California Community Colleges

Multiple Measures Assessment Project
The RP Group

Student Preparation, Experiences, and Success in STEM Calculus:

Statewide Student Survey Findings

Technical Appendices

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Table of Contents

INTRODUCTION **3**

APPENDIX A. STUDY OVERVIEW **4**

Data and Methods 4

Limitations 6

APPENDIX B. EXPLORATORY FACTOR ANALYSIS **8**

Survey Items and Factor Assignments 8

Factor retention 9

APPENDIX C. CONFIRMATORY FACTOR ANALYSIS **11**

Model Fit 11

Factor Loadings 11

APPENDIX D. MULTIPLE REGRESSION ANALYSES AND MISSING DATA SENSITIVITY CHECK **13**

Adjusted Regression Results 14

Assumption Testing 15

Diagnostic Plots for Grade Outcome Models 15

Multiple Imputation 17

Imputation Diagnostics 17

Sensitivity Checks 17

Introduction

These technical appendices provide detailed results from a statewide survey of students who had (1) enrolled in Science, Technology, Engineering, and Math (STEM) Calculus 1, regardless of major, or (2) declared a STEM major that required this course (see sidebar on this page). The RP Group's Multiple Measures Assessment Project (MMAP) team conducted this research in fall 2025.

In 2023, California passed AB 1705—legislation that built on developmental education reform catalyzed by AB 705 and further focused on improving equitable math placement and outcomes for community college students pursuing STEM majors. This study serves to inform colleges' efforts to respond to these requirements and identify ways to strengthen implementation to best meet students' needs and advance their success in this new context.

These appendices provide methodological details for this research to accompany analyses, conclusions, and recommendations summarized for two subsets of survey participants—those who took STEM Calculus 1 and those who did not—in two companion resources:

- *Research Brief: What Students Say About Their STEM Calculus 1 Preparation, Experiences, and Success*
- *Research Highlight: Why Students Choose Not to Take STEM Calculus 1*

Appendix A provides an overview of the study, including information on the data sources, the analytical sample, and research limitations. Appendix B presents the exploratory factor analysis used to develop the study's primary scales, while Appendix C includes the confirmatory factor analysis used to validate those scales. Appendix D summarizes the regression model specifications, assumption testing, final regression results, and missing data sensitivity checks. Each appendix provides relevant tables and figures.

FOR MORE INFORMATION

Find results from the subset who took STEM Calculus 1 in *Research Brief: What Students Say About Their STEM Calculus 1 Preparation, Experiences, and Success*.

Find information on students who chose not to take STEM Calculus 1 in *Research Highlight: Why STEM Students Choose Not to Take Calculus*.

Appendix A. Study Overview

This appendix describes the methodology used, including the research questions, list of participating colleges, how students were classified based on their math course-taking, and the study's limitations.

DATA AND METHODS

The MMAP team conducted a statewide survey in fall 2025 to obtain a broad view of students' perspectives on their high school preparation and experiences and success in STEM Calculus 1 across the California Community Colleges (CCC) system. We developed the survey with input from multiple stakeholders, including Student Senate for California Community Colleges members and the Chancellor's Office, to strengthen clarity and relevance. We contacted all 115 colleges offering transfer-level math courses in early September 2025, requesting their assistance with local administration and providing messaging for student outreach.

The online survey was open from September to November 2025. We asked colleges to distribute it to first-time and first-enrolled STEM students and to any student who had attempted STEM Calculus 1 between fall 2019 and fall 2025 (regardless of major). Participants completed a short series of questions about their experiences pursuing a STEM degree and/or taking STEM Calculus 1 at a California community college. (Survey instrument available upon request at research@rpgroup.org.)

In total, 1,979 students from 57 different colleges responded to the survey (see full list on p. 5). Of the 1,979 respondents, 987 reported having enrolled in STEM Calculus 1, while 992 had not. The technical appendices that follow focus primarily on respondents who reported taking STEM Calculus 1 at a California community college. Findings for students who had not taken STEM Calculus 1 are presented in a separate research highlight.[1]

For respondents who reported taking STEM Calculus 1, the study examined the following research questions (RQs):

- RQ1: How does self-reported high school math background relate to Perceived Preparedness, reflecting students' sense of perceived academic readiness?
- RQ2: How does self-reported high school math background relate to Calculus Confidence, reflecting their belief in their ability to succeed in the course?
- RQ3: To what extent does self-reported high school math background predict STEM Calculus 1 grade, and does this relationship vary by starting course level, race/ethnicity, or gender?
- RQ4: To what extent are Perceived Preparedness and Calculus Confidence associated with first self-reported STEM Calculus 1 grade?

