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The Relationship between Parents' Educational Achievement and Students' Academic Performance

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Abstract

[Objective] *To counter the looming United States "demographic cliff," many researchers focus on optimizing the best writing support for international students, specifically those who are English-as-a-second-language (ESL) learners. Consequently, they neglect writing support for US-educated, English-as-a-first-language learners. This study addresses that research gap, exploring how understanding mothers' and fathers' highest completed levels of education could direct pre-college interventions to the domestic students who need them the most.*

[Methods] *To better understand the relationship between parents' educational achievement and students' academic performance, this study used quantitative descriptive research design to analyze secondary data extracted from the 2011 12th-grade NAEP writing assessment.*

[Results] *The findings suggest a relationship between parental educational achievement levels and student academic performance, using 12th-grade National Assessment of Educational Progress (NAEP) writing scores as a proxy for overall academic performance since writing is integral to success in all contexts at all academic levels.*

[Conclusions] *The findings suggest that educators have an opportunity to develop domestic students' writing skills earlier than their first college years and, therefore, positively impact their future educational outcomes.*

Keywords: *NAEP writing scores, first-generation college students, writing skills, US domestic students, parental education levels*

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Introduction

"Classes will shrink, year after year, for most of the next two decades," warned an education journalist and DC think tank member in an article entitled "The Incredible Shrinking Future of College" (Carey, 2022).

"Details of the demographic shifts affecting higher education were eye-opening and terrifying," echoed an American Council of Education Fellow after a year of studying higher education (Bowles, 2023). She continued: "…'Cliff'...and 'trough'...are used daily in association with declining enrollments, rising costs, institutional closures, and the value of higher education."

These two excerpts are representative of recent US higher education media coverage. Indeed, this pessimistic tone even predated the COVID-19 pandemic as stakeholders realized that colleges and universities need to get creative or risk closing their doors for good. In response, many institutions have evolved their recruitment strategies, turning their focus to a steady international student pipeline (Bryant & Brennan, 2023). Then, to ensure that these international applicants persist once they enroll, these institutions have focused on offering the writing support that ESL (or English-as-a-second-language) learners will need once they arrive in US college classrooms since writing is a critical skill across disciplines and majors (Cequeña, 2020; Curtis, 2020; Dong, 2023; Neugebauer et al., 2015).

This focus on international student success is justified, and the extra support is necessary to ensure these students excel after enrollment. Still, the lack of academic writing skills is familiar to students educated outside of the US. In fact, a large percentage of US-educated, English-as-a-first-language students arrive in college classrooms desperately in need of support for their struggles with writing as well (Butrymowicz, 2017).

How can we ensure we set domestic students up for successful academic writing, too? We have access to these students before they begin their college studies, so can we intervene earlier and boost degree attainment for those whose lives will truly be transformed by earning degrees? How can we target the students most likely to *need* these interventions and focus our limited resources accordingly? Figuring out the answers to these questions will have significant implications for US higher education, the economy, and society.

Literature Review

Writing skills are critical across educational contexts, as all coursework requires writing to some extent. Therefore, for educational researchers, writing is a promising proxy for overall academic performance and a promising place to focus on understanding better which students have the core skills necessary to succeed in college academic settings.

This literature review explores potential ways to boost domestic students' writing skills and overall academic performance, thereby minimizing the need to "catch up" through remedial writing support during their first year of college. Specifically, it compiles answers to the following questions:

- Do students with high self-efficacy have better writing skills?
- Do students who completed advanced coursework in high school have better writing skills?
- Do students whose parents have high levels of educational attainment have better writing skills?

Do students with high self-efficacy have better writing skills?

Cook et al. (2001) saw that students at a range of secondary school grade levels were "unmotivated to write due to low self-confidence, lack of control over writing tasks, inadequate amount of time to expand on writing pieces, lack of emphasis on organizers, limited peer collaboration, and insufficient relevance to real life" (p. 1). Unsurprisingly, this lack of motivation and low self-confidence — also known as a lack of "self-efficacy," or a person's belief that they are capable of accomplishing a task — was not unique to grade-level students and continued to be seen in higher education student bodies as well. Rauch (2023), in research into non-traditional, first-generation students, found that most students who were 25 years old or older and had parents who did not graduate from college felt "unprepared for academic writing before entering into a four-year university." Multiple went as far as saying that they "feared" writing or experienced feelings of "doubt…, anxiety, and uneasiness" about it (p. 44). Rauch (2023) connected those negative perceptions of writing and academic performance suffering.

