

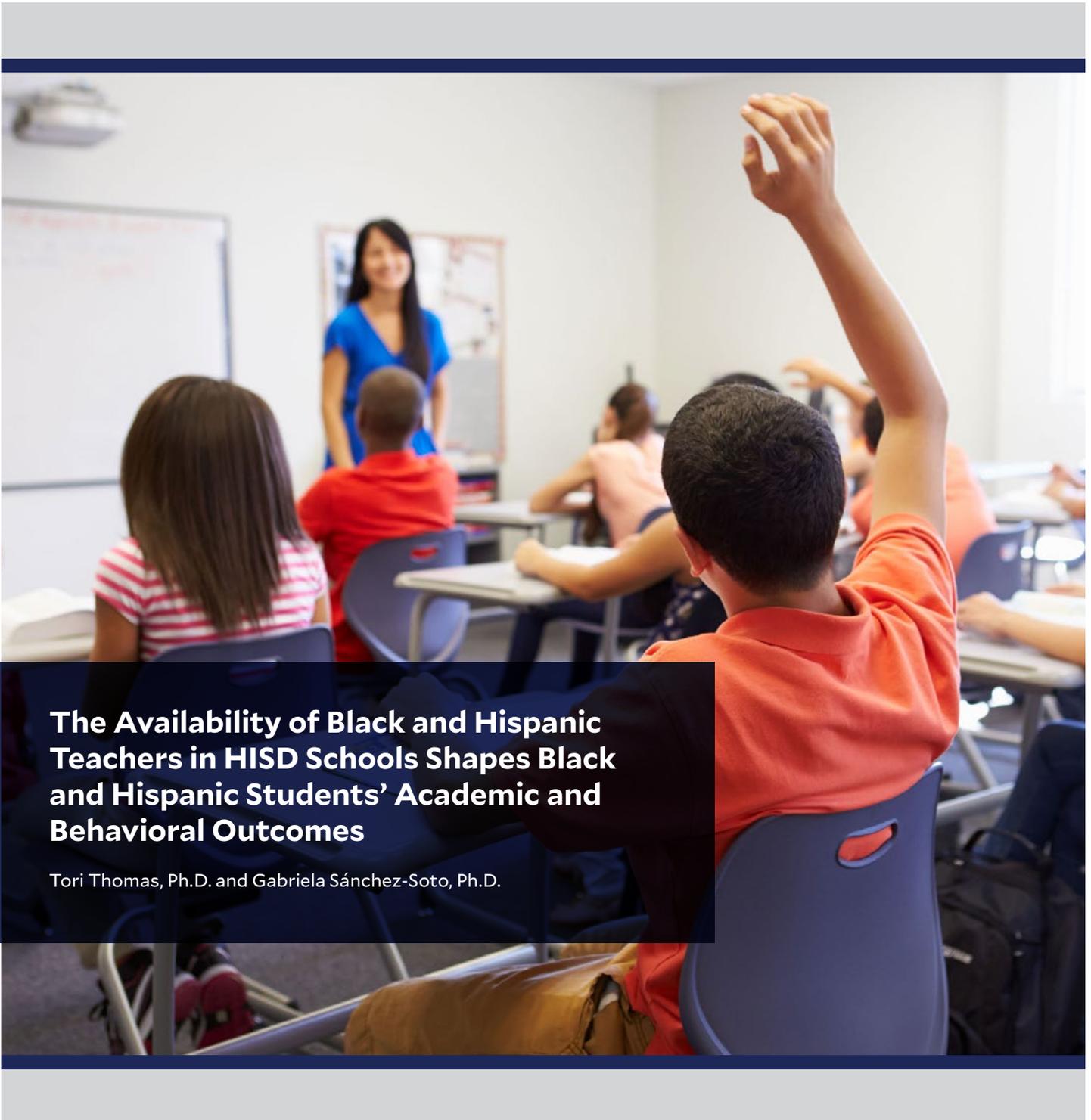


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The Availability of Black and Hispanic Teachers in HISD Schools Shapes Black and Hispanic Students' Academic and Behavioral Outcomes

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Research Brief

for the Houston Independent School District

August 2023

Suggested citation. Thomas, T. & Sánchez-Soto, G. *The Availability of Black and Hispanic Teachers in HISD Schools Shapes Black and Hispanic Students' Academic and Behavioral Outcomes.* (2023). Houston, TX: Houston Education Research Consortium, Kinder Institute for Urban Research, Rice University.

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DOI: doi.org/10.25611/JNK0-ZT31

Research Brief

The Availability of Black and Hispanic Teachers in HISD Schools Shapes Black and Hispanic Students' Academic and Behavioral Outcomes

This study analyzes how the availability of Black and Hispanic teachers within schools in the Houston Independent School District is related to Hispanic and Black students' academic and behavioral outcomes during the 2018-19 and 2019-20 school years. The analyses found that Hispanic and Black students' test scores, attendance and discipline referrals are shaped by the demographics of their fellow students and faculty. Specifically, Hispanic students attending schools where the majority of both teachers and students were also Hispanic had higher test scores, lower absenteeism and lower disciplinary referrals. In contrast, the opposite was found to be the case for Black students: When they attended schools with lower proportions of Black students and teachers, these students tended to have better reading scores, less absenteeism and fewer disciplinary referrals. These results may be due to systemic disadvantages facing some schools in predominantly Black communities.

Key Findings

Achievement

- *Hispanic students:* In schools where **most** students and teachers were Hispanic, **Hispanic students** were **more likely** to have reading and math scores that approached grade level.
- *Black students:* In schools where **few** students and teachers were Black, **Black students** were **more likely** to have reading scores that approached grade level. There were little differences for math scores.

Absenteeism

- *Hispanic students:* In schools where **most** students and teachers were Hispanic, **Hispanic students** were **less likely** to miss school for any reason.

- *Black students:* In schools where **few** students and teachers were Black, **Black students** were **less likely** to miss school for any reason.

Discipline

- *Hispanic students:* In schools where **most** students and teachers were Hispanic, **Hispanic students** were **less likely** to be disciplined for any reason.
- *Black students:* In schools where **few** students and teachers were Black, **Black students** were **less likely** to be disciplined for any reason.

Background

The Houston Independent School District (HISD) is the largest school district in the state of Texas and has more racially and ethnically diverse student and teacher populations relative to those in the rest of the state. Furthermore, the composition of HISD teachers is reflective of their students (24% Black, 44% Hispanic) (NCES 2021). With its diverse teacher and student populations, HISD can provide its students, the majority of whom are of color, with highly qualified teachers who also look like them.

Having teachers of the same race/ethnicity is positively associated with favorable achievement outcomes (Egalite et al. 2015; Wells et al. 2004; Joshi et al 2018; Yarnell & Bohrnstedt 2018) and behavioral outcomes (Downey & Pribesh 2004; Blake et al. 2016; Wright et al. 2017; Lindsay & Hart 2018) among Black and Hispanic students. There are two important reasons for these trends. First, these teachers ideally exhibit cultural competency, which comprises two attributes: 1) awareness of one’s own cultural beliefs and values as well as how they may be different from others and 2) understanding, appreciating and interacting with people from cultures or belief systems different from their own. Second, when Black and Hispanic students have teachers of the same race or ethnicity as them, these teachers may become good role models and advocates within the school (Redding 2019; Lindsay & Hart 2017; Egalite, Kisida & Winters 2015).