[1] *Research Highlight: Why Students Choose Not to Take STEM Calculus 1*

Find additional details on the methodology used in these analyses below.

Institutions Identified by Students as Their Primary California Community College (*n* = 57)

- Allan Hancock College
- American River College
- Bakersfield College
- Cerritos College
- Chaffey College
- Citrus College
- City College of San Francisco
- Clovis Community College
- Coastline Community College
- College of the Sequoias
- Cuyamaca College
- De Anza College
- East Los Angeles College
- Evergreen Valley College
- Fresno City College
- Fullerton College
- Glendale Community College
- Grossmont College
- Hartnell College
- Irvine Valley College
- Lake Tahoe Community College
- Las Positas College
- Long Beach City College
- Los Angeles City College
- Los Angeles Harbor College
- Los Angeles Mission College
- Los Angeles Pierce College
- Los Angeles Southwest College
- Los Angeles Trade Tech College
- Los Angeles Valley College
- Madera College
- Merced College
- MiraCosta College
- Mission College
- Modesto Junior College
- Monterey Peninsula College
- Moreno Valley College
- Mt. San Antonio College
- Mt. San Jacinto College
- Orange Coast College
- Porterville College
- Reedley College
- Rio Hondo College
- Riverside City College
- Saddleback College
- San Diego City College
- San Diego Mesa College
- San Diego Miramar College
- San Jose City College
- Santa Ana College
- Santa Barbara City College
- Santa Monica College
- Santa Rosa Junior College
- Santiago Canyon College
- Skyline College
- West Los Angeles College
- West Valley College

We assigned students to one of seven mutually exclusive math pathway groups based on two derived variables: self-reported high school math background and first CCC math course after high school (Table A1). A hierarchical rule assigned each student to exactly one group with no overlap. Statewide default placement rules for math informed these classifications; however, HS GPA was not used in constructing the math pathway groups given the study's focus on math preparation and background.

Table A1. Math Pathway Group Classifications

Code	High School Background	First CCC Math	Pathway Group
P0 (*n* = 272)	Any high school math background	Did not enroll in any CCC math course	No CCC math after high school
P1 (*n* = 356)	Did not complete Trigonometry, Precalculus, or Calculus in high school	Began CCC math in College Algebra, Trigonometry, or Precalculus	Low placement profile, transfer-level prerequisite start
P2 (*n* = 131)	Did not complete Trigonometry, Precalculus, or Calculus in high school	Began CCC math in STEM Calculus 1	Low placement profile, direct entry STEM Calculus 1
P3 (*n* = 391)	Completed Trigonometry, Precalculus, Calculus, or higher in high school	Began CCC math in STEM Calculus 1	High placement profile, direct entry STEM Calculus 1
P4 (*n* = 252)	Completed Trigonometry, Precalculus, Calculus, or higher in high school	Began CCC math in College Algebra, Trigonometry, or Precalculus	High placement profile, transfer-level prerequisite start
P5 (*n* = 535)	Any high school math background	Began CCC math in a non-STEM math course (e.g., Statistics, Liberal Arts Math)	Began CCC math in a non-STEM math course
P6 (*n* = 42)	Any high school math background	Began CCC math in a STEM math course above STEM Calculus 1 (e.g., Calculus 2, Calculus 3, Linear Algebra, Differential Equations)	Started above STEM Calculus 1

Notes: High school math background = highest high school math code or highest CCC math taken while in high school. Low placement profile = did not complete Trigonometry, Precalculus, or Calculus in high school. High placement profile = completed Trigonometry, Precalculus, Calculus, or higher in high school.

LIMITATIONS

In addition to the limitations outlined in the research brief,[2] a few additional limitations are important to keep in mind. Students came from different colleges, where placement practices, instruction, and available support may vary.

STEM Calculus 1 grades included both final grades and anticipated grades from students who were still enrolled, so the outcome was not measured in the same way for every student. The survey

[2] *Research Brief: What Students Say About Their STEM Calculus 1 Preparation, Experiences, and Success* notes limitations related to the use of self-reported data; the self-selected sample; and the cross-sectional, correlational design, which limits the ability to generalize findings statewide or make causal conclusions.

response options also limited how precisely STEM Calculus 1 grades could be measured. Grades were reported in broad categories, so differences such as a B+, B, or B− could not be distinguished. Some students also selected non-grade responses, such as “Did Not Receive a Grade” or “I Will Probably Withdraw From/Not Complete the Class,” which could not be recorded and used in the regression analyses.