Still, positive perceptions of writing do not *cause* academic success even though her interviewees had positive perceptions of college-readiness writing, many still self-identified as "struggling in their first-year writing course" when interviewed by Mitchell (2023).

Savarese (2022) found a "significant relationship between students' freshman composition course grade and their level of self-efficacy in writing," concluding that this relationship "emphasizes the important role that freshman composition courses play in shaping students' writing behaviors and self-concept" (p. 118). Savarese correlated first-year composition course grades and college GPAs, claiming "this finding underscores the inextricable link between writing and college achievement and suggests that community college students believe the grades they earn in their courses truly reflect their capabilities as academic writers" (pg. 120).

Do students who complete advanced coursework in high school have better writing skills?

Rauch (2023) and Savarese (2022) point out the need for earlier interventions to hone the mindsets that will drive writing success at the college level. Mitchell (2023) explored one of those potential interventions: advanced coursework, specifically dual enrollment during high school. Mitchell (2023) did find that advanced courses in writing helped students to feel "ahead of their peers in their writing ability and confidence" (p. 107).

However, Mitchell's findings do not suggest advanced courses are a panacea. All her interviewees could drop out of ENG 101 by taking dual enrollment writing courses. Though these students completed the advanced preparation intended to set them up for a firm footing, when they began their academic writing in college, they all still identified as "struggling students" (p. 107).

Schmidt (2021) found a similar lack of writing confidence in at-risk students who did not participate in advanced courses. She found that a "lack of opportunities to write often in past writing courses (less than six pages a semester)" and not being "required to engage in research writing more than twice a semester" contributed to a lack of writing confidence in the first-year students whom she interviewed. Together, the findings of Rauch (2023) and Schmidt

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(2023) point to advanced courses having some effect on student confidence but also highlight opportunities to optimize how these courses are currently structured to address students' writing support needs better.

Do students with college-educated parents have higher writing skills?

Existing literature does not directly correlate parental education achievement levels with students' *writing* skills. However, much — but not all — points to a correlation between overall academic achievement, which requires academic writing skills, and parental education achievement levels.

Hahs-Vaughn (2004) found multiple areas where students' academic performance was impacted by their parents' education levels, including aspirations to pursue higher education themselves and college/university entrance exam scores. Redford and Hoyer (2018) extend this impact to degree completion: "Ten years after they were sophomores in high school, a lower percentage of first-generation college students [i.e., students whose parents had not completed a four-year college or university degree] than continuing-generation students had obtained either a bachelor's degree (20 vs. 42 percent) or a master's degree or higher (3 vs. 13 percent)."

Weiser and Riggio (2010) also claim that "parental educational aspirations" influence overall child academic achievement. They see parental education as influencing self-efficacy, with "quality of relationships with parents…and parental educational aspirations significantly predict[ing] education expectations" (Weiser & Riggio, 2010, pp. 376–378).

As mentioned above, not all research confirms that students with college-educated parent(s) perform better academically. Chiu et al. (2016) found that "maternal education level has no significance" when it comes to student academic achievement, while the students' fathers' educational levels had the most significant impact on academic achievement (pg. 12). In their study of community college students, Brown and Burkhardt (1999) found that the education of either parent was not strongly related to student success, with other factors associated with first-generation status (e.g., income, college knowledge, social integration) playing a more significant role. They did, however, affirm that these factors correlate with parental education levels. Shapiro (2009) found that "the GPA of an individual was not influenced by parental education level" and "high school GPA did not show a decreasing pattern with decreasing parental education level" (pgs. 11-12).

Conclusion

Students begin to form their writing self-identities before they step foot on college campuses, honing skills and views of their capabilities (or self-efficacy) when many are influenced by and (consciously and subconsciously) guided by their mothers and fathers. Beyond the messages communicated by parents, what role does a mother's or father's educational attainment have on their child's writing scores? This study explores potential answers to this question to address a lack of literature specifically focused on the relationship between students' writing skills and parental educational achievement. It compares National Assessment of Educational Progress (NAEP) writing scale scores and student-reported answers to the following two research questions:

- Research Question 1: How far in school did your mother go?
- Research Question 2: How far in school did your father go?