The extent to which the racial/ethnic composition of a campus’s teachers matches that of its students can be indicative of a campus’s culture and in turn shape the schooling experiences of Black and Hispanic students. The experience of a Black or Hispanic student attending a school where few students and teachers look like them is likely to be different from attending a school where most students and teachers look like them. Relative to Black and Hispanic students in the former

type of school, those in the latter would have more access to teachers of the same race/ethnicity who can be potential mentors and advocates for them. However, previous work has also pointed out that, relative to White teachers, teachers of color often work in schools where more students experience challenges, particularly coming from economically disadvantaged households as well as having higher special education needs (Frankenberg 2006).

With its majority Black and Hispanic student and teacher populations, HISD provides a unique opportunity. Researchers can explore the academic and behavioral outcomes of Black and Hispanic students attending schools where few, some or many students and teachers looked like them. Understanding these patterns is essential to ensure students have equitable access to potential mentors, advocates and role models in the schools they attend.



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Photo by Katerina Holmes

Research Questions

This brief explores how the availability of Black and Hispanic teachers in HISD schools shapes Black and Hispanic students' academic and behavioral outcomes at the campus level. Specifically, we address the following research question: How is the availability of Black and Hispanic teachers related to the academic and behavioral outcomes of Black and Hispanic students, respectively?

To address this question, this study uses information on 262 HISD schools for the 2018-19 and 2019-20 school years to compute the proportions of Black and Hispanic teachers and students at each campus.

We then examine how the availability of same race/ethnicity teachers on a campus is related to the following two academic and two behavioral outcomes:

- Share of Black or Hispanic students with reading scores approaching grade level
- Share of Black or Hispanic students with math scores approaching grade level
- Whether school has above-average rates of absenteeism for Black or Hispanic students
- Whether school has above-average rates of disciplinary referrals for Black or Hispanic students

Spotlight: Hispanic and Black Students' Access to Same Race/Ethnicity Teachers in HISD

In a previous brief, HERC researchers provided a descriptive analysis on how Hispanic and Black teachers are distributed based on the relative shares of Hispanic and Black students in HISD campuses.

- Students in schools with the highest shares of Hispanic students have the greatest access to Hispanic teachers.

↑↑ **65% of schools with the highest proportions of Hispanic students also have the highest share of Hispanic teachers.**

↓↓ **62% of schools with the lowest proportions of Hispanic students also have the lowest share of Hispanic teachers.**

- Students in schools with the highest shares of Black students have the greatest access to Black teachers:

↑↑ **77% of schools with the highest proportions of Black students also have the highest share of black teachers.**

↓↓ **62% of schools with the lowest proportions of Black students also have the lowest share of Black teachers.**

Data and Methods

The research team used multiple sources of HISD administrative data for the 2018-19 and 2019-20 school years. The analyses predicting the two academic outcomes are limited to the 2018-19 school year, given that the state of Texas did not administer its yearly exams for the 2019-20 school year.

Analyses were conducted separately for Black and Hispanic students to focus on how the availability of Black and Hispanic teachers relative to the school share of Black and Hispanic students was associated to Hispanic and Black students' academic and behavioral outcomes, respectively.

As displayed in Table 1, school-level race/ethnicity was categorized by their relative shares of student and teacher populations to identify campuses with the highest and lowest proportions of each indicator.

TABLE 1 School-Level Race and Ethnicity Percent-Range Categorizations

	Lowest Share	Middle Share	Highest Share
% Hispanic Students	0–33%	34–90%	91% or more
% Hispanic Teachers	0–16%	17–55%	56% or more
% Black Students	0–5%	6–49%	50% or more
% Black Teachers	0–13%	14–64%	65% or more

TABLE 2 Categories of Student-Teacher Racial/Ethnic Match

	Lowest Share of Teachers	Middle Share of Teachers	Highest Share of Teachers
Lowest Share of Students	Few Students & Teachers Looked Like Me (Few)		
Middle Share of Students		Some Students & Teachers Looked Like Me (Some)	
Highest Share of Students			Most Students & Teachers Looked Like Me (Most)

To measure the availability of teachers of the same race or ethnicity as the students in each campus we created a school-level variable that indicates whether the shares of teachers of a respective race/ethnicity match the shares of students of said race/ethnicity in the campus. We use this school-level measure of student-teacher racial/ethnic match to indicate that for a given Black or Hispanic student, they may find more or fewer students and teachers who look like them depending on which school they attend. For instance, a Black student attending a campus with the highest shares of teachers and students who are also Black would be attending a school where most students and teachers looked like them, meaning there is a greater availability of peers and adult role models with the same racial background.

To conceptualize racial/ethnic match as an aspect of campus culture, HERC researchers focus on the three diagonal categories of school-level student-teacher racial/ethnic match, shown in Table 2. These three categories of student-teacher racial/ethnic match at the school level defined include: 1) when the shares of students and teachers of a given race/ethnicity are the lowest or “few students and teachers looked like me,” 2) when the shares of students and teachers of a given race/ethnicity are in the middle of the distribution or “some students and teachers looked like me,” and 3) when the shares of students and teachers of a given race are the highest or “most students and teachers look like me.”

Based on these categories, the focus of the analysis is to examine outcomes for a Black student or a Hispanic student who attended a school where few, some or most students and teachers looked like them. Each of the three categories for racial/ethnic match of students and teachers is indicative of an aspect of the campus environment that can differentially shape Black and Hispanic students’ school experiences and in turn their academic and behavioral outcomes. Findings can help the district design and provide supports to address specific needs.

More information on this study’s data, sample, variables and analysis is in the Appendix.

Key Findings

1 In schools where most students and teachers were Hispanic, Hispanic students were more likely to have reading and math scores that approached grade level.

Figure 1 shows the predicted percentage of students with reading and math scores that approached grade level based on the shares of Hispanic students and teachers at those schools. Nearly half of Hispanic students at schools where most students and teachers looked like them had reading scores that approached grade level. In schools where few students and teachers looked like them, slightly less than a third of Hispanic students had reading scores that approached grade level.