The regression models also only included the information collected in the survey. Other factors, such as prior academic performance, course design, instructor differences, outside responsibilities, or access to academic support, may also be related to students’ success in STEM Calculus 1. Future research could include these factors and other student- and institution-level characteristics to further explore how they may influence the outcomes of interest (i.e., Calculus grades, Perceived Preparedness, and Calculus Confidence).

Appendix B. Exploratory Factor Analysis

We conducted an exploratory factor analysis (EFA) on items from the Calculus Experience and Support section of the survey to identify underlying constructs in students' self-reported calculus learning experiences. We grouped items by three factors:

1. Calculus Confidence
2. Perceived Preparedness[3]
3. Decision-to-Enroll Influences

The EFA used maximum-likelihood extraction with an oblimin rotation, allowing factors to correlate. Retention decisions were based on parallel analysis, model fit, factor loadings, and conceptual coherence. Sampling adequacy was confirmed before analysis: Kaiser-Meyer-Olkin (KMO) values ranged from .71 to .96, and Bartlett's test of sphericity was significant (χ^2= 6,907.30, df = 171, p < .001).

SURVEY ITEMS AND FACTOR ASSIGNMENTS

Table B1 (p. 9) lists 14 of the 20 survey items from the Calculus Experience and Support section of the survey retained across three factors, including the final factor assignment, loading, communality, and EFA status.

The three-factor solution[4] explained 47% of total variance. Table B1 shows the final factor loadings and item disposition. Calculus Confidence and Perceived Preparedness were moderately related, r = .65, while Decision to Enroll was relatively independent of both factors, r = .14 and r = .19.

[3] The Perceived Preparedness factor was made up of survey items from both the Preparation and Calculus Experience sections of the survey.

[4] The factor analysis identified a three-factor solution; however, the Decision to Enroll factor was not included in the subsequent analysis because it did not align with the research questions.

Table B1. Calculus Experience and Support Survey Items, Factor Assignments, Reliability, and EFA Status

Variable Name	Survey Item	Loading	h^2
Factor 1: Calculus Confidence (α = .914)			
calc_confidence_2	Understand complicated ideas in the course?	.93	.86
calc_confidence_3	Learn all of the material in the course?	.92	.85
calc_confidence_4	Complete the hardest work assigned?	.84	.73
calc_confidence_1	Complete all the work assigned?	.72	.64
calc_confidence_5	Remember what you learned for future coursework?	.66	.54
Factor 2: Perceived Preparedness (α = .709)			
calc_prepared_1	I felt prepared to take Calculus 1.	1	.54
calc_experience_1	My HS math coursework prepared me to succeed in Calculus 1.	.61	.48
calc_experience_2	My college math coursework prepared me to succeed in Calculus 1.	.57	.42
calc_prepared_3	It was easy to find a class that worked with my schedule.	.47	.34
calc_prepared_2	I knew which math courses I needed to meet my educational goals.	.46	.37
Factor 3: Decision-to-Enroll Influences (α = .666)			
decision_to_enroll_2	Online degree planner (e.g., program pathways mapper, DegreeWorks).	.68	.48
decision_to_enroll_1	Student educational plan (SEP) from a counselor.	.55	.35
decision_to_enroll_4	Degree/transfer requirements.	.55	.33
decision_to_enroll_3	Course catalog/schedule.	.51	.33

Notes: Items sorted within each factor from strongest to weakest loading. Loadings < .30 shown as —.

FACTOR RETENTION

A scree plot (Figure B1, p. 10) and parallel analysis suggested a two- to three-factor structure. We compared model fit across one- through four-factor solutions (Table B2, p. 10). We selected the three-factor model as the best balance of fit, parsimony, and interpretability. Although the four-factor solution showed a slightly better fit, the fourth factor was weakly defined and not interpretable. The third factor, Decision to Enroll, was identified in the three-factor solution. However, it was not examined further in the study because it did not meaningfully contribute to the research questions (see p. 4). Ultimately, we moved forward with the two remaining factors—Calculus Confidence and Perceived Preparedness—in our analyses.