Methods

A long-running initiative of the National Center for Education Statistics (NCES), the NAEP collects and reports data with the intention of "improving] education policy and practice" (Gorman, 2010). NAEP has collected data on student achievement in various subjects since 1969, and it is set apart in the educational research space because the "Nation's Report Card" provides a standard measure that can be applied across all states. The 2011 NAEP Writing Assessment was given to 8th- and 12th-grade students via laptops. This study focuses on the 12th-grade audience.

Participants and Sampling

NAEP only requires some students in a school to complete its assessments. Rather than requiring all individual students to participate through a sampling frame based on the Common Core of Data (CCD) and the Private School Survey (PSS), this national assessment is administered to a sample of students representing the nation and individual states and districts. Schools are identified and then classified into strata based on their type of location and racial/ethnic composition. Then, schools are sorted by student achievement measure to ensure representation in the data set of all school performance levels. A sample of schools is pulled from each stratum, with this selection process focused on providing adequate representation of all sizes, racial/ethnic makeups, and private or public school types. Every student has a chance of being chosen regardless of factors, but individual results are never reported.

The 2011 NAEP writing assessment was administered at the national level only to 8th—and 12th-grade students. Because the data collection follows this sampling method, the results reported are estimates based on representative samples rather than on the entire student population. Results are presented as average scores on the NAEP writing scale of 0-300 and the percentages of students attaining NAEP writing achievement levels.

Data Analysis

The NAEP Data Explorer (NDE) is an intuitive statistical tool created to help education stakeholders (e.g., parents, policymakers, and educators) process the NAEP results. Through "sophisticated searching, data comparison, and chart and table creation," the NDE facilitates single-year and cross-tabular data analysis, combining data from multiple years and across student groups. Some data sets are also available by state or participating urban district.

For this study, *t*-tests were used to determine the difference in significance between the means of groups. Descriptive tables and tests were created using the 2011 12th-grade writing composite scores for national public schools, and Cohen's *d* effect size was calculated through the University of Colorado's "Effect Size Calculator" (Becker, 2000). For this study, the following coded questions were explored through the NDE:

- How far in school did your mother go (student-reported)? ID: W811801 (Multiple Answers)
- How far in school did your father go (student-reported)? ID: W811901 (Multiple Answers)

Results

This section will report the results of examining the relationship between household academic traditions (i.e., mother's highest education level and father's highest education level) and the NAEP

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2011 12th-grade writing assessment scores for students in national public schools. It reports the means and standard deviation for each explored variable and also includes *t*-test results to determine the significance of the results. Cohen's d effect size was calculated to examine the significant results further via the University of Colorado's Effect Size Calculator (Becker, 2000).

Table 1 presents the average scale score in 2011 for the 12th-grade writing assessment at the nationwide level, which was 148, with a standard deviation of 35. NAEP needs to include the number of students.

Table 1. National Average Scale Score — 12th-grade Writing, All Students

Year	Jurisdiction	Average Scale Score	Standard Deviation
2011	National public	148	35

NOTE: The NAEP writing assessment scale ranges from 0 to 300. SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment

Research Question 1: How Far in School Did Your Mother Go?

Table 2 shows the average scale scores and standard deviations for 12th-grade writing scores, using answers to the question, "How far in school did your mother go (student-reported)?" which included multiple answers.

Table 2. Average scale scores and standard deviations for 12th-grade writing by mother's highest level of completed education

Year	Jurisdiction	Mother's education level	Average scale score	Standard deviation
2011	National	Did not finish high school	132	33
		Graduated high school	144	33
		Some education after high school	152	31
		Graduated college	162	33
		I don't know	122	35

Students who stated that their mothers did not finish high school had an average scale score of 132 (SD=33). Students who indicated that their mothers graduated high school had an average scale score 144 (SD=33). Students who stated that their mothers had some education after high school had an average scale score of 152 (SD=31). Students who indicated their mothers had graduated college had an average scale score of 162 (SD=33). Students who did not know their mothers' highest level of completed education had an average scale score of 122 (SD=35). The differences in means and independent *t*-test results for mothers' highest levels of completed education are shown in Table 3.