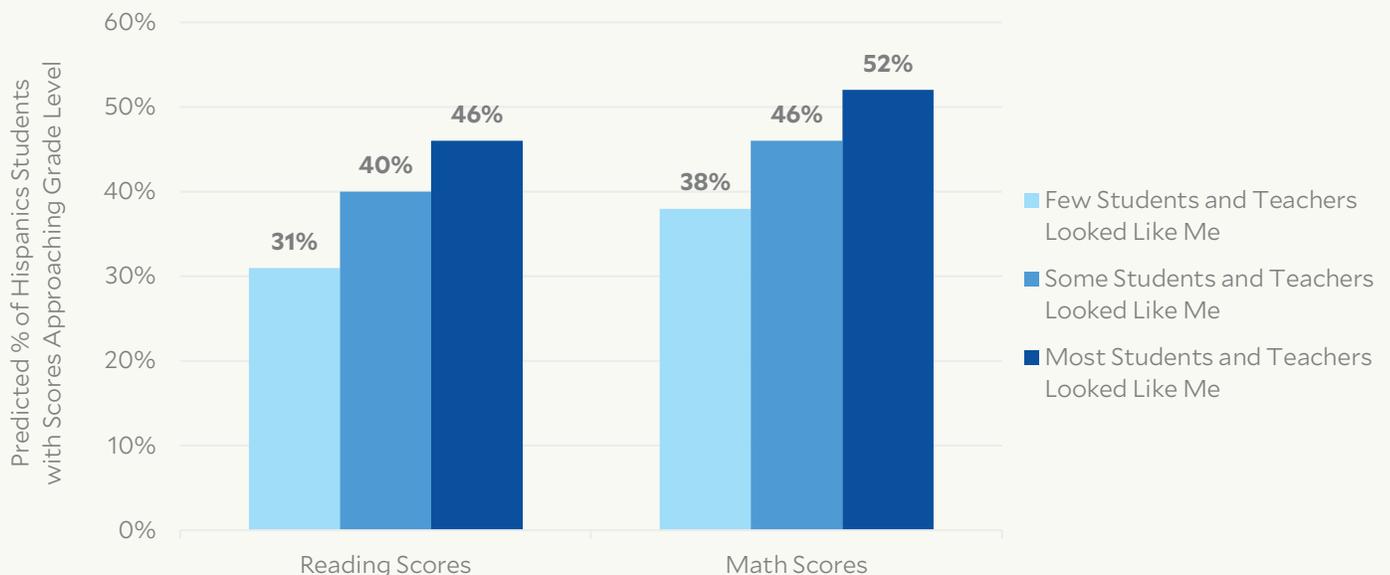
Over half of Hispanic students at schools where most students and teachers looked like them had passing

math scores. In schools where few students and teachers looked like them, nearly 40% of Hispanic students had math scores that approached grade level.

In sum, for Hispanic students, being in a school where most students and teachers looked like them was positive for their academic performance. The share of students who had passing reading and math scores was nearly 15 percentage points higher at schools with the most Hispanic students and teachers compared to those with few Hispanic students and teachers.

FIGURE 1

The Highest Predicted Share of Hispanic Students with Passing Reading and Math Scores Was at Schools Where Most Students and Teachers Looked Like Them



2 In schools where few students and teachers were Black, Black students were more likely to have reading scores that approached grade level. There were little differences in math scores.

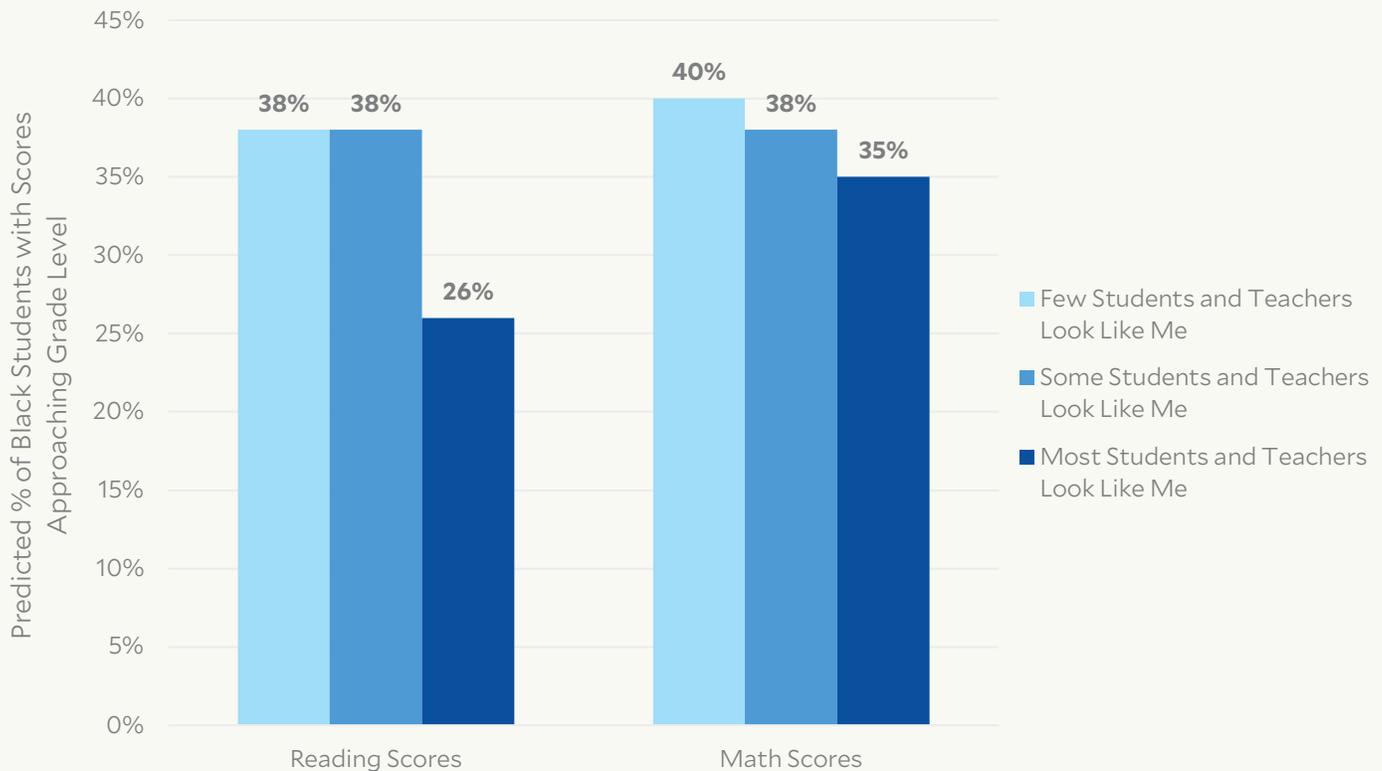
Figure 2 shows a higher predicted share of Black students had passing reading scores¹ at schools where either few or some students and teachers looked like them. Particularly, 38% of Black students at schools where either few or some students and teachers looked like them had reading scores approaching grade level. In contrast, about a quarter of Black students at schools where most students and teachers looked like them had reading scores approaching grade level. Unlike reading, small differences were predicted across categories for math scores; however, these are not significantly different from each other.

This means, in contrast to the findings for Hispanic students, academic achievement for Black students is greater in schools where they, and sometimes Black teachers, are not in the majority. The percentage of Black students with reading scores approaching grade level was about 12 points higher at schools with lower shares of Black students and teachers.

1 There was no association between campus-level student-teacher racial/ethnic match and Black students' math scores.

FIGURE 2

The Highest Predicted Share of Black Students with Passing Reading Scores was at Schools Where Either Few or Some Students and Teachers Looked Like Them



3 In schools where **most** students and teachers were Hispanic, **Hispanic students** were **less likely** to miss school for any reason.

