

Who Chooses the STEM Endorsement in Houston ISD High Schools?

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Research Brief

Who Chooses the STEM Endorsement in Houston ISD High Schools?

This brief examines which students in the Houston Independent School District (HISD) were more likely to choose the STEM endorsement in ninth grade. The study examined STEM endorsement choice among students who began high school in the 2014-2015 and 2015-2016 school years. The analyses showed female students were significantly less likely to choose the STEM endorsement than male students. Furthermore, Asian and Pacific Islander students were more likely to select the STEM endorsement than Black, Hispanic, and White students. Finally, the analyses found a positive relationship between students' scores on the STAAR science test in eighth grade and STEM endorsement choice upon high school entry.

Key Findings

- Male students were more likely to choose the STEM endorsement than female students.
- Asian and Pacific Islander students were more likely to choose the STEM endorsement than Black, Hispanic, and White students.
- Students with higher scores on the eighth grade STAAR science test were more likely to choose the STEM endorsement than students with lower test scores.



Background

House Bill 5, passed by the Texas Legislature in 2013, ushered in a new state high school graduation framework called the Foundation High School Program. The framework aimed to support college and career readiness by providing students opportunities to specialize in an area aligned with their long-term professional goals, regardless of whether they aspired to enroll in college or get a job after high school. The framework was first implemented among high school freshmen in fall 2014.

House Bill 5 introduced *endorsements*, which are like college majors. There are five endorsement options students can choose from: arts and humanities, business and industry, public services, STEM (science, technology, engineering, and mathematics), and multidisciplinary studies. Under each endorsement, there are specific course sequences, or *paths*, students can

complete to earn their endorsement (see Table 1).¹ This study focuses on the STEM endorsement.²

The STEM endorsement is unique given its focus on math and science coursework (Holzman & Lewis, 2020). Given historical inequalities in STEM education by gender, race and ethnicity, and socioeconomic status (Xie, Fang, & Shauman, 2015), it is important to determine which HISD students are more likely to choose the STEM endorsement in ninth grade.

- 1 Please note that the endorsements and paths listed pertain to the period of study, high school freshmen in fall 2014 and fall 2015.
- 2 For more information about the Foundation High School Program in HISD, see Holzman & Lewis (2020).

TABLE 1 Endorsements and Related Curricular Paths Outlined in House Bill 5

Endorsement	Paths
Arts and Humanities	Social Studies, Single Foreign Language, Double Foreign Language, American Sign Language, Fine Arts, English Language Arts
Business and Industry	Career and Technical Education, English Language Arts Electives, Other TEA-Designated Business and Industry Sequence, Interdisciplinary
Public Services	Career and Technical Education, Junior Reserve Officers' Training Corps, Other TEA-Designated Public Services Sequence
STEM	Career and Technical Education, Mathematics, Science, Other TEA-Designated STEM Sequence, Interdisciplinary
Multidisciplinary	Advanced Coursework, 4 Credits in the 4 Core Subject Areas, AP/IB/Dual Credit

Sources: House Bill 5, 2013; Houston Independent School District, 2014.