Table 3. Difference in average scale scores between variables for mother's education level

	Did not finish high school	Graduated high school	Some education after high school	Graduated college
Graduated high school	> Diff = 11 P-value = 0.0000 Family size = 10			
Some education after high school	> Diff = 20 P-value = 0.0000 Family size = 10	> Diff = 8 P-value = 0.0000 Family size = 10		
Graduated college	> Diff = 28 P-value = 0.0000 Family size = 10	> Diff = 17 P-value = 0.0000 Family size = 10	> Diff = 9 P-value = 0.0000 Family size = 10	
I don't know	< Diff = -11 P-value = 0.0000 Family size = 10	< Diff = -22 P-value = 0.0000 Family size = 10	< Diff = -30 P-value = 0.0000 Family size = 10	< Diff = -39 P-value = 0.0000 Family size = 10

For this chart, "<" means significantly lower results, ">" means significantly higher, and "x" means no significant difference. All differences had significance.

Students who reported that their mothers had graduated high school had an average scale score significantly higher than those who reported their mothers had not graduated high school ($p<.001$). Those who reported that their mothers had some education after high school had an average scale score significantly higher than those who reported their mothers did not finish high school or graduated high school. Those who reported

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that their mothers graduated college had average scale scores significantly higher than those who reported their mothers did not finish high school, graduated high school, or had some education after high school. For those who reported they did not know their mothers' highest levels of completed education, they had an average scale score that was significantly lower than all other responses.

Cohen's *d* effect size was calculated on all independent *t*-tests since they all indicated significance, and this process helps determine strength. Effect size: 0.2 is small, 0.5 is medium, and 0.8 is large. Positive and negative values indicate improvement or deterioration (Becker, 2000). Table 4 shows the effect sizes.

Table 4. Effect sizes of significant mean score differences for mother's education level

		Cohen's *d*
Did not finish high school	Graduated high school	-0.36
Did not finish high school	Some education after high school	-0.62
Did not finish high school	Graduated college	-0.91
Did not finish high school	I don't know	0.29
Graduated high school	Some education after high school	-0.30
Graduated high school	Graduated college	-0.55
Graduated high school	I don't know	0.65
Some education after high school	Graduated college	-0.31
Some education after high school	I don't know	0.91
Graduated college	I don't know	1.18

The following fell in the small (.2) range: Did not finish high school vs. graduated high school; Some education after high school vs. graduated college; Graduated high school vs. some education after high school; Did not finish high school vs. I don't know.

The following fell in the medium (.5) range: did not finish high school vs. graduated high school; graduated high school vs. I don't know; graduated high school vs. graduated college; did not finish high school vs. some education after high school.

The following fell in the extensive (.8) range: Graduated college vs. I don't know; some education after high school vs. I don't know; Did not finish high school vs. graduated college.

The highest effect size was graduated college vs. I don't know (1.18), and the lowest was Did not finish high school and I don't know (0.29).

Research Question 2: How Far in School Did Your Father Go?

Table 5 shows the average scale scores and standard deviations for 12th-grade writing scores, using answers to the question, "How far in school did your father go (student-reported)?" which included multiple answers.

Table 5. Average scale scores and standard deviations for 12th-grade writing by father's highest level of completed education

Year	**Jurisdiction**	**Father's education level**	**Average scale score**	**Standard deviation**
2011	National	Did not finish high school	134	33
		Graduated high school	145	33
		Some education after high school	154	31
		Graduated college	164	32
		I don't know	129	34

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Students who stated that their fathers did not finish high school had an average scale score of 134 (SD=33). Students who indicated that their fathers graduated high school had an average scale score of 145 (SD=33). Students who stated that their fathers had some education after high school had an average scale score of 154 (SD=31). Students who indicated that their fathers graduated college had an average scale score of 164 (SD=32). Students who reported they did not know their fathers' highest levels of completed education had an average scale score of 129 (SD=34). The differences in means and independent t-test results for fathers' highest levels of completed education are shown in Table 6.