Figure B1. Scree Plot and Eigenvalues for Exploratory Factor Analysis

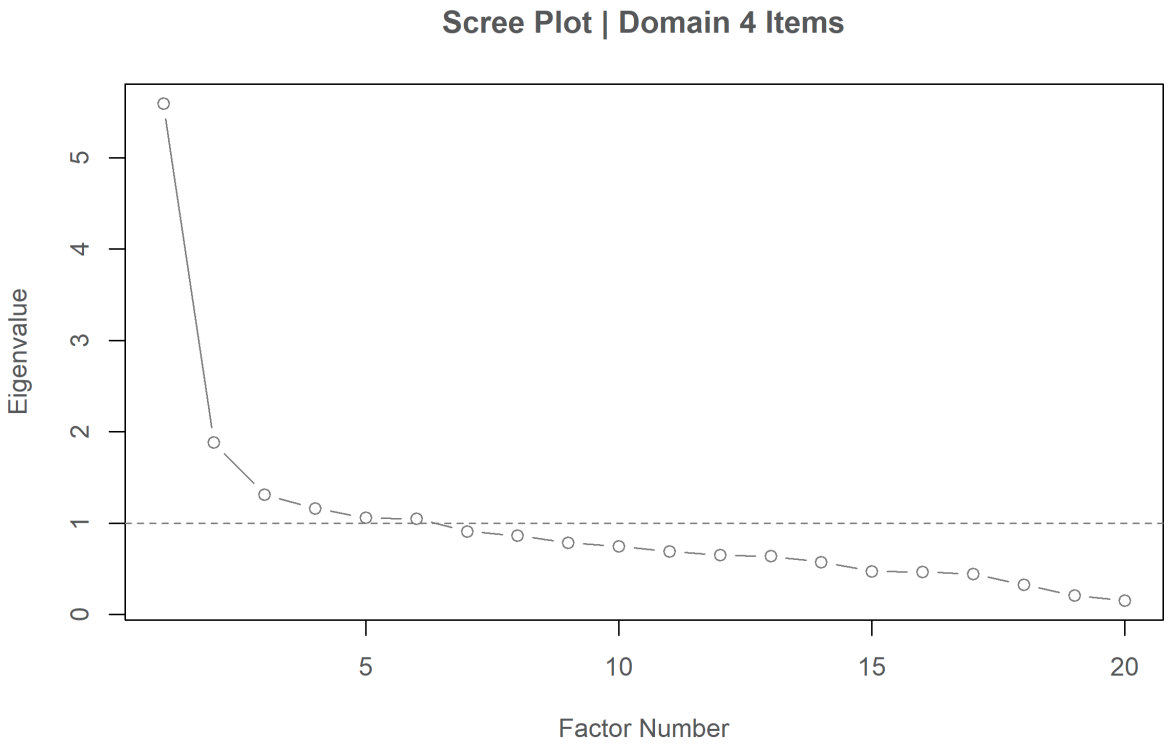


Table B2. EFA Model Fit by Number of Factors Retained

Factors	RMSR	TLI	RMSEA	BIC	Interpretation
1	.099	.745	.126	756.2	Underfits; single factor captures general positive responses
2	.057	.864	.092	160.6	Improved fit; Calculus Confidence and Perceived Preparedness structure clear
3	.029	.943	.060	−123.5	Selected; best balance of fit
4	.017	.964	.047	−152.0	Overfits; fourth factor weakly defined and not interpretable

Notes: RMSR = root mean square residual; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; BIC = Bayesian information criterion. Selected model shown in shading.

Appendix C. Confirmatory Factor Analysis

We used a confirmatory factor analysis (CFA) to assess whether the two scales identified in the EFA fit the data for each factor (i.e., Calculus Confidence and Perceived Preparedness). The CFA tested a two-factor structure, with each item assigned to one of the two scales. The CFA used the multiply imputed dataset with robust maximum likelihood estimation. We excluded students whose first CCC math course was above STEM Calculus 1.

MODEL FIT

We used four standard fit indices to evaluate the model (Table C1). All indices fell within acceptable or good ranges, supporting the two-factor structure.

Table C1. CFA Model Fit Indices

Fit Index	Value	Threshold Used
Comparative Fit Index (CFI)	.970	≥ .95
Tucker-Lewis Index (TLI)	.961	≥ .95
RMSEA	.066 [.054, .078]	≤ .08
SRMR	.035	≤ .08

Notes: RMSEA 95% confidence interval shown in brackets. A scaled chi-square test was also computed, $\chi^2(34) = 130.96$, $p < .001$, but Chi-square is sensitive to sample size and was not used as the primary fit criterion.

