a degree program might have to take.

The certificate programs offer specialization in areas such as agricultural and food technology, public health, electronic engineering technology, and cabinet making (College of Micronesia–FSM, 2020d).

In 2018 degree admission rates (admission to the ACE program or a degree program) across the four states of the FSM ranged from 28 percent (Chuuk) to 58 percent (Pohnpei; FSM National Department of Education, 2018). Further, 54 percent of admitted students across all College of Micronesia–FSM campuses were placed in non-credit-bearing developmental math courses, and 42 percent of full-time students did not persist to a second year (National Center for Education Statistics, 2020). Two previous Regional Educational Laboratory Pacific studies have investigated college course placement and academic factors that support students' college readiness in the Commonwealth of the Northern Mariana Islands. The first found that 92 percent of graduates from the Commonwealth of the Northern Mariana Islands Public School System were placed in developmental math courses in college (Herman, Carreon, et al., 2017). The second found that students were more likely to be placed in credit-bearing math courses in their first year of college if they were enrolled in Advanced Placement courses in high school, had higher high school grade point averages and standardized test scores, and enrolled in more advanced high school math courses (Herman, Scanlan, & Carreon, 2017). However, a similar study has not been conducted for Pohnpei. Because the cultures and context of the Commonwealth of the Northern Mariana Islands differ from those of Pohnpei, those studies might not reflect of college success at the College of Micronesia–FSM.

To address this gap in research for Pohnpei and to identify potential high school academic preparation characteristics beyond those identified in the Commonwealth of the Northern Mariana Islands, the study team first conducted a review of literature on high school academic preparation characteristics for the continental United States. However, given the substantial differences in culture, political structure, and education systems between the continental United States and Pohnpei, the findings of these studies might not be generalizable to this study and so were used as a starting point for possible predictors of early college success.

High school academic preparation characteristics

High school academic preparation characteristics, such as cumulative grade point average and enrollment in college preparation courses in high school, have been linked to college success outcomes (Shewach et al., 2019; Turk, 2018). High school grade point average can be a reliable predictor of first-year college grades (Geiser & Santelices, 2007; Noble & Sawyer, 2002), cumulative college grades, and college completion (Geiser & Santelices, 2007). Tucker and McKnight (2019) found that a high school grade point average below 2.3 on a 4.0 scale was a reliable predictor of low college grade point average and success (defined as maintaining a good academic standing, persisting, and graduating). Additionally, the Center for Community College Student Engagement (2016) found that first-time students enrolling in community college were less likely to be identified as unprepared for credit-bearing coursework if they had higher high school grade point averages.

Prior research has shown that enrollment in advanced high school courses and college preparation courses can be positively associated with early college success and enrollment in more advanced college-level courses (Shewach et al., 2019; Stephan et al., 2015). Additionally, Kreisman and Stange (2019) found that for each additional advanced vocational course credit earned in high school, a student's probability of graduating college increased by 4 percentage points.

Students who attend public schools on Pohnpei have the choice to enroll in one of three high school coursework tracks starting in grade 11: academic (college preparation), business, or vocational. The coursework track that students enroll in affects the types of courses that they take. Students who are enrolled in the academic track take higher-level math courses, such as trigonometry, than students who are enrolled in the business and vocational tracks. Likewise, students who are enrolled in the vocational track take more vocational course credits than students who are enrolled in the academic or business tracks.

Early college success outcomes

Standardized test scores can be significant predictors of college success. Standardized test scores have been linked to first-year cumulative grade point average and second-year retention, independent of whether the college accepts all high school graduates or is highly selective (Westrick et al., 2015). The College of Micronesia–FSM uses a locally developed standardized test, the COMET, for admission rather than the SAT or ACT. The COMET, the SAT, and the ACT assess similar content areas. The COMET assesses students in math, reading, and writing (College of Micronesia–FSM, 2020c). The math section includes algebra, geometry, and problem solving; the reading section includes vocabulary and comprehension; and the writing section includes an essay prompt (College of Micronesia–FSM, 2020c). Multiple researchers argue that state-developed standardized tests might be preferable to other standardized tests because they might be better aligned with the local K–12 curriculum; additionally, studies have shown that state tests can be valid predictors of college outcomes (Atkinson & Geiser, 2009; Porter & Polikoff, 2012).

Students are most likely to drop out of college in their first or second year (Bradburn & Carroll, 2002). In community colleges students who earn 20 credits (excluding developmental coursework) are 7.6 times more likely to graduate than students who earn fewer credits, representing an important milestone in persistence (Calcagno et al., 2007). Placement in developmental coursework, which lengthens the time to degree completion and adds to students' financial burden, decreases the likelihood that a student will persist and graduate from college (Bradburn & Carroll, 2002; Complete College America, 2011). Developmental coursework in math seems to be a particular risk factor for college dropout (Herzog, 2005).

Other high school student characteristics

While academics are strong predictors of college success, other high school student characteristics, such as gender or ethnicity, might be important to consider. The relationship between student characteristics and college success outcomes is complex. For example, one study found that, with the exception of science, technology, engineering, and math courses, male students enrolled in fewer advanced college courses than female students (Shewach et al., 2019). The study also found that Black students enrolled in fewer advanced courses than White, Asian, and Hispanic students, except for Black business majors, who enrolled in a similar quantity of advanced courses as White students (Shewach et al., 2019). Additionally, Hispanic students tended to take more advanced courses in arts and humanities and social sciences than White students (Shewach et al., 2019). High schools might differ in their ability to prepare students for college (McGuire, 2018). Bradshaw (2015) reports that just 11 percent of high schools accounted for 36 percent of Harvard University students, meaning that a small proportion of high schools tends to graduate the most high-achieving students. These results suggest that college success outcomes vary by student characteristics and are not uniform across all disciplines and course levels.

Other college student characteristics

The academic term in which students enroll for the first time and whether students enroll full time or part time also might be important to consider when examining early college success outcomes (Hodara & Cox, 2016; Turk, 2018). Bradburn and Carroll (2002) found that students at two-year colleges who first enrolled in the fall term were more likely to leave for academic reasons. Furthermore, the longer high school graduates delayed college

enrollment, the more likely they were to be placed in developmental courses and the less likely they were to earn a college credential (Hodara & Cox, 2016; Turk, 2018). This is likely due to the time gap in learning (Hodara & Cox, 2016). Students who enroll in the College of Micronesia–FSM for the first time in the summer are required to attend classes every day for six weeks, which might support their ability to engage with the class material and transition to college (Wathington et al., 2011). Students take up to two courses in the summer and typically take developmental courses if they are placed in them. By using the summer for developmental courses, students might start the fall semester taking credit-bearing courses or taking fewer developmental courses. Additionally, part-time enrollment can decrease the probability of persistence and graduation (Herzog, 2005; Turk, 2018). Data compiled from 33 states show that only 8 percent of part-time students earn a two-year associate degree within four years (Complete College America, 2011).

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Appendix B. Methods

This appendix provides details on the study's data sources, sample, measures, methods for dealing with missing data, and analytical approach.

Data sources

To answer the research questions, this study examined student high school data from the Pohnpei Department of Education for the three public high schools on Pohnpei and student college data from the College of Micronesia–FSM (COM–FSM).

High school data. The Pohnpei Department of Education, which operates public high schools on Pohnpei, provided student transcripts or report cards⁵ and demographic information for all students who graduated from a public high school on Pohnpei between spring 2016 and spring 2018.

College data. The COM–FSM provided entrance test results (on the COM–FSM Entrance Test [COMET]), course placement data, and student persistence data for all students who graduated from a Pohnpei public high school between spring 2016 and spring 2018 and applied to the COM–FSM in grade 12.

Data processing and determination of analytic samples

The study team received data for 1,305 students from the three public high schools. Because data were received separately from each of the three high schools and Pohnpei public high schools do not use unique student IDs, the students had to be linked first to the demographic data provided by the Pohnpei Department of Education and then to data provided by the COM–FSM. Given that some student names were not identical across the two datasets (due to misspellings or slight name changes from year to year) and that there was no shared ID, inexact matches that met a threshold of similarity were created using fuzzyjoin (Robinson, 2019), an R package (R Core Team, 2020). Fuzzyjoin was used to create a list of matched students based on first and last name using a probability of likely matches. The study team examined this list and compared students' names, cohort, and gender⁶ across the joined data sources to confirm that matches were correct. Incorrect matches were removed, and the original unmatched pair of students was again considered for matching with other records from the opposite database. This resulted in identifying 1,146 students who took the COMET in grade 12 (88 percent of all Pohnpei public high school graduates) and 327 students who passed the COMET and enrolled in the COM–FSM in the summer or fall term immediately after high school graduation (29 percent of students who took the COMET and 25 percent of all Pohnpei public high school graduates).