Table 6. Difference in average scale scores between variables for father's education level

	Did not finish high school	**Graduated high school**	**Some education after high school**	**Graduated college**
Graduated high school	> Diff = 11 P-value = 0.0000 Family size = 10			
Some education after high school	> Diff = 19 P-value = 0.0000 Family size = 10	> Diff = 9 P-value = 0.0000 Family size = 10		
Graduated college	> Diff = 29 P-value = 0.0000 Family size = 10	> Diff = 19 P-value = 0.0000 Family size = 10	> Diff = 10 P-value = 0.0000 Family size = 10	
I don't know	< Diff = -6 P-value = 0.0000 Family size = 10	< Diff = -16 P-value = 0.0000 Family size = 10	< Diff = -25 P-value = 0.0000 Family size = 10	< Diff = -35 P-value = 0.0000 Family size = 10

As with Table 3, "<" means significantly lower results, ">" means significantly higher, and "x" means no significant difference. All differences had significance.

Students who reported that their fathers had graduated high school had significantly higher average scale scores than students who reported their fathers did not finish high school. Students who reported that their fathers had some education after high school had significantly higher average scale scores than students who reported their fathers did not finish high school or graduated high school. Students who reported their fathers had graduated college had significantly higher average scale scores than students who reported their fathers did not finish high school, graduated high school, or had some education after high school. Students who reported they did not know their fathers' highest level of completed education had significantly lower average scale scores than students who reported their fathers did not finish high school, graduated high school, had some education after high school, or graduated college.

Cohen's *d* effect size was calculated on all independent *t*-tests since they all indicated significance, and this process helps determine strength. Table 7 shows the effect sizes, with 02 being small, 95 being medium, and 0.8 being large.

Table 7. Effect sizes of significant mean score differences for father's education level

		Cohen's *d*
Did not finish high school	Graduated high school	-0.33
Did not finish high school	Some education after high school	-0.62
Did not finish high school	Graduated college	-0.92
Did not finish high school	I don't know	0.15
Graduated high school	Some education after high school	-0.28
Graduated high school	Graduated college	-0.58
Graduated high school	I don't know	0.48

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Some education after high school	Graduated college	-0.32
Some education after high school	I don't know	0.77
Graduated college	I don't know	1.06

The following fell in the small (.2) range: Did not finish high school vs. graduated high school; Did not finish high school vs. I don't know; Graduated high school vs. some education after high school; Graduated high school vs. I don't know; Some education after high school vs. graduated college.

The following fell in the medium (.5) range: Did not finish high school vs. some education after high school; Graduated high school vs. graduated college; Some education after high school vs. I don't know.

The following fell in the large (.8) range: Did not finish high school vs. graduated college; Graduated college vs. I don't know.

Discussion

This study was conducted to better understand the relationship between parental educational achievement levels—specifically, mothers' and fathers' highest levels of education completed—and students' writing scores.

Mother's Highest Level of Education Completed

Students with mothers who did not finish high school scored under the average writing scale score for national public schools. They were the second lowest scorers after those who did not know their mothers' highest levels of completed education. Students whose mothers graduated high school scored lower than the national average and lower than those who had some education after high school or who graduated college. Students with mothers who had some education after high school or graduated college scored higher than the national average, and those whose mothers graduated college scored higher than all other respondents. This could potentially be because of Augustine's suggestion (2014) that "children of less educated mothers are more vulnerable to their family circumstances while mothers with more education can buffer their children against them." However, Augustine's focus on mothers' educational attainment levels only leaves the question of whether only mothers have this impact or if it is more generalizable to parents of either gender (pg. 711).

Father's Highest Level of Education Completed

Students with fathers who did not finish high school scored lower than the national public schools' average writing scale score. They were the second lowest scorers, behind those who did not know their fathers' highest levels of education completed. Students with fathers who graduated high school scored lower than the national average but higher than those who did not finish high school or who did not know their fathers' highest level of educational achievement. Those with fathers who had some education after high school or graduated college scored higher than the national average, with those whose fathers graduated college scoring the highest across respondents. Chiu et al. (2016) found that students' fathers' educational levels had the most significant impact on academic achievement (pg. 12). This study suggests a relationship between *fathers'* and students' academic achievement. Still, it also suggests a similar relationship between *mothers'* educational achievement and students' academic achievement as well.