FACTOR LOADINGS

Table C2 (p. 12) shows the standardized item loading for each factor. All loadings were statistically significant, $p < .001$. Confidence items loaded strongly and consistently, ranging from .703 to .912. Perceived Preparedness items ranged from .462 to .772, with "I felt prepared to take Calculus 1" as the strongest item. The two factors were strongly related, $r = .69$, consistent with the EFA result, $r = .65$, but still measured distinct constructs.

Table C2. CFA Standardized Factor Loadings and R^2

Variable Name	Survey Item	Loading	R^2
Factor 1: Calculus Confidence (α = .914)			
calc_confidence_3	Learn all the material in the course?	.912	.831
calc_confidence_2	Understand complicated ideas in the course?	.905	.819
calc_confidence_4	Complete the hardest work assigned?	.878	.771
calc_confidence_5	Remember what you learned for future coursework?	.723	.522
calc_confidence_1	Complete all the work assigned?	.703	.494
Factor 2: Perceived Preparedness (α = .712)			
calc_prepared_1	I felt prepared to take Calculus 1.	.772	.595
calc_experience_1	My HS math coursework prepared me to succeed in Calculus 1.	.570	.325
calc_prepared_2	I knew which math courses I needed to meet my educational goals.	.530	.281
calc_prepared_3	It was easy to find a class that worked with my schedule.	.475	.225
calc_experience_2	My college math coursework prepared me to succeed in Calculus 1.	.462	.213

Notes: Items are sorted from strongest to weakest loading within each factor. R^2 = proportion of item variance explained by its assigned factor. All loadings were significant at $p < .001$. Factor intercorrelation: $r = .69$.

Appendix D. Multiple Regression Analyses and Missing Data Sensitivity Check

The multiple regression analyses examined whether students' self-reported high school math background was associated with Calculus Confidence, Perceived Preparedness, and self-reported STEM Calculus 1 grade after accounting for first CCC math course, highest high school math, race/ethnicity, and gender. When considering high school math background, we grouped students whose highest high school math was below Precalculus.

We used ordinary least squares regression models for all outcomes and applied robust standard errors for all complete-case models. We use the following models:

- $\textit{Perceived Preparedness Score}_i = \beta_0 + \beta_1(\text{HS Math}_i) + \beta_2(\text{First CCC Math}_i) + \beta_3(\text{Race/Ethnicity}_i) + \beta_4(\text{Gender}_i) + \varepsilon_i$
- $\textit{Calculus Confidence Score}_i = \beta_0 + \beta_1(\text{HS Math}_i) + \beta_2(\text{First CCC Math}_i) + \beta_3(\text{Race/Ethnicity}_i) + \beta_4(\text{Gender}_i) + \varepsilon_i$
- $\textit{STEM Calculus 1 Grade}_i = \beta_0 + \beta_1(\text{HS Math}_i) + \beta_2(\text{First CCC Math}_i) + \beta_3(\text{Race/Ethnicity}_i) + \beta_4(\text{Gender}_i) + \varepsilon_i$
- $\textit{STEM Calculus 1 Grade}_i = \beta_0 + \beta_1(\text{HS Math}_i) + \beta_2(\text{First CCC Math}_i) + \beta_3(\text{Race/Ethnicity}_i) + \beta_4(\text{Gender}_i) + \beta_5(\textit{Perceived Preparedness Score}_i) + \beta_6(\textit{Calculus Confidence Score}_i) + \varepsilon_i$

Table D1 summarizes the analytic sample used for each research question after developing and validating the Calculus Confidence and Perceived Preparedness scales. Sample sizes vary based on the outcome and predictor data required for each analysis.

Table D1. Analytic Sample by Research Question

RQ	Research Question	Outcome	*n*	Notes
RQ1	How does high school math background relate to Perceived Preparedness?	Perceived Preparedness score	539	Students who attempted STEM Calculus 1 and answered at least 4 Perceived Preparedness scale items
RQ2	How does high school math background relate to Calculus Confidence?	Calculus Confidence score	554	Students who attempted STEM Calculus 1 and answered at least 4 Calculus Confidence scale items
RQ3	To what extent does high school math background predict first STEM Calculus 1 grade?	First STEM Calculus 1 grade (0–4.0)	510	Students who attempted STEM Calculus 1 and reported their expected or received grade
RQ4	To what extent are Calculus Confidence and Perceived Preparedness associated with first STEM Calculus 1 grade?	First STEM Calculus 1 grade (0–4.0)	497	Students who attempted STEM Calculus 1 and reported their expected or received grade and answered at least 4 of both the Perceived Preparedness and Calculus Confidence scale items

Note: Sample sizes reflect the analytic sample available for each research question.