Although about half the students who took the COMET and scored high enough to be considered for admission to Achieving College Excellence (ACE) or a two-year associate degree program, only 29 percent of students who took the COMET actually enrolled in one of those programs. The reason for the low number is unknown but might be the result of students not qualifying for admission based on other criteria, qualifying for admission only to a certificate program, attending college off-island, choosing to delay enrollment, or deciding not to enroll at all.

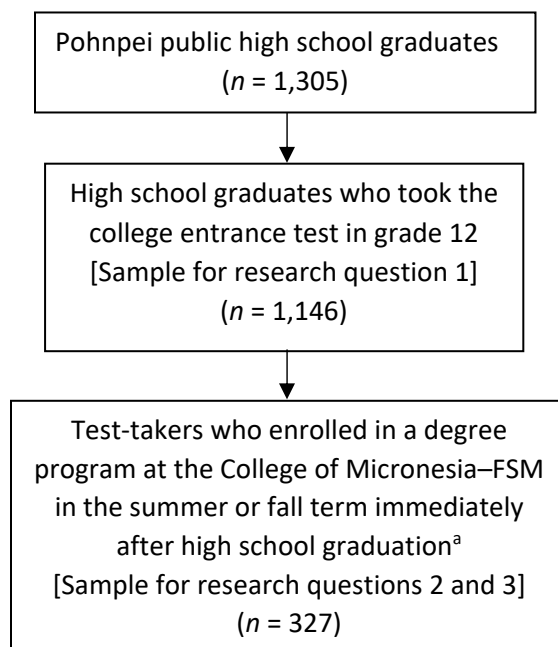
The study team relied on two analytic samples (figure B1). The analysis for research questions 1 and 1a used the sample of 1,146 students who graduated from a public high school on Pohnpei between spring 2016 and spring 2018 and took the COMET in grade 12. The analysis for research questions 2, 2a, 3, and 3a used the sample of 327

⁵ Because student-level course and grade point average data are maintained only by the high schools, the format of the data received varied. In one school only report cards were available. In another school report cards were available for two cohorts and transcripts for one cohort. In the third school only transcripts were available.

⁶ Gender and date of birth were not available in all datasets so they could not be consistently used to verify linking.

students who received the ACE result or degree program result on the COMET⁷ and enrolled in the COM–FSM in the summer or fall term immediately after high school graduation. The two samples were similar for most high school academic preparation characteristics and other high school characteristics examined in the study. However, the second sample had a higher percentage of female students and students from Nanpei Memorial High School and a lower percentage of students from Pohnpei Island Central School than the first sample (see table C1 in appendix C). The second sample also had a higher mean high school cumulative grade point average than the first sample (see table C2).

Figure B1. Number of students at each step of the determination of the analytic samples



Note: The college entrance test is the College of Micronesia–FSM Entrance Test.

a. Enrollment in a degree program at the College of Micronesia–FSM includes students admitted to either Achieving College Excellence (a series of developmental courses) or a two-year associate degree program.

Source: Authors’ compilation based on data from the Pohnpei Department of Education and the College of Micronesia–FSM.

Deviation coding

All the categorical predictor variables used in the regression models to answer the research questions were deviation coded (University of California Los Angeles Statistical Consulting Group, 2011). In deviation coding, each level of a predictor variable is compared with the grand mean, which is the mean of the means of each level of the predictor variables and can be a conceptual proxy for the general population average. With deviation coding, binary predictor variables were coded as 1 and –1. For categorical variables with three or more levels, a dummy variable was created and coded for the number of levels minus one. The regression beta for dummy variable 1 would indicate the results of level 1 of the example variable compared with the grand mean, and the results for dummy variable 2 would be for level 2 compared with the grand mean (see tables B1 and B2). As an example, for findings regarding the high school coursework track, deviation coding permitted a comparison of outcomes for students who were enrolled in the academic track with outcomes for the average student in the sample. In contrast, dummy coding would allow only for comparing much smaller subgroups of students with each other,

⁷ Students who enrolled in a certificate program were not included in this sample because certificate programs are one-year nondegree programs. The study’s outcomes would not make sense for these students because certificate students would not take credit-bearing courses and because persisting to a second year would be a negative outcome.

such as female Pohnpeian students who were enrolled in the academic coursework track with female Pohnpeian students who were enrolled in the business coursework track, which ignores many of the students in the sample and could lead to comparisons that are less interesting or useful for answering the research questions.

High school academic preparation characteristics

Two high school academic preparation characteristics were used in answering all the research questions:

- *High school cumulative grade point average.* A student’s unweighted cumulative high school grade point average. The possible values ranged from 0 to 4.
- *High school coursework track.* The high school coursework track a student was enrolled in during grades 11 and 12. The possible values were academic, business, or vocational. These values were deviation coded (table B1).

Table B1. Deviation coding of high school coursework track

| Possible value | High school coursework track 1 | High school coursework track 2 |
|----------------|--------------------------------|--------------------------------|
| Academic | 1 | 0 |
| Business | 0 | 1 |
| Vocational | -1 | -1 |

Source: Authors’ analyses of data from the Pohnpei Department of Education for public high school graduates from 2016 to 2018.

Early college outcomes

The study team examined the following early college outcomes:

- *Student’s COMET result.* Values were coded as an ordinal variable with possible values of not admitted, certificate, ACE, or degree program.
- *Placement in credit-bearing math courses.* Whether a student was placed directly in a credit-bearing math course at the COM–FSM. Values were 1 (placed in credit-bearing course) or 0 (placed in developmental course).
- *Placement in credit-bearing reading courses.* Whether a student was placed directly in a credit-bearing reading course at the COM–FSM. Values were 1 (placed in credit-bearing course) or 0 (placed in developmental course).
- *Placement in credit-bearing writing courses.* Whether a student was placed directly in a credit-bearing writing course at the COM–FSM. Values were 1 (placed in credit-bearing course) or 0 (placed in developmental course).
- *Persistence into a second year.* Whether a student persisted to a second year at the COM–FSM. Values were 1 (persisted to a second year) or 0 (did not persist). Because the sample included only students who initially enrolled in the summer or fall term, persistence was calculated as still being enrolled in the college in the fall term of the next calendar year.

Other high school student characteristics

To answer the research questions, the study team used two high school student characteristics; data were received from the Pohnpei Department of Education as controls:

- *Gender*. The gender of a student as reported by the Pohnpei Department of Education. Values were deviation coded as female (1) and male (–1).
- *Ethnicity*. The ethnicity of a student as reported by the Pohnpei Department of Education. For research questions 1 and 1a, possible values included Mortlockese, Mwokilese, Nukuoran/Kapingamarangi, other Micronesian, Pingelapese, and Pohnpeian. These values were deviation coded (table B2). For research questions 2, 2a, 3, and 3a, ethnicity was collapsed to two levels due to the small sample sizes. Values were deviation coded as other Micronesian (1) and Pohnpeian (–1).

To answer research questions 1a, 2a, and 3a, the study team included high school cohort and high school as random intercepts in the regression models:

- *High school*. The Pohnpei public high school from which a student graduated. Values included Pohnpei Island Central School, Madolenihmw High School, and Nanpei Memorial High School.
- *Cohort*. The year the student graduated from high school. Values included 2016, 2017, and 2018.

Table B2. Deviation coding of ethnicity of students for research question 2

| | Ethnicity 1 | Ethnicity 2 | Ethnicity 3 | Ethnicity 4 | Ethnicity 5 |
|--------------------------|----------------|----------------|----------------|----------------|----------------|
| Mortlockese | 1 | 0 | 0 | 0 | 0 |
| Mwokilese | 0 | 1 | 0 | 0 | 0 |
| Nukuoran/ Kapingamarangi | 0 | 0 | 1 | 0 | 0 |
| Other Micronesian | 0 | 0 | 0 | 1 | 0 |
| Pingelapese | 0 | 0 | 0 | 0 | 1 |
| Pohnpeian | –1 | –1 | –1 | –1 | –1 |

Source: Authors' analyses of data from the Pohnpei Department of Education for public high school graduates from 2016 to 2018.