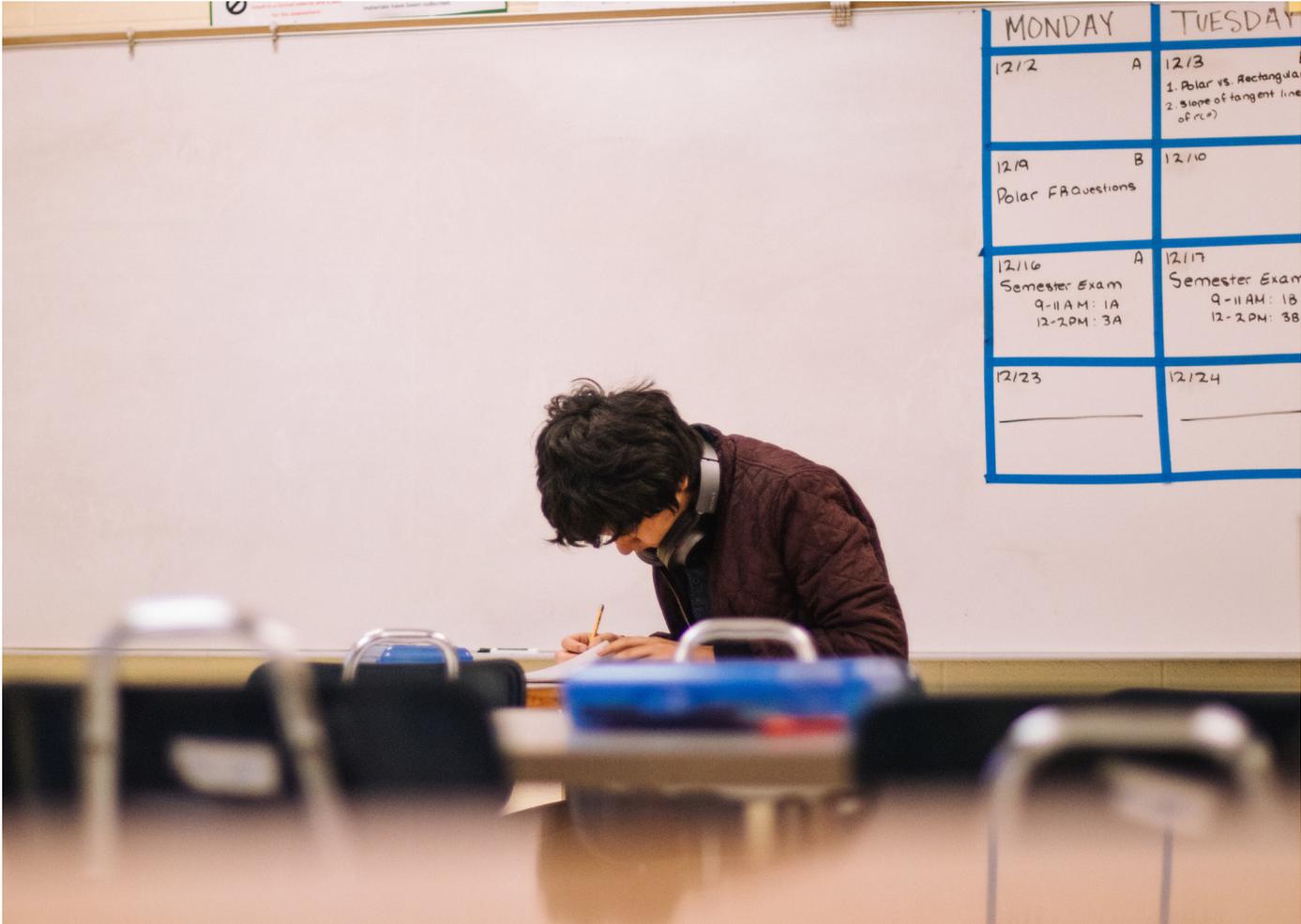


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Research Question

Using HISD administrative data, this study asks the following question:

1. Which student and school characteristics predicted whether an HISD student chose the STEM endorsement upon high school entry?