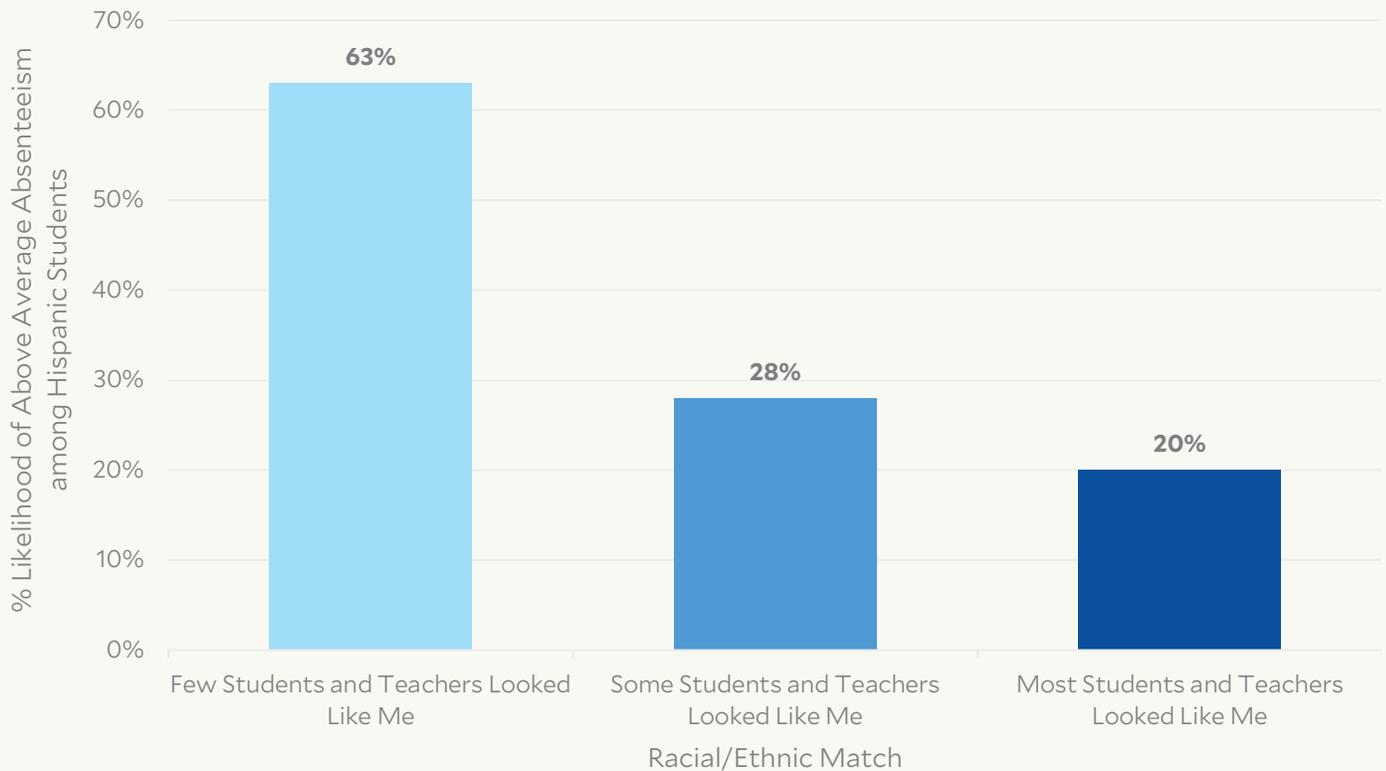
As displayed in Figure 3, Hispanic students were less likely to be chronically absent in schools where most students and teachers looked like them. Particularly, Hispanic students at schools where most students and teachers looked like them had a 20% likelihood of having chronic absenteeism. Hispanic students at schools where some students and teachers looked like them had a 28% likelihood. In contrast, Hispanic students at schools where few students and teachers looked like them had a 63% likelihood of chronic absenteeism; this is over three times the likelihood of Hispanic students at schools where most students and teachers looked like them.



Photo by RDNE Stock project

FIGURE 3

Hispanic Students Were Less Likely to be Chronically Absent in Schools Where Most Students and Teachers Looked Like Them



4 In schools where few students and teachers looked like them, Black students were less likely to miss school for any reason.

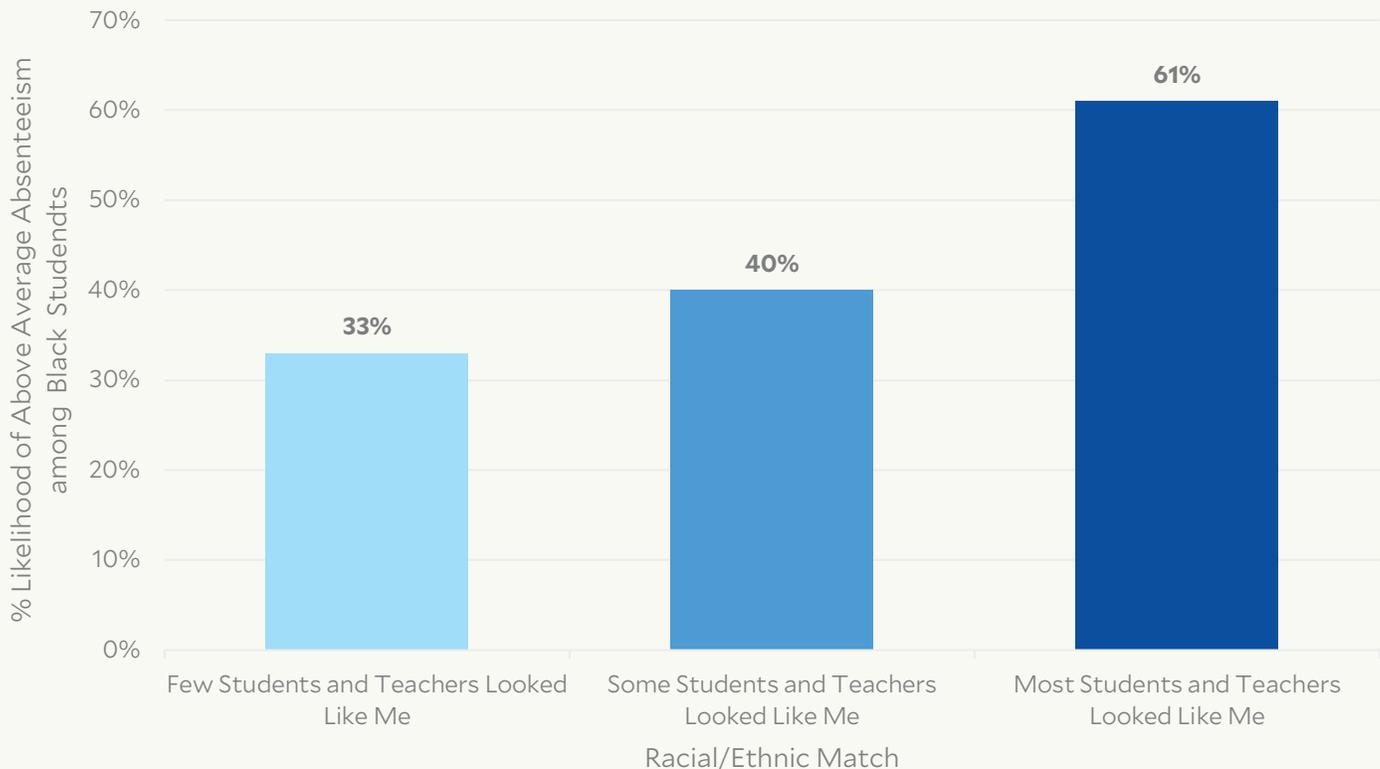
Figure 4 shows Black students had the lowest likelihood of chronic absenteeism in schools where either few or some students and teachers looked like them. Specifically, Black students at schools where few students and teachers looked like them had a 33% likelihood of chronic absenteeism. Black students at schools where some students and teachers looked like them had a 40% likelihood. In contrast, Black students at schools where most students and teachers looked like them had a 61% likelihood of chronic absenteeism; this is nearly twice the likelihood of Black students at schools with few students and teachers who looked like them.