Other college student characteristics

To answer research question 3a, the study team used additional college student characteristics as controls for predicting persistence to a second year at the COM–FSM. The following college student characteristics were examined:

- *Enrollment type*. Whether a student was enrolled full- or part-time at the COM–FSM. Values were deviation coded as full-time (1) or part-time (–1).
- *Program type*. Whether a student started enrollment at the COM–FSM in ACE or directly in a degree program. Values were deviation coded as ACE (1) or degree program (–1).
- *First term of enrollment*. Whether a student enrolled for the first time at the COM–FSM in the summer or fall term directly after high school graduation. Values were deviation coded as fall (1) or summer (–1).

Missing data

Students in both analytic samples had missing data (tables B3 and B4); however, no student was missing outcome data because the samples were defined to include only students with the outcomes in question.

Table B3. Percentage of students missing data for variables in the regression models for sample 1

| Student variable | Percent missing data |
|--|----------------------|
| High school cumulative grade point average | 7.59 |
| Gender | 1.04 |
| Ethnicity | 3.49 |

Note: $n = 1,146$ Pohnpei public high school graduates from 2016 to 2018. Variables not listed did not have missing data.

Source: Authors' analyses of data from the Pohnpei Department of Education for public high school graduates from 2016 to 2018.

Table B4. Percentage of students missing data for variables in the regression models for sample 2

| Student variable | Percent missing data |
|--|----------------------|
| High school cumulative grade point average | 2.14 |
| Gender | 0.92 |
| Ethnicity | 2.14 |

Note: $n = 327$ Pohnpei public high school graduates from 2016 to 2018 who enrolled in the College of Micronesia–FSM. Variables not listed did not have missing data.

Source: Authors' analyses of data from the Pohnpei Department of Education for public high school graduates from 2016 to 2018.

To preserve the study's sample size and to include students with missing data for predictors in the study, the study team conducted multiple imputation using the mice: Multivariate Imputation by Chained Equations package (van Buuren & Groothuis-Oudshoorn, 2011) in R (R Core Team, 2020). Multivariate imputation by chained equations is appropriate for imputing continuous, binary, and ordered and unordered categorical data. The imputation models included student background characteristics and the outcome variables examined for each sample and used the mice package's random forest algorithm to calculate the imputations. The imputation procedures created 10 versions of complete datasets by using existing values to predict missing characteristic data. Analyses were then performed across datasets, and results were pooled to yield one set of results for each analysis. Findings from these analyses are presented in the main report. To determine whether the study findings differed based on the methods used to address missing data, the study team also conducted sensitivity analyses using the sample of students who had complete data. The findings from those analyses are presented in appendix D.

Analysis methods

This section describes the analysis methods used to answer the research questions.

Descriptive analyses. To address research question 1, the study team used R (R Core Team, 2020) to calculate the percentage of students who had each of the four possible COMET results (not admitted, certificate, ACE, or degree).

To address research questions 2 and 3, the study team calculated the percentages of students who were placed into credit-bearing math, reading, and writing courses and who persisted to a second year at the COM–FSM.

The characteristics and outcome variables included in these descriptive analyses are described above.

Mixed effect regression analyses. To address research questions 1a, 2a, and 3a, the study team used the R (R Core Team, 2020) package brms (Bürkner, 2017) to run five Bayesian mixed effect regression models. Bayesian models were used instead of traditional frequentist models because Bayesian models have fewer model convergence issues with smaller datasets, allow for the full models motivated by previous research and the study's research questions, and provide a more nuanced way to model uncertainty and prior knowledge than frequentist models (Kruschke, 2015). Four of the models used logistic regression because the outcome variables of placement in

credit-bearing math courses, placement in credit-bearing reading courses, placement in credit-bearing writing courses, and persistence to a second year are dichotomous. The model for the COMET result used ordinal (cumulative link) regression because the outcome variable is ordinal.

All five regression models used the same random effect structure of random intercepts of high school and the interaction of high school and cohort. Cohort was nested inside of high school based on the assumption that most cohort-level variance would occur within a given high school rather than across schools, because of the variability of education practices⁸ in each school from year to year and because the Pohnpei Department of Education reported limited systemwide policy change during the study's timespan.

The fixed effect characteristics for research questions 1a and 2a included high school cumulative grade point average, high school coursework track, gender, and ethnicity. The fixed effect characteristics for research question 3a included high school cumulative grade point average, high school coursework track, gender, ethnicity, enrollment type, program type, and first term of enrollment. The categorical fixed effect predictors in all the regression models were deviation coded (see above for a description of the coding scheme) so that the reference group was the grand mean of the categorical predictors.

The ordinal mixed-effect model used to answer research question 2 is as follows:

$$\log(\theta_m) = \alpha_m - \sum \beta_1 \mathbf{X}_{ics} - \sum \beta_2 \mathbf{Z}_{ics} - U_s - U_s U_c$$

where $\log(\theta_m)$ is the log odds of lower or equal entrance test result m (not admitted, certificate, ACE, or degree admission) for student i in cohort c in high school s and $\theta_m = \frac{\text{prob}(\text{outcome} \leq m)}{1 - \text{prob}(\text{outcome} \leq m)}$; $\sum \mathbf{X}_{ics}$ is a vector of the student high school academic preparation measures of interest; $\sum \mathbf{Z}_{ics}$ is a vector of other high school student characteristics (gender and ethnicity); U_s is random intercept by high school to account for the nested nature of the data by school; and $U_s U_c$ is a random intercept of the interaction of high school and cohort, c .

The logistic mixed-effect models used to answer research question 2a are as follows:

$$\text{logit}(\text{Pr}[Y_{ics} = 1 | \mathbf{X}_{ics}, \mathbf{Z}_{ics}]) = \log \frac{p}{1-p} = \beta_0 + \sum \beta_1 \mathbf{X}_{ics} + \sum \beta_2 \mathbf{Z}_{ics} + U_s + U_s U_c$$

where $\text{logit}(\text{Pr}[Y_{ics} = 1 | \mathbf{X}_{ics}, \mathbf{Z}_{ics}])$ is the log odds of any of the three binary outcomes Y_{ics} (placement in credit-bearing math, reading, or writing courses) for student i in cohort c at school s .

For research question 3a, the logistic mixed-effect model is as follows:

$$\text{logit}(\text{Pr}[Y_{ics} = 1 | X_{ics}, Z_{ics}, W_{ics}]) = \log \frac{p}{1-p} = \beta_0 + \sum \beta_1 X_{ics} + \sum \beta_2 Z_{ics} + \sum \beta_3 W_{ics} + U_s + U_s U_c$$

where $\text{logit}(\text{Pr}[Y_{ics} = 1 | X_{ics}, Z_{ics}, W_{ics}])$ is the log odds of the binary outcome, Y_{ics} , of persistence to a second year for student i in cohort c at school s and $\sum \mathbf{W}_{ics}$ is a vector of college student characteristics (enrollment type, placement type, and first term of enrollment).

Because Bayesian models were used for each of the regression models, weakly informative priors were incorporated into the models, given the lack of prior research on Pohnpei in this area. These priors were selected so that they did not overly influence the data but penalized highly improbable values. For each of the fixed effect predictors, a normal distribution with mean of 0 and a standard deviation of 3 was used as the prior. These priors told the model that there is a 95 percent certainty (two standard deviations) that a one unit increase in the

⁸ As an example of school-level variation by cohort, schools varied in their course offerings year to year. One school required students enrolled in the academic coursework track in all three cohorts to take trigonometry. Another school offered precalculus instead of trigonometry but only to two cohorts in the study, and the third cohort took Algebra II. The third school required two cohorts of students enrolled in the academic coursework track to take trigonometry, and a third could take Algebra II or trigonometry.

predictor should correspond to a change in the predicted outcome variable of between -6 and 6 log odds,⁹ which corresponds to odds of 0.0024–403.42. Any values outside of that range are heavily penalized. A sensitivity analysis that examined the effect of the priors on the outcomes is provided in appendix D. Using weaker priors of 4, 5, and 6 standard deviations instead of 3 had very little effect on the models and did not change the significance of the predictors.

For the model's intercept the brms package default of a student t -distribution prior with a mean of 0, standard deviation of 2.5, and 3 degrees of freedom was used as a weakly informative prior.