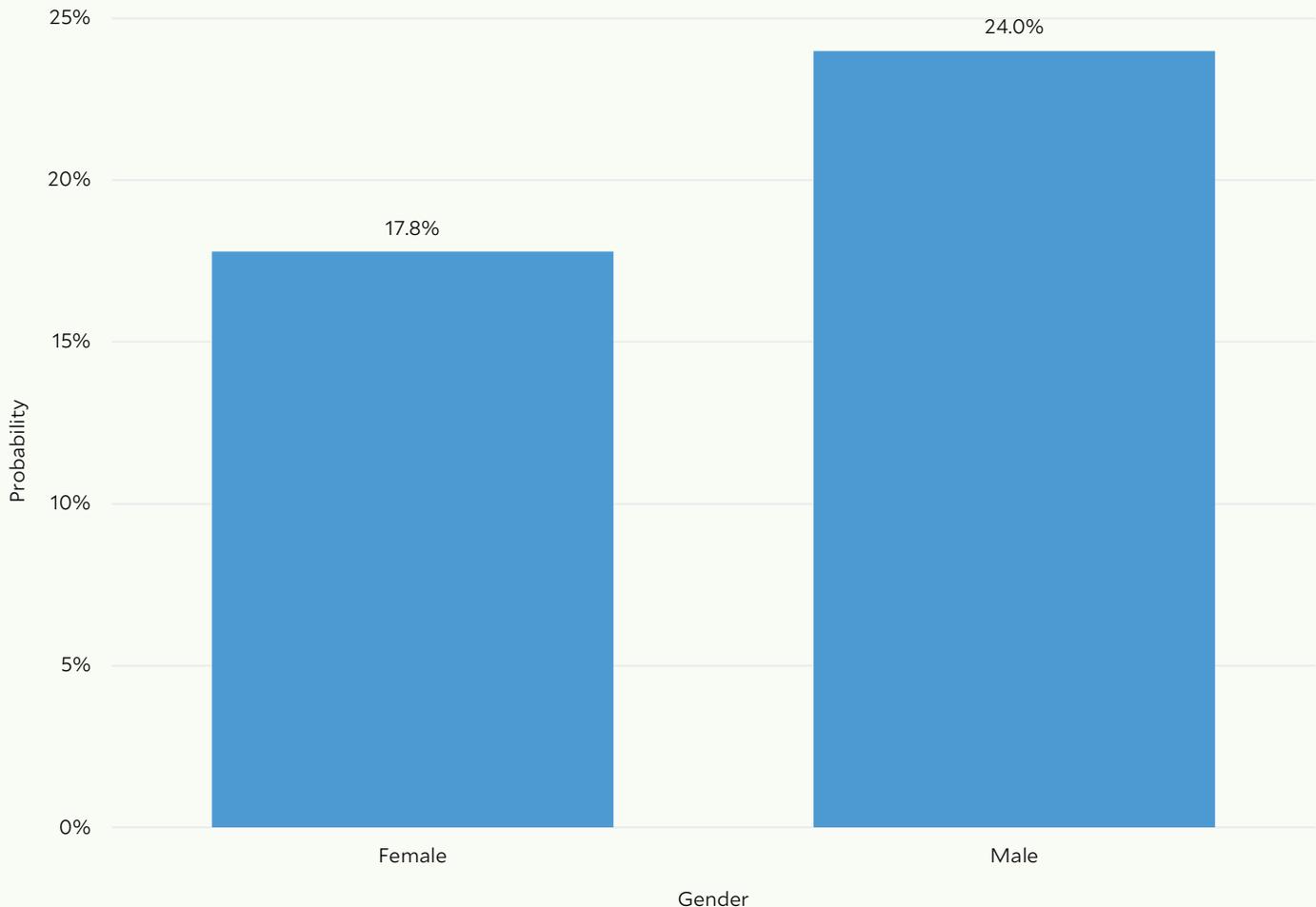
To address this question, this brief studies two cohorts of HISD students who were in ninth grade in the 2014-2015 and 2015-2016 school years ($N = 14,772$). Statistical models, which accounted for student and school characteristics, were used to predict STEM endorsement choice. Select predictors are described below. Full results, as well as details on the data, sample, and analytic strategy, are available from the authors upon request.

Key Predictors of STEM Endorsement Choice

Female students were less likely than male students to choose the STEM endorsement in ninth grade.

Figure 1 shows that compared to their male peers, female students were about 6 percentage points less likely to choose the STEM endorsement in ninth grade.