ADJUSTED REGRESSION RESULTS

Table D2 presents unstandardized coefficients from the four main regression models corresponding to RQ1–RQ4 described in Table D1.

Table D2. Adjusted Regression Results, All Models

Predictor	RQ1: Perceived Preparedness	RQ2: Calculus Confidence	RQ3: STEM Calculus 1 Grade	RQ4: STEM Calculus 1 Grade + Perceived Preparedness & Calculus Confidence Scales
HS Math Background (reference group: Below Precalculus)				
Statistics	-.171	-.212	-.133	.017
Precalculus	.039	-.026	.195	.194
STEM Calculus 1 or Higher	.302***	.569***	.625***	.321*
First CCC Math Course (reference group: Below Transfer Level)				
Statistics	.050	.135	.177	.151
Transfer-Level Prerequisite	.042	.185	.196	.270
STEM Calculus 1	.002	.424*	.027	.147
Other	.213	.524+	.531	.274
Race/Ethnicity (reference group: Hispanic/Latine)				
African American/Black	.127	.079	.372	.337
Asian	.117+	.097	.483***	.426***
White	.072	.238*	.252	.134
Multi-Ancestry	.113	.042	.112	.076
Another Race/Ethnicity	.130	.096	.730*	.848**
Gender (reference group: Man)				
Woman	.140**	.212*	.254*	.131
Gender Diverse/Other	.062	.235	.128	.167
Scale Scores (RQ4 only)				
Perceived Preparedness Score	—	—	—	.300**
Calculus Confidence Score	—	—	—	.399***
Model Summary				
n	538	538	497	497
R^2	.087	.113	.102	.247
Adjusted R^2	.063	.090	.076	.222
RMSE	0.55	0.94	1.18	1.08

*Notes: + p < .10, * p < .05, ** p < .01, *** p < .001. Values are unstandardized OLS coefficients from the main adjusted models. HC3 robust standard errors were used. Model-estimation sample sizes may differ slightly from the analytic samples in Table D1 because adjusted models also require complete covariate information.*

ASSUMPTION TESTING

Standard OLS assumptions tests were run for the four main adjusted models (Table D3). Heteroscedasticity was detected in RQ1, RQ3, and RQ4 and addressed with HC3 robust standard errors. Residual banding and left-skewness in RQ3 and RQ4 were expected because we measured STEM Calculus 1 grade on a bounded 0–4 scale. Multicollinearity was not a concern, with all generalized Variance Inflation Factor (VIF) values below 5, indicating that the factors in our model were sufficiently distinct for us to reliably estimate the effect of each one separately. None of the assumption checks identified issues severe enough to invalidate the models.

Table D3. Regression Assumption Testing Summary

RQ	Outcome	n	R^2	Adjusted R^2	RSE	BP Test	Residual Skew	Large Std. Residuals	Cook's D
RQ1	Perceived Preparedness	538	.087	.063	.556	p = .116	−.291	3	.033
RQ2	Calculus Confidence	538	.113	.090	.955	p = .107	−.117	0	.036
RQ3	First STEM Calculus 1 Grade	497	.102	.078	1.199	p = .014	−.911	0	.038
RQ4	First STEM Calculus 1 Grade + Preparedness/ Confidence	497	.247	.222	1.100	p < .001	−.811	1	.030

Notes: RSE = residual standard error. BP Test = Breusch-Pagan test for heteroscedasticity; a significant p-value indicates uneven residual spread. Large standardized residuals are cases with $|z| > 3$. Generalized VIF values were below 5 across all models, indicating that multicollinearity was not a concern. Cook's D threshold was calculated as $4/(n - k - 1)$. RQ2 had no major assumption concerns and was the cleanest model of the four.

DIAGNOSTIC PLOTS FOR GRADE OUTCOME MODELS

Figures D1 and D2 (p. 16) show the standard OLS diagnostic plots for the two grade outcome models, RQ3 and RQ4, respectively. The plots show residual banding, left-skewed residuals, and uneven residual spread, which are expected for a bounded 0–4 grade outcome. Cook's distance plots did not indicate that any single case was unduly influencing the results.