Given Bayesian models' lack of p -values, a region of practical equivalence (ROPE; Kruschke & Liddell, 2018) was used to determine the extent to which predictors have a different posterior distribution from that of the intercept. ROPE is a Bayesian alternative to frequentist statistical significance. ROPE defines a small region close to zero, which is determined to be substantively equivalent to zero. After the ROPE is defined, the percentage of the 95 percent highest density interval (the 95 percent most probable values of the posterior distribution for each predictor) that falls inside the ROPE can be calculated. If 0 percent of the predictor's highest density interval falls inside the ROPE, the predictor's posterior distribution is considered statistically different from that of the intercept; if 100 percent of the predictor's highest density interval falls inside the ROPE, the predictor's posterior distribution is not considered statistically different from that of the intercept; and if more than 0 percent but less than 100 percent of the posterior distribution falls inside the ROPE, it is uncertain whether the predictor's posterior distribution is statistically different from that of the intercept. In appendixes C and D the regression results tables provide the highest density interval (HDI) bounds (called the lower 95 percent HDI and upper 95 percent HDI) and the percentage inside the ROPE. Based on the guidance from Kruschke and Liddell (2018), a ROPE of -0.18 to 0.18 log odds was used for the logistic regression models and -0.1 to 0.1 was used for the ordinal regression models.

All Bayesian regression models were checked for chain convergence based on the Gelman-Rubin convergence statistic (Gelman & Rubin, 1992), and none of the models had divergent transitions. Each model was run with 6 chains, 1,000 warmup samples, and 2,000 postwarmup samples.

After the regression models were run, predicted probabilities (conditional effects) were calculated for each of the significant predictors using the `ggpredict()` function of the `ggeffects` R package (Lüdtke, 2018). The predicted probabilities were calculated by first selecting the variable of interest, which included only variables that had statistically different distributions in the regression models. Next, the other predictors in the regression models were held constant. For research questions 1a and 2a, the other predictor variables were held constant at Pohnpeian, female student, high school academic coursework track, and average high school cumulative grade point average.¹⁰ For research question 3a, they were held constant at Pohnpeian, female student, high school academic coursework track, average high school cumulative grade point average, full-time enrollment, enrolled in a degree program, and started in fall term. Finally, the probability of achieving the outcome was calculated from the regression models for each level of the predictor of interest (if the predictor was a categorical variable) or at specified values (if the predictor was continuous) while holding the other variables constant as specified above. Using these values to calculate the predicted probabilities is why the average outcomes reported in table C4 are not always within the range of the reported predicted probabilities.

⁹ Six log odds were determined by multiplying the prior's standard deviation of 3 by 2. Log odds are used because of the logistic and ordinal regressions.

¹⁰ High school cumulative grade point average and high school coursework track were allowed to vary when calculating the predicted probabilities when they were the predictors of interest.

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Appendix C. Supporting analysis

Appendix C provides the detailed results for the research study.

Detailed results of descriptive statistics

This section provides descriptive statistics (percentages, means, minimum values, maximum values, and standard deviations) for the two analytic samples (research questions 1, 2, and 3; tables C1–C4).

Table C1. Percentages for each categorical predictor, by analytic sample

| Predictor | Sample 1 (<i>n</i> = 1,146) | Sample 2 (<i>n</i> = 327) | Percent inside ROPE |
|-------------------------------------|---------------------------------|-------------------------------|------------------------|
| High school coursework track | | | |
| Academic | 50.96 | 61.47 | 1.11 |
| Business | 23.73 | 17.43 | 29.73 |
| Vocational | 25.31 | 21.10 | 65.02 |
| Gender | | | |
| Female | 53.57 | 65.12 | 0.00 |
| Male | 46.43 | 34.88 | 0.00 |
| Ethnicity | | | |
| Mortlockese | 3.75 | — | — |
| Mwokilese | 3.75 | — | — |
| Nukuoran/Kapingamarangi | 4.54 | — | — |
| Other Micronesian ^a | 1.92 | 11.93 | — |
| Pingelapese | 3.84 | — | — |
| Pohnpeian | 78.27 | 85.93 | 11.79 |
| Missing | 3.49 | 2.14 | 100.00 |
| High school | | | |
| Pohnpei Island Central School | 56.46 | 33.33 | 0.00 |
| Madolenihmw High School | 17.02 | 22.94 | 35.44 |
| Nanpei Memorial High School | 26.53 | 43.73 | 0.00 |
| Cohort | | | |
| 2016 | 44.68 | 46.18 | 88.96 |
| 2017 | 28.01 | 22.63 | 45.69 |
| 2018 | 27.31 | 31.19 | 65.19 |
| Enrollment type | | | |
| Full-time | — | 78.59 | — |
| Part-time | — | 21.41 | — |
| Placement type | | | |
| Achieving College Excellence | — | 40.98 | — |
| Degree | — | 59.02 | — |
| First term of enrollment | | | |
| Fall | — | 49.85 | — |
| Summer | — | 50.15 | — |

ROPE is region of practical equivalence.

– indicates that the category was not applicable for the sample or could not be compared between samples.

Note: Sample 1 comprises students who graduated from a Pohnpei public high school between spring 2016 and 2018 and took the College of Micronesia–FSM Entrance Test in grade 12. Sample 2 comprises students in sample 1 who were admitted to the College of Micronesia–FSM in Achieving College Excellence or a degree program and enrolled in the college in the summer or fall term immediately after high school graduation. Percentages might not sum to 100 because of rounding or missing values. Predictors with missing data are listed in tables B3 and B4. The proportions of each level of each variable were compared across samples using a Bayesian test of proportions, which models the probability of two proportions being different. The percent inside ROPE represents the percentage of the 95 percent highest density interval of the posterior distribution of the predicted percentage difference between the two samples from the test of proportions that overlaps with the region $[-5, 5]$ percentage points. Values in bold italics are statistically different because they have zero overlap with the ROPE and represent predicted differences between the samples that are greater than ± 5 percentage points.

a. For sample 2, ethnicity was collapsed to two categories: Pohnpeian and other Micronesian.

Source: Authors' analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Table C2. Descriptive statistics for high school cumulative grade point average, by sample

| Sample | Mean | Standard deviation | Minimum | Maximum |
|------------------------------|------|--------------------|---------|---------|
| Sample 1 (<i>n</i> = 1,146) | 2.87 | 0.69 | 0.00 | 4.00 |
| Sample 2 (<i>n</i> = 327) | 3.16 | 0.67 | 0.00 | 4.00 |

Note: Sample 1 comprised students who graduated from a Pohnpei public high school between spring 2016 and 2018 and took the College of Micronesia–FSM Entrance Test in grade 12. Sample 2 comprised students from sample 1 who enrolled in Achieving College Excellence or a degree program at the College of Micronesia–FSM in the summer or fall term immediately after high school graduation. Based on a Bayesian *t*-test, the two samples had statistically different distributions of high school cumulative grade point averages. Sample 2 had a predicted mean grade point average 0.30 [0.22, 0.39] higher than sample 1.

Source: Authors' analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Table C3. Percentage of students who received each College of Micronesia–FSM Entrance Test result (research question 1)

| Result | Percent |
|------------------------------|---------|
| Not admitted | 10.12 |
| Certificate | 34.03 |
| Achieving College Excellence | 22.51 |
| Degree | 33.33 |

Note: *n* = 1,146 students who graduated from a Pohnpei public high school between spring 2016 and 2018 and took the College of Micronesia–FSM Entrance Test in grade 12.

Source: Authors' analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Table C4. Percentage of students who met the college outcomes (research questions 2 and 3)

| College outcome | Percent |
|---|---------|
| Placement in credit-bearing math courses | 68.50 |
| Placement in credit-bearing reading courses | 13.46 |
| Placement in credit-bearing writing courses | 39.76 |
| Persistence to a second year | 71.87 |

Note: *n* = 327 students who graduated from a Pohnpei public high school between spring 2016 and 2018 and enrolled in Achieving College Excellence or a degree program at the College of Micronesia–FSM in the summer or fall term immediately after high school graduation.

Source: Authors' analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Detailed results from regression analyses

This section provides the detailed results of the regression analyses for research questions 1a (table C5), 2a (tables C6–C8), and 3a (table C9) and detailed results on the predicted probabilities for predictors that are statistically different from those of the reference group for each outcome (tables C10–C12).