Photo by Max Fischer

FIGURE 4

The Lowest Likelihood of Black Students Being Chronically Absent Was at Schools Where Few Students and Teachers Looked Like Them



5 In schools where **most** students and teachers were Hispanic, **Hispanic students** were **less likely** to be disciplined for any reason.

Figure 5 shows the predicted ratio of students who were disciplined for any reason based on the shares of Hispanic students and teachers at those schools. At schools where few students and teachers were Hispanic, about 11 for every 100 Hispanic students were disciplined for any reason, compared to about six per 100 Hispanic students at schools where some students and teachers looked like them, and five per 100 Hispanic students at schools where most students and teachers looked like them.

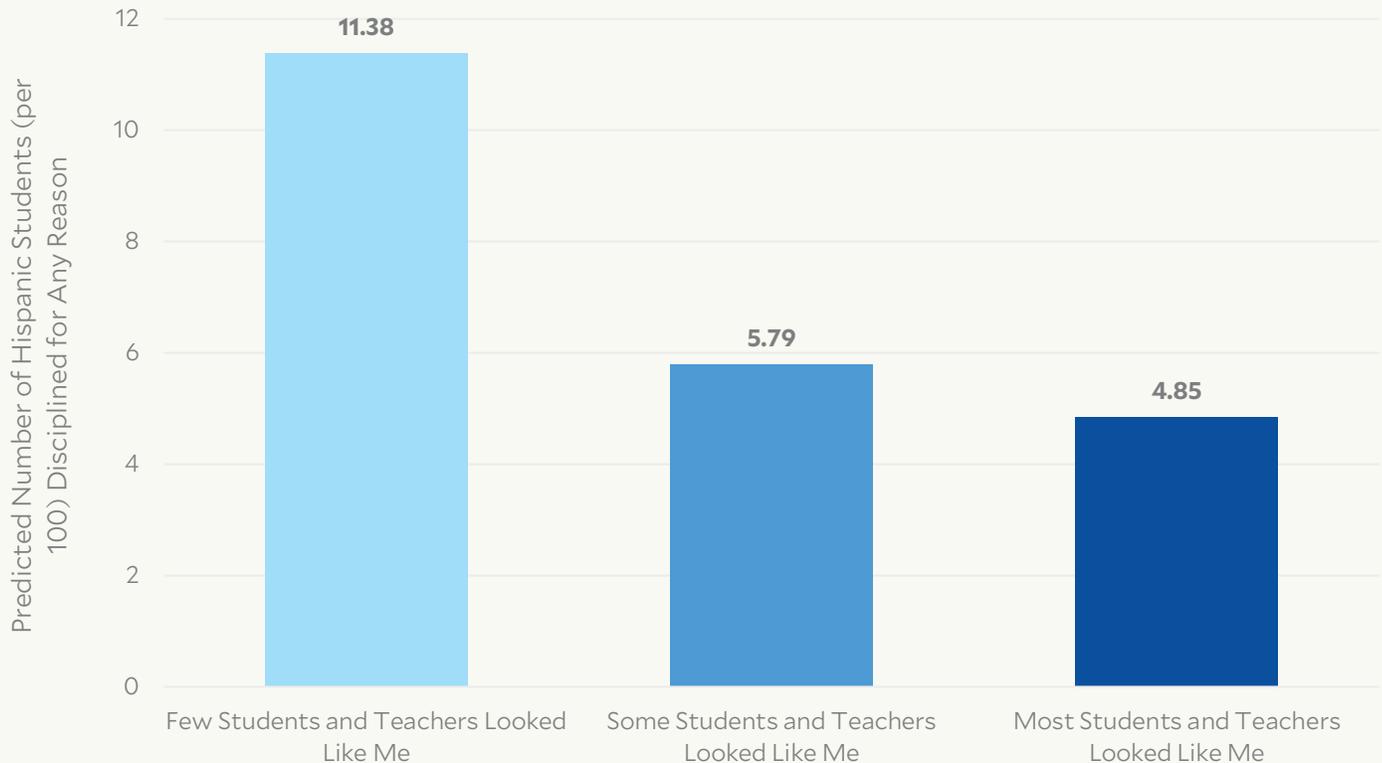
This means Hispanic students attending schools where they were the minority were more likely to be disciplined for any reason than Hispanic students attending schools where they and Hispanic teachers were in the majority.



Photo by Yan Krut'kai

FIGURE 5

More Hispanic Students Were Disciplined for Any Reason in Schools Where Few Students and Teachers Looked Like Them



6 In schools where few students and teachers were Black, Black students were less likely to be disciplined for any reason.

Figure 6 shows the predicted ratio of students who were disciplined for any reason based on the shares of Black students and teachers at those schools. At schools where either few or some students and teachers looked like them, about 12 out of every 100 Black students were disciplined for any reason. In contrast, at schools where most students and teachers looked like them, 21 out of every 100 Black students were disciplined for any reason.

