

## High School Role Models and Minority College Achievement

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### Executive Summary

This paper analyzed the role of students having a same-race teacher on a high school student's short- and long-term outcomes. How is a student's academic achievement affected in the classroom with a same-race teacher and how is their likelihood of attending college changed by having a same-race teacher? Race-matching improves Black and Asian students' standardized test scores for that class and their likelihood of passing that class as well. Black and Hispanic students also became significantly more likely to enroll in a two- or four- year college with a same-race 9th grade teacher. Black and Hispanic students with a same-race 9th grade STEM teacher were also significantly more likely to major in STEM in college.

This paper highlights the need to have a more diverse and representative teacher population and gives a concrete policy recommendation of increasing the ethnic and racial diversity of the Texas teaching population to better match the students that they serve.

### What We Studied

Educational outcomes have unequal distributions across race and income. Over 20 years, the test score gap between White and Black students decreased slightly but remains large with White students scoring 0.7 standard deviations higher on 4th grade standardized tests with similar findings for the White-Hispanic achievement gap (Reardon et al., 2013). A number of potential explanations and mechanisms could be behind these differences including differing resources, differing qualities of schools, and others. Among these possible mechanisms is the racial distribution of teachers and how teachers improve outcomes for same-race students. Past literature shows that same-race teachers can increase students' short-term, course-level outcomes like test scores, grades, and behavior<sup>1</sup>. Teachers may be more effective at communicating and teaching same-race students or may work effectively as role models, updating students' beliefs about the returns to education or increasing their motivation<sup>2</sup>. In support of the role model hypothesis, past literature shows that having a same-race teacher increases teachers' and students' expectations of student educational attainment<sup>3</sup>.

The distribution of teacher race may be contributing to the persistent racial disparities, and Texas is an excellent state to examine the role of teacher race as it is an ethnically and racially diverse state. However, the teacher population does

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<sup>1</sup>(Dee (2004); Dee (2005); Fairlie, Hoffmann and Oreopoulos (2014); Egalite, Kisida and Winters (2015); Holt and Gershenson (2017); Lusher, Campbell and Carrell (2018))

<sup>2</sup> Ladson-Billings (1995); Walker (2001); Marx and Roman (2002); Dee (2005); Gershenson et al. (2018))

<sup>3</sup> Ferguson (2003); Fox (2015); Papageorge, Gershenson and Kang (2018)

not align with the student population with Black, Hispanic, and Asian students not being properly represented in the teaching population and White students being overrepresented by the teaching population. See Table 1 on the composition of students and teachers in public high school in Texas. Hispanic students make up almost half of all students in public high schools in Texas, but Hispanic teachers make up about 18% of all public high school teachers. White students make up only about a third of all students, but White teachers make up over 70% of the teaching population.

Table 1:

Variable	Black Mean	Hispanic Mean	Asian Mean	White Mean
Student Composition	13.7%	49.8%	4.1%	33.2%
Teacher Composition	9.1%	18.3%	2.3%	70.2%

### How We Analyzed the Data

One difficulty in assessing the role that a same-race teacher plays in a student’s academic achievement is that students and teachers are not randomly assigned to each other<sup>4</sup>. This sorting issue is particularly true of high school students that have a greater choice over their courses and therefore teachers. After talking with high school administrators in the state, high school students have choice over their courses but not their teachers conditional on courses.

The paper exploits this fact on teacher assignment by comparing two students that select the same course in a semester in a given high school but are assigned different teachers. Using a fixed effects strategy, the analysis would then compare two students with the same race, taking the same course but were assigned teachers of different races. Another specification used compared 9th grade students with the same race who took the exact same set of courses in the 9th grade but were assigned different teachers. This strategy reduced students sorting to a same-race teacher by 99%, suggesting that we’re eliminating almost all of the problematic student-teacher sorting.

### What We Discovered

First, the research examines the effect of matching with a same-race teacher in a course on course-level outcomes. Conditional on student and teacher fixed effects, Black and Asian students perform significantly better on standardized test scores and have higher pass rates in the class that they match with a same-race teacher. These students score better along both objective and subjective measurements of course performance with a same-race teacher, suggesting an increase in learning and not just preferential grading. There’s no significant effect for short-term race matching effects for White or Hispanic students.

Next, the research examines the longer-term effects of matching with a same-race teacher. The research looks at a student’s 9th grade teachers and examines the effect of having an additional same-race teacher on the likelihood of graduating from high school and enrolling in college. To minimize non-random sorting, similar students are compared that selected the exact same set of courses but received teachers of different races. There are large effects from race matching for minority students in high school graduation and college enrollment. Hispanic and Asian students become significantly more likely to graduate high school with an additional same-race teacher. One additional race match for

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<sup>4</sup> Clotfelter, Ladd and Vigdor (2006); Rivkin, Hanushek and Kain (2005); Paufler and Amrein-Beardsley (2014); Rothstein (2009); Koedel and Betts (2011)

Black and Hispanic students significantly increases their likelihood of enrolling in college by 1 p.p. (2%) and 1.5 p.p. (3.4%), respectively. There are also small, significantly positive effects for race matching for White students on two-year college enrollment.

Race matching in a subject in high school has strong effects for college major choice, especially for Science, Technology, Engineering, and Math (STEM) fields. One additional same-race STEM teacher in high school for Black and Hispanic students increases a student's likelihood of majoring in STEM as a college freshman by 0.7 p.p. (8.6%) and 0.6 p.p. (6.6%), respectively. An additional Hispanic teacher in social sciences for a Hispanic student increases their likelihood of majoring in social sciences by 0.3 p.p. When examining major choice one concerning pattern is that Black and Hispanic students in college are less likely to major in STEM fields, which have larger wage premiums (Altonji, Blom and Meghir, 2012). These differences in major choice could contribute to racial income gaps. My findings paired with the dearth of Black and Hispanic students in STEM fields suggest a need to train and hire more STEM minority teachers.

## **Discussion/Policy Recommendations**

The obvious policy recommendation is to increase training and hiring of minority teachers. In particular, training and hiring additional Black and Hispanic teachers would go a long way in increasing high school completion and college enrollment for Black and Hispanic students who are traditionally underrepresented in higher education. These results also suggest that additional Black and Hispanic STEM teachers would increase their likelihood of majoring in STEM, a more lucrative degree path where Black and Hispanic students have also been traditionally underrepresented.

To examine how a more representative teaching population would affect students, I ran 5,000 Monte Carlo simulations where I randomized the teachers' races such that it would match the distribution of students' race at a given school. For instance, if a school had a student population that was 20% Black, 60% Hispanic, 5% Asian, and 15% White, then I would force the distribution of teachers to match that student distribution. Next, I see how many additional or fewer race matches each race of students receives and estimate how high school graduation and college enrollment would change. I find large increases in Hispanic high school graduation and college enrollment and relatively small decreases for White students. Specifically, my back-of-the-envelope calculations suggest that a representative teaching population would increase the aggregate high school graduation rate by 0.5 p.p. or about 2,500 additional students graduating high school and would increase the aggregate college enrollment rate by 0.8 p.p. or about 4,000 additional students enrolling in college.

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