Table C5. Results of regression model predicting College of Micronesia–FSM Entrance Test result

| Characteristic | College of Micronesia–FSM Entrance Test result | | |
|--|---|-------------------|------------------------|
| | Coefficient | 95 percent HDI | Percent inside ROPE |
| High school academic preparation characteristic | | | |
| High school grade point average | 0.73 | 0.53 to 0.92 | 0.00 |
| High school coursework track academic | 0.77 | 0.61 to 0.93 | 0.00 |
| High school coursework track business | –0.21 | –0.39 to –0.03 | 7.04 |
| Other high school characteristic | | | |
| Gender female | 0.13 | 0.02 to 0.24 | 27.22 |
| Ethnicity Mortlockese | 0.10 | –0.42 to 0.63 | 30.35 |
| Ethnicity Mwokilese | –0.12 | –0.63 to 0.39 | 30.24 |
| Ethnicity Nukuoran/Kapingamarangi | –0.25 | –0.75 to 0.26 | 22.01 |
| Ethnicity other Micronesian | 0.28 | –0.45 to 1.02 | 17.89 |
| Ethnicity Pingelapese | 0.11 | –0.42 to 0.65 | 29.47 |
| Intercept for nonadmission certificate | –0.40 | –1.57 to 0.94 | 11.18 |
| Intercept for certificate Achieving College Excellence | 1.88 | 0.71 to 3.23 | 0.00 |
| Intercept for Achieving College Excellence degree | 3.02 | 1.84 to 4.37 | 0.00 |

HDI is highest density interval. ROPE is the region of practical equivalence.

Note: $n = 1,146$ students who graduated from a Pohnpei public high school between spring 2016 and 2018 and took the Micronesia–FSM Entrance Test in grade 12. Results are based on Bayesian ordinal mixed effects regression analysis. Percent inside ROPE represents the percentage of the predictor’s posterior distribution that is inside the ROPE, which was set as $[-0.1, 0.1]$. Values in bold italics are statistically different because they have zero overlap with the ROPE. The 95 percent HDI is similar to a confidence interval used in frequentist analyses. It is set so that one can say that there is a 95 percent chance that the true parameter is within the HDI. Coefficients and HDI values are in log odds. The reference group was the grand mean. The model’s marginal R^2 was 0.189, and the conditional R^2 was 0.232.

Source: Authors’ analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Table C6. Results of regression model predicting placement into credit-bearing math courses at College of Micronesia–FSM

| Characteristic | Placement in credit-bearing math courses | | |
|--|---|-------------------|------------------------|
| | Coefficient | 95 percent HDI | Percent inside ROPE |
| High school academic preparation characteristic | | | |
| High school grade point average | 1.82 | 1.26 to 2.42 | 0.00 |
| High school coursework track academic | 0.52 | 0.09 to 0.96 | 0.99 |
| High school coursework track business | 0.05 | –0.44 to 0.54 | 58.96 |
| Other high school characteristic | | | |
| Gender female | –0.16 | –0.48 to 0.16 | 56.84 |
| Ethnicity other Micronesian | –0.30 | –0.75 to 0.15 | 28.97 |
| Intercept | –4.96 | –7.81 to –2.40 | 0.00 |

HDI is highest density interval. ROPE is the region of practical equivalence.

Note: $n = 327$ students who graduated from a Pohnpei public high school between spring 2016 and 2018 and enrolled in Achieving College Excellence or a degree program at the College of Micronesia–FSM in the summer or fall term immediately after high school graduation. Results are based on Bayesian logistic mixed effects regression analysis. Percent inside ROPE represents the percentage of the predictor’s posterior distribution that is inside the ROPE, which was set as $[-0.18, 0.18]$. Values in bold italics are statistically different because they have zero overlap with the ROPE. The 95 percent HDI is similar to a confidence interval used in frequentist analyses. It is set so that one can say that there is a 95 percent chance that the true parameter is within the HDI. Coefficients and HDI values are in log odds. The reference group was the grand mean. The model’s marginal R^2 was 0.230, and the conditional R^2 was 0.355. Source: Authors’ analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Table C7. Results of regression model predicting placement in credit-bearing reading courses at College of Micronesia–FSM

| Characteristic | Placement in credit-bearing reading courses | | |
|--|---|-----------------|---------------------|
| | Coefficient | 95 percent HDI | Percent inside ROPE |
| High school academic preparation characteristic | | | |
| High school grade point average | 1.53 | 0.76 to 2.38 | 0.00 |
| High school coursework track academic | 0.92 | 0.18 to 2.90 | 0.00 |
| High school coursework track business | 0.71 | –0.20 to 1.76 | 10.06 |
| Other high school characteristic | | | |
| Gender female | 0.03 | –0.36 to 0.43 | 70.93 |
| Ethnicity other Micronesian | 0.08 | –0.51 to 0.63 | 50.60 |
| Intercept | –7.64 | –10.92 to –4.92 | 0.00 |

HDI is highest density interval. ROPE is the region of practical equivalence.

Note: $n = 327$ students who graduated from a Pohnpei public high school between spring 2016 and 2018 and enrolled in Achieving College Excellence or a degree program at the College of Micronesia–FSM in the summer or fall term immediately after high school graduation. Results are based on Bayesian logistic mixed effects regression analysis. Percent inside ROPE represents the percentage of the predictor’s posterior distribution that is inside the ROPE, which was set as $[-0.18, 0.18]$. Values in bold italics are statistically different because they have zero overlap with the ROPE. The 95 percent HDI is similar to a confidence interval used in frequentist analyses. It is set so that one can say that there is a 95 percent chance that the true parameter is within the HDI. Coefficients and HDI values are in log odds. The reference group was the grand mean. The model’s marginal R^2 was 0.113, and the conditional R^2 was 0.126. Source: Authors’ analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Table C8. Results of regression model predicting placement in credit-bearing writing courses at College of Micronesia–FSM

| Characteristic | Placement in credit-bearing writing courses | | |
|--|---|----------------|---------------------|
| | Coefficient | 95 percent HDI | Percent inside ROPE |
| High school academic preparation characteristic | | | |
| High school grade point average | 1.05 | 0.59 to 1.53 | 0.00 |
| High school coursework track academic | 0.13 | –0.23 to 0.50 | 61.73 |
| High school coursework track business | 0.05 | –0.43 to 0.52 | 60.75 |
| Other high school characteristic | | | |
| Gender female | 0.11 | –0.16 to 0.38 | 72.50 |
| Ethnicity other Micronesian | 0.01 | –0.41 to 0.42 | 68.49 |
| Intercept | –4.02 | –6.00 to –2.11 | 0.00 |

HDI is highest density interval. ROPE is the region of practical equivalence.

Note: $n = 327$ students who graduated from a Pohnpei public high school between spring 2016 and 2018 and enrolled in Achieving College Excellence or a degree program at the College of Micronesia–FSM in the summer or fall term immediately after high school graduation. Results are based on Bayesian logistic mixed effects regression analysis. Percent inside ROPE represents the percentage of the predictor’s posterior distribution that is inside the ROPE, which was set as $[-0.18, 0.18]$. Values in bold italics are statistically different because they have zero overlap with the ROPE. The 95 percent HDI is similar to a confidence interval used in frequentist analyses. It is set so that one can say that there is a 95 percent chance that the true parameter is within the HDI. Coefficients and HDI values are in log odds. The reference group was the grand mean. The model’s marginal R^2 was 0.098, and the conditional R^2 was 0.146. Source: Authors’ analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Table C9. Results of regression model predicting persistence to a second year at College of Micronesia–FSM

| Characteristic | Persistence to a second year | | |
|--|------------------------------|----------------|---------------------|
| | Coefficient | 95 percent HDI | Percent inside ROPE |
| High school academic preparation characteristic | | | |
| High school grade point average | 1.36 | 0.86 to 1.88 | 0.00 |
| High school coursework track academic | –0.09 | –0.51 to 0.31 | 64.23 |
| High school coursework track business | 0.18 | –0.33 to 0.70 | 47.58 |
| Other high school characteristic | | | |
| Gender female | –0.21 | –0.52 to 0.09 | 41.42 |
| Ethnicity other Micronesian | –0.37 | –0.82 to 0.08 | 17.10 |
| College student characteristic | | | |
| Enrollment type full-time | 0.28 | –0.09 to 0.64 | 27.63 |
| Placement type Achieving College Excellence | 0.25 | –0.08 to 0.58 | 32.99 |
| First term of enrollment fall | –0.58 | –0.90 to –0.29 | 0.00 |
| Intercept | –3.43 | –5.38 to –1.66 | 0.00 |

HDI is highest density interval. ROPE is the region of practical equivalence.