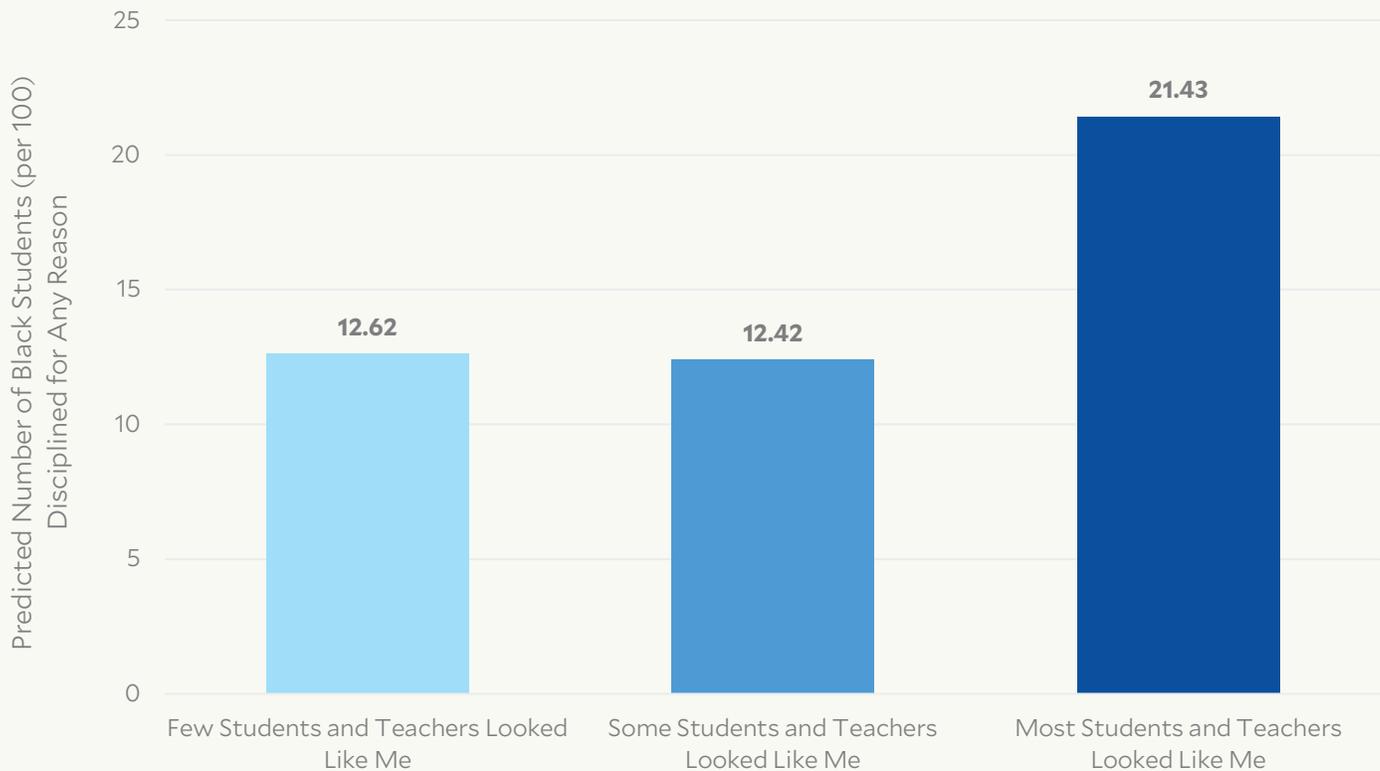
This means Black students are more likely to be disciplined at schools where they are the majority than those attending schools where they, and Black teachers, are in the minority.



Photo by RDNE Stock project

FIGURE 6

More Black Students Were Disciplined for Any Reason in Schools Where Most Students and Teachers Looked Like Them



Conclusion

Summary and Implications

These findings strongly suggest the racial/ethnic makeup of students and teachers in HISD is connected to Black and Hispanic students' academic, attendance and disciplinary outcomes, but this relationship works in opposite directions. Consistent with previous work on racial/ethnic matching, Hispanic students seem to benefit when attending schools where most students and teachers looked like them. In contrast, Black students experience the opposite when attending schools where Black students and teachers are in the majority. These findings align with previous work showing Black teachers tend to work in more challenging environments and in under-resourced schools that have more students with socioeconomic and academic challenges, all of which can be related to students' disciplinary outcomes (Fiore & Reynolds 1996; Frankenberg 2006; Bryant & Wilson 2020).

These findings raise questions about how schools in predominantly Black neighborhoods are different from those in predominantly Hispanic neighborhoods. Even though predominantly Black neighborhoods and predominantly Hispanic neighborhoods both have a history of disadvantage and racial/ethnic segregation, this tends to manifest in different ways for each of them (Flippen 2001; Marcuse 2005). Research shows that the concentration of Hispanic people in neighborhoods, or ethnic enclaves, often protects from the negative effects of segregation (Flippen 2001). Relative to Hispanic ethnic enclaves, disinvestment has been associated with the deterioration of predominantly Black neighborhoods (Flippen 2001). In turn, it is imperative to explore why Black student achievement is lower, and why their chronic absenteeism and disciplinary actions are higher in schools where they have greater availabil-

ity of peers and teachers of their same race even after considering other factors, specifically the school-level share of economically disadvantaged students.

Recommendations

Based on these findings we have the following recommendations:

- **Teachers may need specific training and resources to support students of different racial/ethnic backgrounds, particularly in contexts where Black and Hispanic students and teachers are the minority.** Findings indicated that Hispanic students at schools where few (or some) students and teachers looked like them experienced lower achievement, higher absenteeism and higher disciplinary referrals. Future work should examine how to better support racial/ethnic minority students who go to schools where they have less access to students and teachers who look like them and who can be potential advocates and mentors.
- **Examine the resources available to teachers at predominantly Hispanic schools relative to those available at predominantly Black schools to identify why racial/ethnic matching seems to benefit Hispanic students but not Black students.** Findings indicated that Black students at schools where most students and teachers looked like them experienced lower achievement, higher absenteeism and higher disciplinary referrals. Given that these findings are in stark contrast with previous work on racial/ethnic matching, future work should examine what resources are available to teachers at predominantly Hispanic schools relative to predominantly Black schools to potentially account for this difference.

Appendix A: Data and Sample

HERC researchers used campus-level administrative data from the Houston Independent School District (HISD) in the Houston Metro Area for the school years 2018–2019 and 2019–2020. The analyses predicting academic outcomes are limited to the 2018–19 school year, given that the state of Texas did not administer its yearly exams for the 2019–20 school year.

The study leveraged information on the characteristics of teachers and students in HISD campuses as well as student outcomes for the period of the study. The teacher characteristics selected for the analyses were obtained from district employee records and included teacher demographic profile (race and ethnicity), the distribution of teacher professional qualifications across campuses (types of certifications attained by teachers, years of teaching experience, educational degree and major/minor in education). HERC researchers used student data from the Texas Public Education Information Management System (PEIMS) from the Texas Education Agency (TEA) to obtain campus-level student characteristics and aggregated them to the school level. Student characteristics included race/ethnicity, English language learner and immigrant status, special education status and economic disadvantage status. Lastly, HERC researchers obtained data from disciplinary referral files, attendance records, and the

State of Texas Assessments of Academic Readiness (STAAR) scores and passing rates.

Due to administrative data restrictions and specifying each outcome to Black and Hispanic students, there is a different sample size for each of the four outcomes. Therefore, the sample for each analysis is based on listwise case deletion, where only schools with complete data specific to the analysis are included.

Because the size of the school may affect the distribution of teacher qualifications across schools, the analyses looking at how teacher qualifications influence student outcomes were based on a further sub-sample where HERC researchers limited it to schools that have 500 or more students. The rest of the analyses were based on the listwise case deletion sample. Table A1 below displays the sample sizes for each of the outcomes specific to Black and Hispanic students, respectively.