Comparing Mothers' and Fathers' Highest Level of Education Completed

The data does not make it clear which scores are associated with students who had two parents who completed a higher level of education, which scores are associated with students who have only one parent who completed a higher level of education, and which students have no parents who completed a higher level of education. Still, the trends across the average scale scores are consistent no matter if a student reported on their mother's or father's highest level of completed education. Overall, students with at least one parent who graduated college scored the highest, with those who didn't know their parent's education level scoring lowest, followed by those who reported their parent did not finish high school.

This study corroborates the findings of Weiser and Riggio (2010) that "both family background and self-efficacy influence academic outcomes." This is an essential confirmation because Weiser and Riggio (2010) also concluded that family background contributes to the development of self-efficacy, which Savarese (2022) found to have a "significant relationship" with freshman composition grades.

Taken comprehensively, this study's findings contrast with Chiu et al. (2016) findings that while maternal education level had no significance regarding student academic achievement, the father's educational levels did have a significant impact. Based on the NAEP average scale scores and students' self-reported answers to the research questions, mothers' and fathers' highest levels of education completed significantly correlate with students' writing scores. Chiu et al. (2016) were more generally focused on academic achievement rather than just on writing scores, so there is a possibility that writing was an outlier, and Chiu et al. did not dive deep enough into specific subject areas to realize that parental educational achievement levels had this impact on writing. This study's findings also contrast with Brown and Burkhardt's (1999) finding that the education of either parent is not strongly related to student success and with Shapiro's (2009) findings that GPA does not decrease as parental education level decreases.

Future Research, Limitations, and Conclusions

Based on this study's findings, there is a relationship between a parent's level of educational attainment and their child's writing skills, which is valid for both mothers and fathers. So, what can educators do about this, with an understanding that creating a time machine and giving parents a chance to change their past educational achievement levels is not a viable option? For one, they could direct writing interventions to those who need them the

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most and start these interventions as early as possible. This could look like an effort to help high school students who do not have at least one parent who graduated college spend more time practicing academic writing in their classes or providing one-on-one or small group tutoring outside of class to these students.

Acknowledging the limited resources available to provide such targeted support, future research could focus on better understanding which students without household academic traditions would most benefit from this attention. Future researchers should consider:

- I compared the writing scores of students with two parents who have completed college to those with one parent who has completed college and those with no parents who have completed college.
- They are conducting the same study in other subjects (e.g., Math, Science) to determine if parental educational achievement levels uniquely impact writing or if all subject areas are similarly affected.

While the current study offers a starting point for determining the relationship between parents' educational achievements and students' academic performance, there are limitations to its data collection and research methodology. To maintain confidentiality, the NAEP does not provide a sample size, though it can be assumed to range from 10,000 to 20,000 students (NCES, 2018). Because it uses this NAEP data, this research includes any validity issues from its original collection. The variables were also pre-decided, and some correlation analyses were non-natural. These findings should, therefore, not be interpreted as causation. Beyond the data, the analysis methods were based on models in the NAEP Explorer.

Despite these limitations, understanding which students would benefit most from earlier writing skill interventions will empower educators to counter the impact of generational non-academic traditions and boost the success of students from all backgrounds. By setting more students up to succeed in US college classrooms, there is a chance to drop "cliff" and "trough" from our vocabularies and to counter "eye-opening" and "terrifying" enrollment trends by making higher education a more attractive and accessible option for all.

The demographic cliff is natural. As we approach 2025, we face the year that college-aged students will peak, and a dramatic, multi-year decline in the number of students we've traditionally seen as prospective applicants will begin. As the number of prospective students decreases, we should continue recruiting (and supporting) international and non-traditional-age students. Still, we would be doing society a disservice if we didn't make higher education an attractive and accessible option for a higher percentage of traditional-age students at the same time. The excellent news: Countering this "demand cliff," to quote the rarer, more optimistic media coverage of higher education, is a "battle [we] can win" — but if and only if we use the insights we have to boost self-efficacy and make higher education more attainable for students from all backgrounds (Mathews et al., 2023).

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