Note: $n = 327$ students who graduated from a Pohnpei public high school between spring 2016 and 2018 and enrolled in Achieving College Excellence or a degree program at the College of Micronesia–FSM in the summer or fall term immediately after high school graduation. Results are based on Bayesian logistic mixed effects regression analysis. Percent inside ROPE represents the percentage of the predictor’s posterior distribution that is inside the ROPE, which was set as $[-0.18, 0.18]$. Values in bold italics are statistically different because they have zero overlap with the ROPE. The 95 percent HDI is similar to a confidence interval used in frequentist analyses. It is set so that one can say that there is a 95 percent chance that the true parameter is within the HDI. Coefficients and HDI values are in log odds. The reference group was the grand mean. The model’s marginal R^2 was 0.219, and the conditional R^2 was 0.221. Source: Authors’ analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Table C10. Predicted probabilities of College of Micronesia–FSM Entrance Test results

| Characteristic | College of Micronesia–FSM Entrance Test results | | | |
|--|---|-------------|------------------------------|--------|
| | Not admitted | Certificate | Achieving College Excellence | Degree |
| High school grade point average | | | | |
| 0 | 0.23 | 0.49 | 0.15 | 0.10 |
| 1 | 0.13 | 0.46 | 0.22 | 0.18 |
| 2 | 0.07 | 0.34 | 0.26 | 0.32 |
| 3 | 0.03 | 0.22 | 0.25 | 0.49 |
| 4 | 0.02 | 0.12 | 0.20 | 0.66 |
| High school coursework track | | | | |
| Academic | 0.04 | 0.23 | 0.26 | 0.46 |
| Business | 0.09 | 0.40 | 0.25 | 0.25 |
| Vocational | 0.13 | 0.45 | 0.23 | 0.19 |

Note: $n = 1,146$ students who graduated from a Pohnpei public high school between spring 2016 and 2018 and took the College of Micronesia–FSM Entrance Test in grade 12. Predicted probabilities are calculated from the regression model in table C5 (see appendix B for details on the calculations).

Source: Authors’ analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Table C11. Predicted probabilities for placing into credit-bearing courses at College of Micronesia–FSM

| Characteristic | Math | Reading | Writing |
|---------------------------------|------|---------|---------|
| High school grade point average | | | |
| 0 | 0.02 | 0.00 | 0.02 |
| 1 | 0.10 | 0.00 | 0.06 |
| 2 | 0.41 | 0.02 | 0.16 |
| 3 | 0.81 | 0.09 | 0.35 |
| 4 | 0.96 | 0.31 | 0.60 |
| High school coursework track | | | |
| Academic | — | 0.12 | — |
| Business | — | 0.10 | — |
| Vocational | — | 0.01 | — |

Note: $n = 327$ students who graduated from a Pohnpei public high school between spring 2016 and 2018 and enrolled in Achieving College Excellence or a degree program at the College of Micronesia–FSM in the summer or fall term immediately after high school graduation. Predicted probabilities are calculated from the regression models in tables C6–C8 (see appendix B for details on the calculations). Only statistically different predictors are included in the table. Source: Authors’ analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Table C12. Predicted probabilities for persistence to a second year at College of Micronesia–FSM

| Characteristic | Persistence to a second year |
|---------------------------------|------------------------------|
| High school grade point average | |
| 0 | 0.02 |
| 1 | 0.08 |
| 2 | 0.24 |
| 3 | 0.55 |
| 4 | 0.82 |
| First term of enrollment | |
| Summer | 0.83 |
| Fall | 0.60 |

Note: $n = 327$ students who graduated from a Pohnpei public high school between spring 2016 and 2018 and enrolled in Achieving College Excellence or a degree program at the College of Micronesia–FSM in the summer or fall term immediately after high school graduation. Predicted probabilities are calculated from the regression model in table C9 (see appendix B for details on the calculations). Only statistically different predictors are included in the table. Source: Authors’ analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Appendix D. Sensitivity analyses

This appendix details results of the sensitivity analyses for research questions 1a, 2a, and 3a. Two different types of sensitivity analyses are provided. The first set compares the findings from the main analysis, which used the pooled results from 10 imputed datasets, with findings from analyses run only on students with complete data in order to test the robustness of the study to the methods used to handle missing data. The second set compares the findings from the main analysis to findings from models run with different priors in order to test the robustness of the study to the priors used. Both sets of sensitivity analyses indicate that results of the main analyses were not sensitive to the method used for handling missing data or the priors used.

Detailed results of missing data sensitivity analyses

This section presents the results of analyses that examined the extent to which the regression analyses used to answer research questions 1a, 2a, and 3a are sensitive to the methods used to handle missing data. The main analysis models are compared with models that used listwise deletion instead of multiple imputation.

The findings did not reveal any substantial differences between the imputed and nonimputed datasets (tables D1–table D5) because predictors that had 0 percent inside the region of practical equivalence (ROPE) did not change. The estimates of those coefficients were also comparable across models, meaning that predictors’ coefficients varied by 0.26 logits or less.

Table D1. Sensitivity results for the College of Micronesia–FSM Entrance Test result

| High school characteristic | Main analysis (<i>n</i> = 1,146) | | No multiple imputation (<i>n</i> = 1,033) | |
|--|--------------------------------------|------------------------|---|------------------------|
| | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE |
| Academic preparation characteristic | | | | |
| Cumulative grade point average | 0.73 | 0.00 | 0.77 | 0.00 |
| High school coursework track academic | 0.77 | 0.00 | 0.77 | 0.00 |
| High school coursework track business | –0.21 | 7.04 | –0.23 | 3.00 |
| Other student characteristic | | | | |
| Gender female | 0.13 | 27.22 | 0.11 | 42.51 |
| Ethnicity Mortlockese | 0.10 | 30.35 | 0.06 | 28.84 |
| Ethnicity Mwokilese | –0.12 | 30.24 | –0.17 | 26.06 |
| Ethnicity Nukuoran/Kapingamarangi | –0.25 | 22.01 | –0.27 | 20.50 |
| Ethnicity other Micronesian | 0.28 | 17.89 | 0.56 | 9.15 |
| Ethnicity Pingelapese | 0.11 | 29.47 | –0.12 | 27.41 |
| Intercept for nonadmission certificate | –0.40 | 11.18 | –0.43 | 11.40 |
| Intercept for certificate Achieving College Excellence | 1.88 | 0.00 | 2.08 | 0.00 |
| Intercept for Achieving College Excellence degree | 3.02 | 0.00 | 3.21 | 0.00 |

ROPE is the region of practical equivalence.

Note: The samples for both analyses comprise students who graduated from a Pohnpei public high school between spring 2016 and 2018 and took the College of Micronesia–FSM Entrance Test in grade 12. Results are based on Bayesian ordinal mixed effects regression analysis. Percent inside ROPE represents the percentage of the predictor’s posterior distribution that is inside the ROPE, which was set as [–0.1, 0.1]. Values in bold italics are statistically different because they have zero overlap with the ROPE. Coefficients are in log odds.

Source: Authors’ analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Table D2. Sensitivity results for placement in credit-bearing math courses at College of Micronesia–FSM

| High school characteristic | Main analysis (<i>n</i> = 327) | | No multiple imputation (<i>n</i> = 313) | |
|--|------------------------------------|------------------------|---|------------------------|
| | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE |
| Academic preparation characteristic | | | | |
| Cumulative grade point average | 1.82 | 0.00 | 1.83 | 0.00 |
| High school coursework track academic | 0.52 | 0.99 | 0.51 | 2.57 |
| High school coursework track business | 0.05 | 58.96 | –0.01 | 58.00 |
| Other student characteristic | | | | |
| Gender female | –0.16 | 56.84 | –0.16 | 56.45 |
| Ethnicity other Micronesian | –0.30 | 28.97 | –0.43 | 9.88 |
| Intercept | –4.96 | 0.00 | –5.12 | 0.00 |

ROPE is the region of practical equivalence.

Note: The samples for both analyses comprise students who graduated from a Pohnpei public high school between spring 2016 and 2018 and enrolled in Achieving College Excellence or a degree program at the College of Micronesia–FSM in the summer or fall term immediately after high school graduation. Results are based on Bayesian logistic mixed effects regression analysis. Percent inside ROPE represents the percentage of the predictor’s posterior distribution that is inside the ROPE, which was set as [–0.18, 0.18]. Values in bold italics are statistically different because they have zero overlap with the ROPE. Coefficients are in log odds.