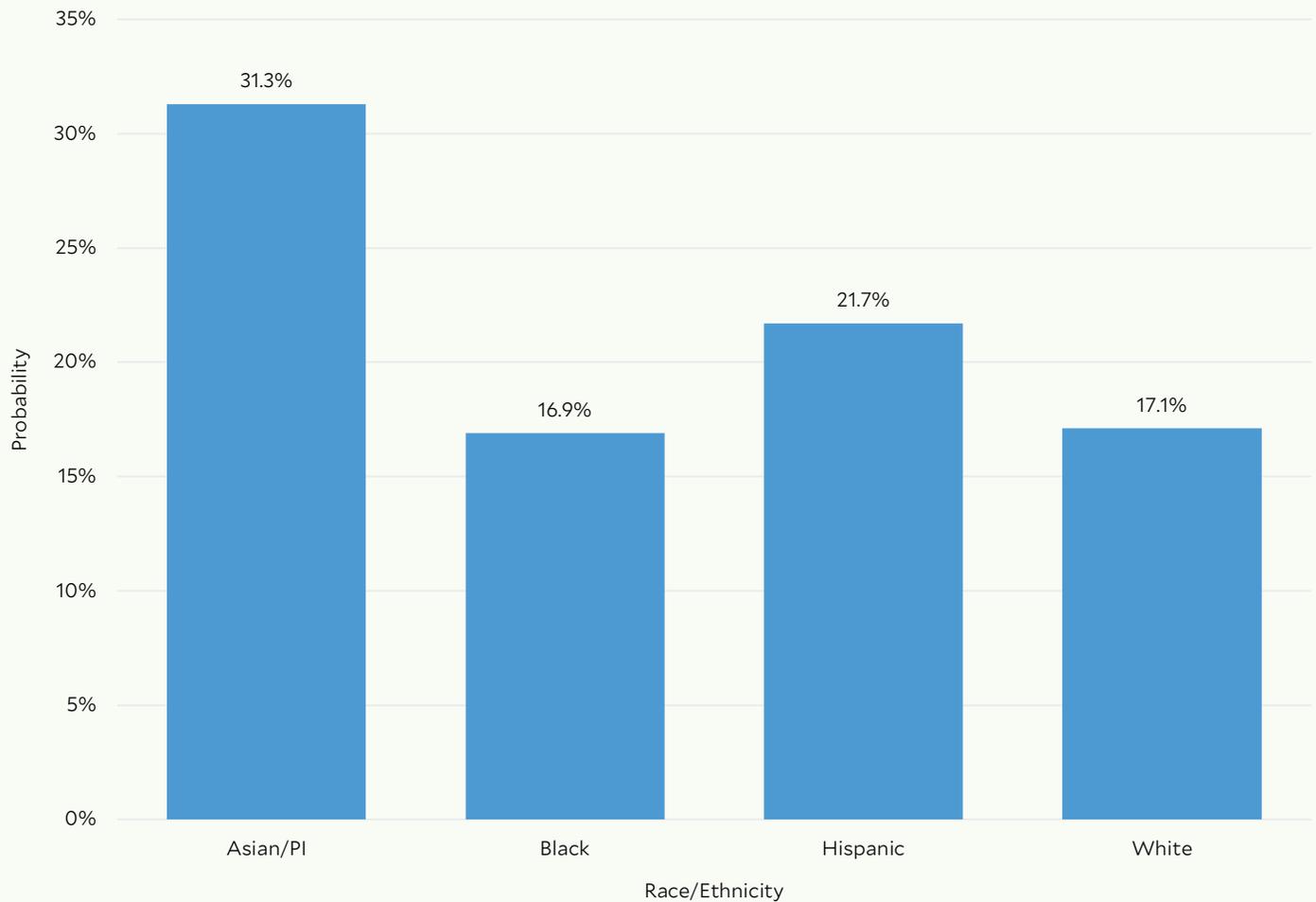
FIGURE 1 STEM Endorsement Choice by Gender



Asian and Pacific Islander students were more likely to choose the STEM endorsement than Black, Hispanic, and White students.

Figure 2 shows Asian and Pacific Islander students were about 14 percentage points more likely to choose the STEM endorsement than Black and White students, and nearly 10 percentage points more likely to choose the STEM endorsement than Hispanic students.