TABLE A1 Number of HISD Campuses Included in Each Analysis Based on Each Student Outcome

	Black Students		Hispanic Students	
	Listwise Case Deletion Sample	Sub-Sample	Listwise Case Deletion Sample	Sub-Sample
Reading	249	191	252	192
Math	244	190	251	192
Absenteeism	524	393	524	393
Discipline Referrals	440	n/a	440	n/a

Appendix B: Variables Used for the Analyses

Student Outcomes

HERC researchers focused on how teacher qualifications and availability of Black and Hispanic teachers were related to four school-level outcomes; two are academic, and two are behavioral. Because HERC researchers examined each of the four outcomes specific to Black and Hispanic students, there were eight total analyses.

The two academic outcomes included the school-level proportions of students with reading and math scores meeting or exceeding grade level.

Proportion of Students with Reading Scores

Approaching Grade Level: A continuous measure that indicated the proportion of either Black or Hispanic students in a school who had passing reading scores. This measure ranges from 0 to 1. On average, 36.5% of Black students and 39.9% of Hispanics had passing reading scores.

Proportion of Students with Math Scores

Approaching Grade Level: A continuous measure that indicated the proportion of either Black or Hispanic students in a school who had passing math scores. On average, 35.2% of Black students and 45.8% of Hispanics had passing math scores.

The two behavioral outcomes include chronic absenteeism and disciplinary referrals.

Chronic Absenteeism: A binary measure that indicated whether a school has an above average proportion of either Black or Hispanic students who have been chronically absent, which means attending school for less than 90% of the school year. A school was assigned a zero if the proportion was lower than average for the respective racial/ethnic group (15.8% for Black students and 11.2% for Hispanic students), and a school was assigned a one if the proportion of students who have been chronically absent was above average. For Black students, this was true for 41.8% of HISD schools. For Hispanic students, this was true for 32.2% of HISD schools.

Disciplinary Referrals: A continuous measure that indicated the disciplinary rate for either Black or Hispanic students in a school. Across HISD schools, the average discipline rate for Black students was 13.73 referrals per 100 students. The average discipline rate for Hispanic students across HISD schools was 6.82 per 100 students.

TABLE B1 School Level Teacher Qualifications

Advanced Degrees	25% or more of teachers at a campus have an advanced degree
Formal Background in Education	25% or more teachers at a campus majored and/or minored in an education-related field
SPED Certification	15% or more teachers have SPED certification
ESL/Bilingual Certification	50% or more teachers have ESL/Bilingual certification
Above-Average Teaching Experience	The average years of teaching experience at a campus is above the district average (12 years)

Main Independent Variables

Teacher Qualifications

Shown in Table B1, HERC researchers included a set of variables that focused on teacher qualifications at the school level. Two of these variables were related to teachers' postsecondary education. Another two were related to certifications, and one more was related to years of experience teaching.

Advanced Degrees: A binary indicator for school-level proportion of teachers with advanced degrees. A school assigned one for this variable had at least 25% of teachers at the school who had at least a master's degree. A school assigned a zero had less than 25% of teachers at the school with those credentials.

Formal Background in Education: A binary indicator for the proportion of teachers who majored or minored in an educational-based program. Schools assigned a one for this variable have 25% or more teachers with a formal background in education, and schools assigned a zero have less than 25% of teachers with this credential.

Special Education Certification: A binary indicator of the proportion of teachers certified to teach special education. A school assigned a one had 15% or more teachers with a special education certification, and those assigned a zero had less than 15% of teachers with the certification.

English as a Second Language/Bilingual Certification:

A binary indicator of the proportion of teachers certified to teach English as a Second Language (ESL)/Bilingual Education. A school assigned a one had at least half or more teachers with the certification, and a school assigned a zero had less than half of teachers with this credential.

Years of Teaching Experience: A binary indicator of school-level average years of teaching experience. On average, a teacher in this district had 12 years of experience. Thus, a school assigned a one means that its teachers have an average of or above 12 years of teaching experience, and a school assigned a zero means that the average years of experience was below 12 years.

Availability of Black and Hispanic Teachers Relative to Same Race/Ethnicity Students

A set of four independent variables focused on the school-level proportions of Black students and teachers as well as Hispanic students and teachers. Table B2 demonstrates the specific ranges in the proportions of Black students and teachers as well as Hispanic students and teachers for each of the three categories.

Share of Hispanic Students: A three-category variable indicating the share of Hispanic students within a campus. Categories include proportions within the lowest 20th percentile, those within the middle 60th percentile and those within the highest 20th percentile.

Share of Hispanic Teachers: A three-category variable indicating the share of Hispanic teachers within a campus. Categories include proportions within the lowest 20th percentile, those within the middle 60th percentile and those within the highest 20th percentile.

Share of Black Students: A three-category variable indicating the share of Black students within a campus. Categories include proportions within the lowest 20th percentile, those within the middle 60th percentile and those within the highest 20th percentile.

Share of Black Teachers: A three-category variable indicating the share of Black teachers within a campus. Categories include proportions within the lowest 20th percentile, those within the middle 60th percentile and those within the highest 20th percentile.

TABLE B2 School-Level Race and Ethnicity Percent-Range Categorizations

	Lowest 20% Percentile	Middle 60% Percentile	Highest 20% Percentile
% Hispanic Students	0–33%	34–90%	91% or more
% Hispanic Teachers	0–16%	17–55%	56% or more
% Black Students	0–5%	6–49%	50% or more
% Black Teachers	0–13%	14–64%	65% or more

TABLE B3

Availability of Teachers Relative to Share of Same Race/Ethnicity Students

	Lowest 20% Teachers	Middle 60% Teachers	Highest 20% Teachers
Lowest 20% Students	Few Students & Teachers Looked Like Me		
Middle 60% Students		Some Students & Teachers Looked Like Me	
Highest 20% Students			Most Students & Teachers Looked Like Me

To measure Black and Hispanic teacher availability relative to the share of students of the same race/ethnicity at the campus level, HERC researchers used two-way interactions between the proportion of students and the proportion of teachers of each respective race/ethnicity as categorized above in Table B2. Table B3 (above) shows a matrix of the possible categories when interacting two of these three-category variables which HERC researcher used as indicators of the type of ethno-racial school contexts students were exposed to in HISD. HERC researchers were particularly interested in the groups where the percentiles of teacher and student composition were the same (shown in red, yellow and green text) because they indicate a match in the levels of availability of teachers of the same race and ethnicity in the campus to students of said race/ethnicity. Researchers labeled these three categories based on how many students and teachers at the school would look like you if you are a Black or Hispanic student attending that school.

Availability of Teachers Relative to Share of Same Race/Ethnicity Students: When examining the relationship between the availability of Black and Hispanic teachers and same race/ethnicity students' outcomes, HERC researchers focused on the following three categories as indicated in Table B3: 1) few students and teachers looked like me (both are in the lowest 20th percentile), 2) some students and teachers looked like me (both are in the middle 60th percentile), and 3) most students and teachers looked like me (both are in the highest 20th percentile).

Other Student Characteristics

We also included school-level student characteristics related to their socio-demographic and academic backgrounds.

Title 1 school: This variable is a binary indicator for whether a school is Title 1, meaning that 40% or more students are eligible for free/reduced lunch; we use this as an indicator of student economic disadvantage. Schools assigned a 0 are not Title 1, and those that are Title 1 are assigned a 1. Title 1 status was true for about 91% of HISD schools.