Source: Authors’ analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Table D3. Sensitivity results for placement in credit-bearing reading courses at College of Micronesia–FSM

| High school characteristic | Main analysis (<i>n</i> = 327) | | No multiple imputation (<i>n</i> = 313) | |
|--|------------------------------------|------------------------|---|------------------------|
| | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE |
| Academic preparation characteristic | | | | |
| Cumulative grade point average | 1.53 | 0.00 | 1.79 | 0.00 |
| High school coursework track academic | 0.92 | 0.00 | 1.05 | 0.00 |
| High school coursework track business | 0.71 | 10.06 | 0.42 | 24.38 |
| Other student characteristic | | | | |
| Gender female | 0.03 | 70.93 | 0.06 | 68.94 |
| Ethnicity other Micronesian | 0.08 | 50.60 | 0.01 | 49.52 |
| Intercept | –7.64 | 0.00 | –8.68 | 0.00 |

ROPE is the region of practical equivalence.

Note: The samples for both analyses comprise students who graduated from a Pohnpei public high school between spring 2016 and 2018 and enrolled in Achieving College Excellence or a degree program at the College of Micronesia–FSM in the summer or fall term immediately after high school graduation. Results are based on Bayesian logistic mixed effects regression analysis. Percent inside ROPE represents the percentage of the predictor’s posterior distribution that is inside the ROPE, which was set as [–0.18, 0.18]. Values in bold italics are statistically different because they have zero overlap with the ROPE. Coefficients are in log odds.

Source: Authors’ analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Table D4. Sensitivity results for placement in credit-bearing writing courses at College of Micronesia–FSM

| High school characteristic | Main analysis (<i>n</i> = 327) | | No multiple imputation (<i>n</i> = 313) | |
|--|------------------------------------|------------------------|---|------------------------|
| | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE |
| Academic preparation characteristic | | | | |
| Cumulative grade point average | 1.05 | 0.00 | 1.04 | 0.00 |
| High school coursework track academic | 0.13 | 61.73 | 0.17 | 51.88 |
| High school coursework track business | 0.05 | 60.75 | –0.00 | 59.87 |
| Other student characteristic | | | | |
| Gender female | 0.11 | 72.50 | 0.08 | 81.58 |
| Ethnicity other Micronesian | 0.01 | 68.49 | 0.04 | 66.68 |
| Intercept | –4.02 | 0.00 | –3.94 | 0.00 |

ROPE is the region of practical equivalence.

Note: The samples for both analyses comprise students who graduated from a Pohnpei public high school between spring 2016 and 2018 and enrolled in Achieving College Excellence or a degree program at the College of Micronesia–FSM in the summer or fall term immediately after high school graduation. Results are based on Bayesian logistic mixed effects regression analysis. Percent inside ROPE represents the percentage of the predictor’s posterior distribution that is inside the ROPE, which was set as [–0.18, 0.18]. Values in bold italics are statistically different because they have zero overlap with the ROPE. Coefficients are in log odds.

Source: Authors’ analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Table D5. Sensitivity results for persistence to a second year at College of Micronesia–FSM

| Characteristic | Main analysis (<i>n</i> = 327) | | No multiple imputation (<i>n</i> = 313) | |
|--|------------------------------------|------------------------|---|------------------------|
| | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE |
| High school academic preparation characteristic | | | | |
| Cumulative grade point average | 1.36 | 0.00 | 1.37 | 0.00 |
| High school coursework track academic | –0.09 | 64.23 | –0.09 | 62.83 |
| High school coursework track business | 0.18 | 47.58 | 0.16 | 48.25 |
| Other high school student characteristic | | | | |
| Gender female | –0.21 | 41.42 | –0.20 | 46.33 |
| Ethnicity other Micronesian | –0.37 | 17.10 | –0.33 | 24.13 |
| Other college student characteristic | | | | |
| Enrollment type full-time | 0.28 | 27.63 | 0.31 | 21.88 |
| Placement type Achieving College Excellence | 0.25 | 32.99 | 0.24 | 36.48 |
| First term of enrollment fall | –0.59 | 0.00 | –0.63 | 0.00 |
| Intercept | –3.43 | 0.00 | –3.45 | 0.00 |

ROPE is the region of practical equivalence.

Note: The samples for both analyses comprise students who graduated from a Pohnpei public high school between spring 2016 and 2018 and enrolled in Achieving College Excellence or a degree program at the College of Micronesia–FSM in the summer or fall term immediately after high school graduation. Results are based on Bayesian logistic mixed effects regression analysis. Percent inside ROPE represents the percentage of the predictor’s posterior distribution that is inside the ROPE, which was set as [–0.18, 0.18]. Values in bold italics are statistically different because they have zero overlap with the ROPE. Coefficients are in log odds.

Source: Authors’ analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Detailed results of different priors sensitivity analyses

This section presents the results of analyses that examined the extent to which the regression analyses used to answer research questions 1a, 2a, and 3a are sensitive to priors used in the models. The main analysis models that used a normal distribution with a mean of 0 and a standard deviation of 3 for each predictor are compared with models that used normal distributions with a mean of 0 and standard deviations of 4, 5, and 6, respectively.

The findings did not reveal any substantial differences between the models with different priors (table D6–D10) because the predictors that had 0 percent inside the ROPE did not change and the estimates of the coefficients were comparable, meaning that they all varied by 0.08 logits or less. Therefore, the main analysis is not substantially influenced by the priors used.

Table D6. Sensitivity results for the College of Micronesia—FSM Entrance Test result

| High school characteristic | Main analysis (mean = 0; SD = 3) | | Test 1 (mean = 0; SD = 4) | | Test 2 (mean = 0; SD = 5) | | Test 3 (mean = 0; SD = 6) | |
|--|-------------------------------------|---------------------------|------------------------------|---------------------------|------------------------------|---------------------------|------------------------------|---------------------------|
| | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE |
| Academic preparation characteristic | | | | | | | | |
| Cumulative grade point average | 0.73 | 0.00 | 0.73 | 0.00 | 0.73 | 0.00 | 0.73 | 0.00 |
| High school coursework track academic | 0.77 | 0.00 | 0.77 | 0.00 | 0.77 | 0.00 | 0.77 | 0.00 |
| High school coursework track business | -0.21 | 7.04 | -0.21 | 6.74 | -0.21 | 6.88 | -0.21 | 7.02 |
| Other student characteristic | | | | | | | | |
| Gender female | 0.13 | 27.22 | 0.13 | 27.63 | 0.13 | 28.10 | 0.13 | 26.95 |
| Ethnicity Mortlockese | 0.10 | 30.35 | 0.10 | 30.74 | 0.10 | 30.34 | 0.11 | 30.32 |
| Ethnicity Mwokilese | -0.12 | 30.24 | -0.12 | 30.18 | -0.12 | 30.19 | -0.12 | 30.23 |
| Ethnicity Nukuoran/Kapingamarangi | -0.25 | 22.01 | -0.25 | 21.57 | -0.25 | 21.63 | -0.25 | 21.77 |
| Ethnicity other Micronesian | 0.28 | 17.89 | 0.28 | 17.74 | 0.29 | 17.58 | 0.28 | 17.68 |
| Ethnicity Pingelapese | 0.11 | 29.47 | 0.11 | 29.58 | 0.11 | 29.06 | 0.11 | 29.26 |
| Intercept for nonadmission certificate | -0.40 | 11.18 | -0.40 | 11.03 | -0.40 | 11.22 | -0.40 | 11.25 |
| Intercept for certificate ACE | 1.88 | 0.00 | 1.88 | 0.00 | 1.88 | 0.00 | 1.88 | 0.00 |
| Intercept for ACE degree | 3.02 | 0.00 | 3.02 | 0.00 | 3.02 | 0.00 | 3.02 | 0.00 |

ACE is Achieving College Excellence. ROPE is the region of practical equivalence. SD is standard deviation.