Figure D1. Diagnostic Plots, RQ3: First STEM Calculus 1 Grade, High School Math Background Model

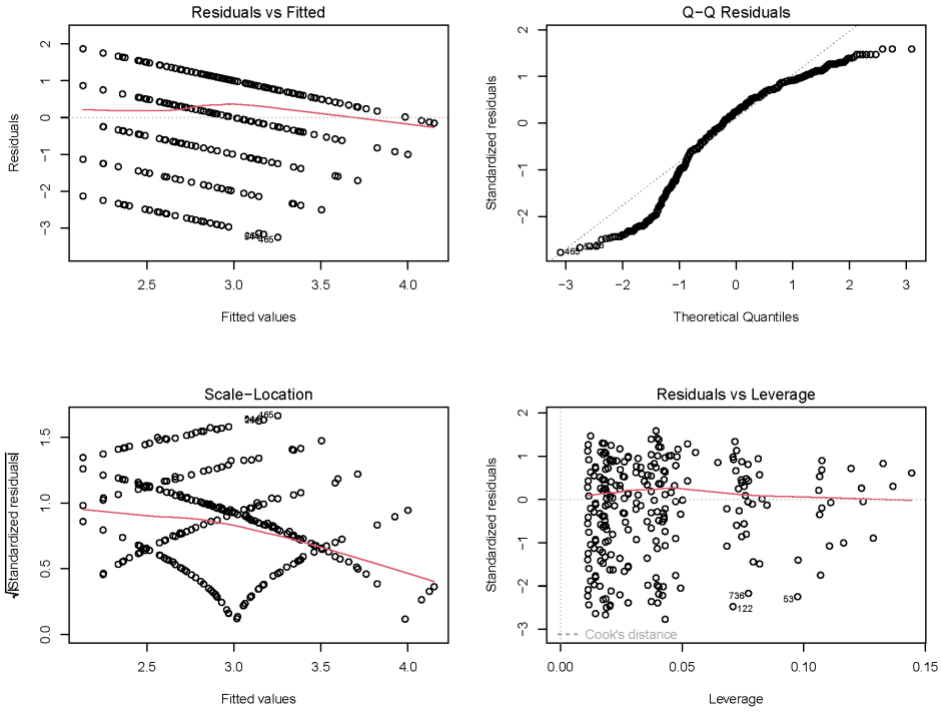
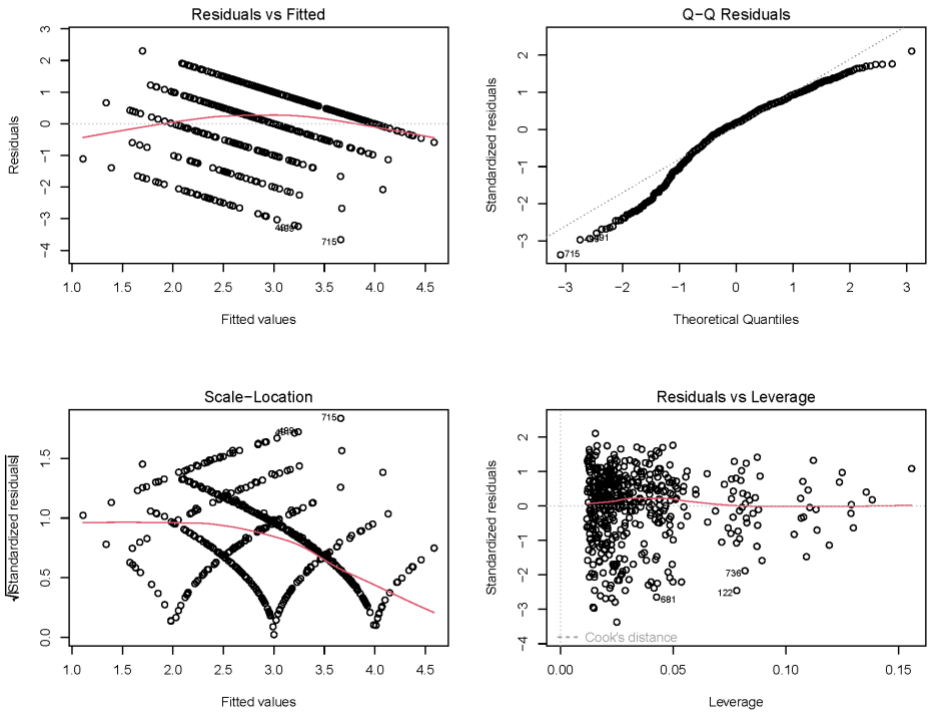


Figure D2. Diagnostic Plots, RQ4: First STEM Calculus 1 Grade, Full Adjusted Model



MULTIPLE IMPUTATION

To evaluate whether missingness in Perceived Preparedness and Calculus Confidence item responses influenced the regression findings, we conducted a sensitivity analysis using multiply imputed data for the outcomes of interest. We applied multivariate imputation by chained equations (MICE)[5] with m = 50 imputed datasets. Since the preparedness and confidence factor items had ordered response categories, we used proportional-odds logistic regression for each imputed item.