Share of Immigrant Students:² This variable consists of three categories, like previous variables in this study: lowest 20th percentile, middle 60th percentile and highest 20th percentile. This results in three categories of the proportion of immigrant students in the school: less than 1%, 1 to 9%, and 10% and more.

Share of Students in Special Education: A three-category variable indicating the proportion of students enrolled in special education: lowest 20th percentile, middle 60th percentile, and highest 20th percentile. This results in three categories of the proportion of students in special education: less than 5%, 5% to 10%, and greater than 10%.

² In PEIMS the immigrant student variable indicates whether the student is an individual age 3 through 21 who was not born in any U.S. state and has not been attending one or more schools in any one or more states for more than 3 full academic years. Thus, this definition captures only recent immigrants and does not necessarily include all foreign-born students.



Photo by Katerina Holmes

Share of Students in English as a Second Language (ESL)/Bilingual Education: A three-category variable indicating the proportion of students enrolled in ESL/Bilingual Education: lowest 20th percentile, middle 60th percentile and highest 20th percentile. This results in three categories of the proportion of students in ESL/Bilingual Education: 0-12%, 13-55% and 56% to 100%.

Share of Students with Passing Reading/Math Scores in Previous Year:³ A continuous variable for proportion of students who met or exceeded grade level the previous year. On average, 41.5% of all HISD students within a given school had at least passing reading scores. Also, on average, about 25% of all students within a given HISD school had at least passing scores.

Other School-Level Controls

At the school level, we control for two variables: school size and grade levels of the school.

School Size: This variable consists of three categories: 1) 0-200 students, 2) 201-500 students and 3) 501 or more students. Over 70% of HISD schools across the 2018-19 and 2020-21 school years comprised of 501 or more students.

Grade Span: This variable consists of four categories: 1) early education centers and elementary schools, 2) combined elementary and/or middle and/or high schools, 3) middle school (grades 6-8), and 4) high schools. Of the schools included within the 2018-19 and 2020-21 school years, over 60% of schools were elementary schools, about 10% were combined, 14% were middle schools and 15% were high schools.

³ These scores are based on the 2017-2018 school year.

Appendix C: Methods

Distribution of Teacher Characteristics across HISD Schools

To examine how teacher characteristics were distributed across HISD schools, HERC researchers estimated cross-tabulations between a given school-level teacher characteristic and a school-level student characteristic. Following, HERC researchers utilized the chi-square statistic to determine whether differences were significant. The differences were displayed using a series of bar graphs.

Association between Teacher Characteristics and Student Outcomes

There were two sets of teacher characteristics that HERC researchers examined in relation to student outcomes: teacher qualifications and availability of Black and Hispanic teachers. To examine how these teacher characteristics were related to student outcomes, HERC researchers used ordinary least squares (OLS) regressions to estimate the proportion of students who met or exceeded grade level in reading and math, and then we used binary logistic regressions to estimate the proportion of schools with above-average chronic absenteeism and proportion of schools with above-average discipline rates. As mentioned, we specify each outcome to Black and Hispanic students, thus there are eight analyses per brief, four OLS regressions and four logistic regressions.⁴ The following paragraphs explain how HERC researchers displayed the findings from these analyses.

⁴ In preliminary stages of the analyses, we tested a series of nested models to understand how different sets of variables influenced the results. The first model included the school-level proportions of Black/Hispanic students and teachers and all school-level teacher qualification variables. The second model added variables for school-level student characteristics. The third model added interactions between the proportions of Black/Hispanic teachers and students to test the effect of racial/ethnic match between students and teachers at the campus level. The briefs present results from this last model.

Teacher Qualifications as the Main Predictor

To illustrate which teacher qualifications were positively related to Black and Hispanic students' academic and behavioral outcomes, tables in the research brief highlight only the teacher qualifications that had positive and statistically significant associations with relevant student outcomes.

Availability of Black and Hispanic Teachers as the Main Predictor

To display how availability of Black and Hispanic teachers is related to Black and Hispanic students' academic and behavioral outcomes, HERC researchers estimated predicted values and predicted probabilities. Using a bar graph, HERC researchers displayed the predicted value for Black and Hispanic students who passed reading and math, respectively. Also using bar graphs, HERC researchers displayed the predicted probabilities of above-average shares of Black and Hispanic students being chronically absent at a given HISD school. Using bar graphs, researchers also displayed the predicted probabilities of Black and Hispanic students having above-average disciplinary referral rates at a given HISD school.

Appendix D: Supplementary Findings for Black & Hispanic Teacher Availability and Student Outcomes

As mentioned, HERC researchers only focused on the diagonals (listed in shades of blue) when it came to the availability of same race/ethnicity teachers in relation to share of Black and Hispanic students. This section of the appendix shows the predicted values/probabilities for each of the four outcomes based on all the possible values of the two-way interactions.

TABLE D1 Predicted Proportion of Students with Passing Reading Scores

	Black Students			Hispanic Students			
	Lowest 20% Teachers	Middle 60% Teachers	Highest 20% Teachers		Lowest 20% Teachers	Middle 60% Teachers	Highest 20% Teachers
Lowest 20% Students	38%	41%	n/a	Lowest 20% Students	31%	35%	n/a
Middle 60% Students	43%	39%	34%	Middle 60% Students	40%	40%	44%
Highest 20% Students	n/a	29%	25%	Highest 20% Students	n/a	47%	46%

TABLE D2 Predicted Proportion of Students with Passing Math Scores

	Black Students			Hispanic Students			
	Lowest 20% Teachers	Middle 60% Teachers	Highest 20% Teachers		Lowest 20% Teachers	Middle 60% Teachers	Highest 20% Teachers
Lowest 20% Students	40%	40%	n/a	Lowest 20% Students	38%	41%	n/a
Middle 60% Students	38%	35%	33%	Middle 60% Students	43%	46%	53%
Highest 20% Students	n/a	29%	30%	Highest 20% Students	n/a	52%	52%

TABLE D3

Predicted Probabilities of Chronic Absenteeism

	Black Students				Hispanic Students		
	Lowest 20% Teachers	Middle 60% Teachers	Highest 20% Teachers		Lowest 20% Teachers	Middle 60% Teachers	Highest 20% Teachers
Lowest 20% Students	33%	37%	n/a	Lowest 20% Students	66%	27%	n/a
Middle 60% Students	30%	40%	51%	Middle 60% Students	47%	28%	24%
Highest 20% Students	n/a	36%	62%	Highest 20% Students	n/a	20%	20%

TABLE D4

Predicted Probabilities of Disciplinary Referrals

	Black Students				Hispanic Students		
	Lowest 20% Teachers	Middle 60% Teachers	Highest 20% Teachers		Lowest 20% Teachers	Middle 60% Teachers	Highest 20% Teachers
Lowest 20% Students	84%	64%	n/a	Lowest 20% Students	82%	67%	n/a
Middle 60% Students	32%	40%	30%	Middle 60% Students	64%	56%	70%
Highest 20% Students	n/a	45%	44%	Highest 20% Students	n/a	55%	58%

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About

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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