Note: $n = 1,146$ students who graduated from a Pohnpei public high school between spring 2016 and 2018 and took the Micronesia–FSM Entrance Test in grade 12. Results are based on Bayesian ordinal mixed effects regression analysis. Percent inside ROPE represents the percentage of the predictor’s posterior distribution that is inside the ROPE, which was set as $[-0.1, 0.1]$. Values in bold italics are statistically different because they have zero overlap with the ROPE. Source: Authors’ analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Table D7. Sensitivity results for placement in credit-bearing math courses at College of Micronesia–FSM

| High school characteristic | Main analysis (mean = 0; SD = 3) | | Test 1 (mean = 0; SD = 4) | | Test 2 (mean = 0; SD = 5) | | Test 3 (mean = 0; SD = 6) | |
|--|-------------------------------------|---------------------|------------------------------|---------------------|------------------------------|---------------------|------------------------------|---------------------|
| | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE |
| Academic preparation characteristic | | | | | | | | |
| Cumulative grade point average | 1.82 | 0.00 | 1.83 | 0.00 | 1.83 | 0.00 | 1.83 | 0.00 |
| High school coursework track academic | 0.52 | 0.99 | 0.51 | 1.44 | 0.51 | 1.47 | 0.52 | 1.34 |
| High school coursework track business | 0.05 | 58.96 | 0.05 | 58.89 | 0.05 | 58.49 | 0.05 | 58.62 |
| Other student characteristic | | | | | | | | |
| Gender female | -0.16 | 56.84 | -0.16 | 56.46 | -0.16 | 56.82 | -0.16 | 56.46 |
| Ethnicity other Micronesian | -0.30 | 28.97 | -0.30 | 28.47 | -0.30 | 28.74 | -0.30 | 28.27 |
| Intercept | -4.96 | 0.00 | -4.99 | 0.00 | -5.00 | 0.00 | -5.01 | 0.00 |

ROPE is the region of practical equivalence. SD is standard deviation.

Note: $n = 327$ students who graduated from a Pohnpei public high school between spring 2016 and 2018 and enrolled in Achieving College Excellence or a degree program at the College of Micronesia–FSM in the summer or fall term immediately after high school graduation. Results are based on Bayesian logistic mixed effects regression analysis. Percent inside ROPE represents the percentage of the predictor’s posterior distribution that is inside the ROPE, which was set as $[-0.18, 0.18]$. Values in bold italics are statistically different because they have zero overlap with the ROPE. Coefficients are in log odds.

Source: Authors’ analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Table D8. Sensitivity results for placement in credit-bearing reading courses at College of Micronesia–FSM

| High school characteristic | Main analysis (mean = 0; SD = 3) | | Test 1 (mean = 0; SD = 4) | | Test 2 (mean = 0; SD = 5) | | Test 3 (mean = 0; SD = 6) | |
|--|-------------------------------------|---------------------|------------------------------|---------------------|------------------------------|---------------------|------------------------------|---------------------|
| | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE |
| Academic preparation characteristic | | | | | | | | |
| Cumulative grade point average | 1.53 | 0.00 | 1.54 | 0.00 | 1.55 | 0.00 | 1.55 | 0.00 |
| High school coursework track academic | 0.92 | 0.00 | 0.93 | 0.00 | 0.94 | 0.00 | 0.94 | 0.00 |
| High school coursework track business | 0.71 | 10.06 | 0.73 | 9.98 | 0.73 | 9.98 | 0.73 | 9.97 |
| Other student characteristic | | | | | | | | |
| Gender female | 0.03 | 70.93 | 0.03 | 71.03 | 0.03 | 71.48 | 0.03 | 70.95 |
| Ethnicity other Micronesian | 0.08 | 50.60 | 0.08 | 50.51 | 0.08 | 50.46 | 0.08 | 50.55 |
| Intercept | -7.64 | 0.00 | -7.70 | 0.00 | -7.72 | 0.00 | -7.72 | 0.00 |

ROPE is the region of practical equivalence. SD is standard deviation.

Note: $n = 327$ students who graduated from a Pohnpei public high school between spring 2016 and 2018 and enrolled in Achieving College Excellence or a degree program at the College of Micronesia–FSM in the summer or fall term immediately after high school graduation. Results are based on Bayesian logistic mixed effects regression analysis. Percent inside ROPE represents the percentage of the predictor’s posterior distribution that is inside the ROPE, which was set as $[-0.18, 0.18]$. Values in bold italics are statistically different because they have zero overlap with the ROPE. Coefficients are in log odds.

Source: Authors’ analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Table D9. Sensitivity results for placement in credit-bearing writing courses at College of Micronesia–FSM

| | Main analysis (mean = 0; SD = 3) | | Test 1 (mean = 0; SD = 4) | | Test 2 (mean = 0; SD = 5) | | Test 3 (mean = 0; SD = 6) | |
|--|-------------------------------------|---------------------|------------------------------|---------------------|------------------------------|---------------------|------------------------------|---------------------|
| | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE |
| High school characteristic | | | | | | | | |
| Academic preparation characteristic | | | | | | | | |
| Cumulative grade point average | 1.05 | 0.00 | 1.05 | 0.00 | 1.05 | 0.00 | 1.05 | 0.00 |
| High school coursework track academic | 0.13 | 61.73 | 0.13 | 61.29 | 0.13 | 61.49 | 0.13 | 61.40 |
| High school coursework track business | 0.05 | 60.75 | 0.05 | 60.37 | 0.05 | 60.26 | 0.05 | 60.14 |
| Other student characteristic | | | | | | | | |
| Gender female | 0.11 | 72.50 | 0.11 | 71.77 | 0.11 | 71.91 | 0.11 | 71.51 |
| Ethnicity other Micronesian | 0.01 | 68.49 | 0.00 | 68.47 | 0.01 | 68.02 | 0.01 | 68.17 |
| Intercept | -4.02 | 0.00 | -4.03 | 0.00 | -4.03 | 0.00 | -4.02 | 0.00 |

ROPE is the region of practical equivalence. SD is standard deviation.

Note: $n = 327$ students who graduated from a Pohnpei public high school between spring 2016 and 2018 and enrolled in Achieving College Excellence or a degree program at the College of Micronesia–FSM in the summer or fall term immediately after high school graduation. Results are based on Bayesian logistic mixed effects regression analysis. Percent inside ROPE represents the percentage of the predictor’s posterior distribution that is inside the ROPE, which was set as $[-0.18, 0.18]$. Values in bold italics are statistically different because they have zero overlap with the ROPE. Coefficients are in log odds.

Source: Authors’ analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.

Table D10. Sensitivity results for persistence to a second year at College of Micronesia–FSM

| | Main analysis (mean = 0; SD = 3) | | Test 1 (mean = 0; SD = 4) | | Test 2 (mean = 0; SD = 5) | | Test 3 (mean = 0; SD = 6) | |
|--|-------------------------------------|---------------------|------------------------------|---------------------|------------------------------|---------------------|------------------------------|---------------------|
| | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE | Estimate | Percent inside ROPE |
| High school academic preparation characteristic | | | | | | | | |
| Cumulative grade point average | 1.36 | 0.00 | 1.36 | 0.00 | 1.36 | 0.00 | 1.37 | 0.00 |
| High school coursework track academic | -0.09 | 64.23 | -0.09 | 64.07 | -0.09 | 64.02 | -0.09 | 63.90 |
| High school coursework track business | 0.18 | 47.58 | 0.18 | 47.58 | 0.18 | 47.35 | 0.18 | 47.28 |
| Other high school student characteristic | | | | | | | | |
| Gender female | -0.21 | 41.42 | -0.21 | 41.08 | -0.21 | 40.83 | -0.21 | 40.98 |
| Ethnicity other Micronesian | -0.37 | 17.10 | -0.37 | 17.03 | -0.37 | 16.37 | -0.37 | 16.80 |
| Other college student characteristic | | | | | | | | |
| Enrollment type full-time | 0.28 | 27.63 | 0.28 | 28.13 | 0.28 | 28.20 | 0.28 | 27.66 |
| Placement type Achieving College Excellence | 0.25 | 32.99 | 0.25 | 32.53 | 0.25 | 32.33 | 0.25 | 32.52 |
| First term of enrollment fall | -0.59 | 0.00 | -0.59 | 0.00 | -0.59 | 0.00 | -0.59 | 0.00 |
| Intercept | -3.43 | 0.00 | -3.44 | 0.00 | -3.46 | 0.00 | -3.45 | 0.00 |

ROPE is the region of practical equivalence. SD is standard deviation.

Note: $n = 327$ students who graduated from a Pohnpei public high school between spring 2016 and 2018 and enrolled in Achieving College Excellence or a degree program at the College of Micronesia–FSM in the summer or fall term immediately after high school graduation. Results are based on Bayesian logistic mixed effects regression analysis. Percent inside ROPE represents the percentage of the predictor’s posterior distribution that is inside the ROPE, which was set as $[-0.18, 0.18]$. Values in bold italics are statistically different because they have zero overlap with the ROPE. Coefficients are in log odds.

Source: Authors’ analyses of data from the Pohnpei Department of Education and the College of Micronesia–FSM for public high school graduates from 2016 to 2018.