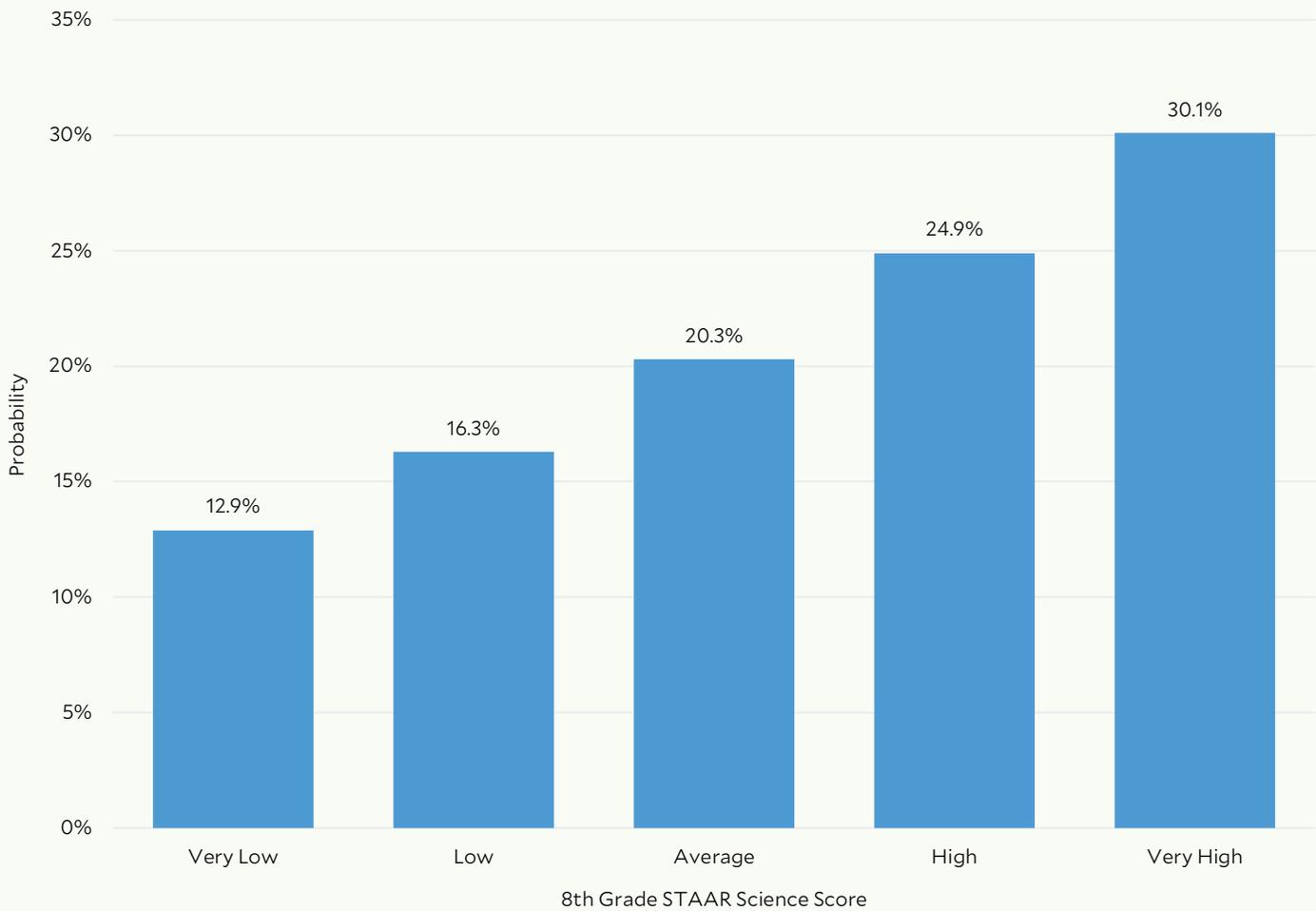
FIGURE 2 STEM Endorsement Choice by Race/Ethnicity



Students who had higher test scores on the eighth grade STAAR science test were more likely to choose the STEM endorsement than students who had lower test scores.

Test scores on the eighth grade STAAR science test positively predicted STEM endorsement choice. For example, Figure 3 shows that while only 12.9 percent of students with very low test scores chose the STEM endorsement in ninth grade, 30.1 percent of students with very high test scores chose the STEM endorsement.

FIGURE 3 STEM Endorsement Choice by 8th-Grade STAAR Science Score



Conclusion

This brief examined which HISD students were more likely to choose the STEM endorsement upon high school entry. The findings show that gender, race/ethnicity, and STAAR science scores were key predictors of STEM endorsement choice in ninth grade. Female students were less likely to choose the STEM endorsement than male students, while Asian and Pacific Islander students were more likely to select the STEM endorsement than Black, Hispanic, and White students. Lastly, students with higher test scores on the eighth grade STAAR science test were more likely to choose the STEM endorsement than students with lower test scores.

Recommendation

- **Communicate with students and families about why students do or do not choose the STEM endorsement:** This study cannot speak to why some groups of students are more likely to choose the STEM endorsement than other groups. Developing a greater understanding of the endorsement choice process will help school and district leaders develop appropriate policies, practices, and interventions.

References

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The Houston Education Research Consortium (HERC) is a research-practice partnership between the Kinder Institute for Urban Research and 11 Houston-area school districts. HERC aims to improve the connection between education research and decision making for the purpose of equalizing outcomes by race, ethnicity, economic status, and other factors associated with inequitable educational opportunities.



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