We imputed skipped item-level responses on the Perceived Preparation and Calculus Confidence Likert-scale items, but not structural missing values (e.g., "Unsure/Don't know") or STEM Calculus 1 grades. Scale scores were rebuilt separately within each imputed dataset.

IMPUTATION DIAGNOSTICS

Diagnostic checks confirmed that imputation preserved the structure and reliability of both scales.

Factor loadings were stable across the imputed datasets, with differences between the complete-case loadings and average imputed loadings ranging from .019 to .013.

Reliability was also stable (Table D4). Cronbach's alpha for the Perceived Preparedness scale was .709 in both the complete-case and imputed data. Cronbach's alpha for the Calculus Confidence scale was .918 in the complete-case data and .914 in the imputed data.

Table D4. Cronbach's Alpha: Complete-Case Reference vs. m = 50 Imputed Datasets

Scale	N Items	Complete Case α	Imputed Datasets Mean α	Imputed SD	Imputed Min	Imputed Max
Perceived Preparedness	5	.709	.709	.000	.709	.709
Calculus Confidence	5	.918	.914	.000	.914	.914

Notes: Reference alpha estimated from complete-case EFA sample. Imputed values were estimated within each of the 50 imputed datasets.

SENSITIVITY CHECKS

As a sensitivity check, the four regression models were re-estimated using the imputed datasets. Table D5 (p. 17) presents the pooled results. The coefficients and significance patterns were generally similar to those from the complete-case models in Table D2 (p. 14), suggesting that the main findings were not affected by item-level missingness in the Perceived Preparedness and Calculus Confidence factors.

[5] Multiple imputation was conducted using the mice package (van Buuren & Groothuis-Oudshoorn, 2011) in R.

Table D5. Regression Models Re-Estimated Using Imputed Data

Predictor	RQ1: Perceived Preparedness	RQ2: Calculus Confidence	RQ3: STEM Calculus 1 Grade	RQ4: STEM Calculus 1 Grade + Perceived Preparedness & Calculus Confidence Scales
HS Math Background (reference group: Below Precalculus)				
Statistics	.162	-.220	-.116	.017
Precalculus	.052	-.078	.212	.194
Calculus 1 or Higher	.315***	.530***	.652***	.321*
First CCC Math Course (reference group: Below Transfer Level)				
Statistics	-.052	.063	.254	.151
Transfer-Level Calculus Prerequisite	.042	.083	-.112	-.270
Calculus 1	-.014	.358*	.091	-.147
Other	.209	.439	.632+	.274
Race/Ethnicity (reference group: Hispanic/Latine)				
African American/Black	.134	.236	.202	.337
Asian	.123+	.084	.481***	.426**
White	.080	.246*	.267+	.134
Multi-Ancestry	.118	.058	.118	.076
Another Race/Ethnicity	.136	.039	.736+	.848*
Gender (reference group: Man)				
Woman	-.135**	-.191*	-.241*	-.131
Gender Diverse/Other	.068	-.234	.160	.167
Scale Scores (RQ4 only)				
Perceived Preparedness Score	—	—	—	.300**
Calculus Confidence Score	—	—	—	.399***
Model Summary				
n	539	554	510	497
R^2	.087	.113	.102	.247
Adjusted R^2	.063	.090	.076	.222

*Notes: + p < .10, * p < .05, ** p < .01, *** p < .001. Values are pooled unstandardized OLS coefficients from 50 multiply imputed datasets. Estimates, standard errors, and degrees of freedom were combined using Rubin's rules. Sample sizes reflect the number of observations used in each imputed model. Pooled R^2 and adjusted R^2 are averages across the imputed datasets.*

Multiple Measures Assessment Project

The RP Group launched MMAP in 2014 to support the advancement of developmental education reform in the California Community Colleges. MMAP now supports the California Community Colleges Chancellor's Office with the implementation of AB 705 and AB 1705, which seek to improve equitable placement into and completion of transfer-level English and math courses required for a student's program of study.

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Learn more at www.rpgroup.org/mmap.