



White Advantage in Teacher Assignment

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WHITE ADVANTAGE IN TEACHER ASSIGNMENT¹

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Abstract

Using detailed classroom-level data for North Carolina, we build on previous research to examine racial gaps in access to high-quality teachers. We calculate the exposure of White, Black and Hispanic students to teachers with various characteristics in 4th grade, 7th grade math and English, and 10th grade math and English. We find that across the state White students enjoy sizable advantages over both Black and Hispanic students in the form of higher exposure to teachers with strong credentials and lower exposure to teachers with weak credentials. Remarkably, we also find this pattern of White advantage in most individual counties, with the largest White advantage occurring in the largest counties by enrollment. A decomposition of the White advantages shows that the bulk of them can be attributed to differences across counties and differences between schools within counties. Only in 10th grade are differences across classrooms within schools important in explaining the White advantage.

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WHITE ADVANTAGE IN TEACHER ASSIGNMENT

At a moment when systemic discrimination has burst into the national conversation, we examine racial and ethnic disparities in the provision of an essential government service: K-12 public education. In this article, we build upon previous research, particularly Goldhaber, Quince and Theobald's (2018) study of teacher assignments. As those authors acknowledge, recognition of systematic disparities in exposure to high quality teachers is by no means new.² What is new is the unprecedented attention now being paid to systemic inequalities instigated or tolerated by government itself. Our aim here is to build on the existing evidence of systemic disparities using more detailed and more recent data from North Carolina.

Background

In their 2018 study, Goldhaber et al. present a sweeping “descriptive history” of teacher quality gaps in the states of Washington and North Carolina over a period spanning nearly two decades. Dividing students alternatively by broad racial category and economic status and differentiating teachers using three different measures, the authors conclude that teacher quality gaps are “pervasive” and by no means a new feature of public schools. In a second study, covering just North Carolina, Bastian (2021) measured differences in students' exposure to teachers with various characteristics. The study aggregated data for

² See, for example, Lankford, Loeb and Wyckoff (2002); Clotfelter, Ladd, and Vigdor (2005); Sass, Hannaway, Xu, Figlio and Feng (2010); Kalogrides and Loeb (2013); Isenberg et al (2013); and Goldhaber, Lavery and Theobald (2015).

all “core content” classes in grades K to 12 in traditional public schools, finding sizable differences by race and economic status.³

In the present paper, we use detailed classroom-level data for 2017 to amplify the findings of Goldhaber et al. and Bastian in four ways. First, we take advantage of North Carolina’s diversity to make separate calculations for White-Black gaps and White-Hispanic gaps. The historical context surrounding discrimination against Black students in North Carolina’s schools differs starkly from that related to the state’s much shorter history of Hispanic students and provides a compelling reason to examine the two groups separately. We confine our analysis to just these three racial groups because they constitute the bulk of all students in the state. Second, we extend the grade coverage of Goldhaber et al. (2018) and provide more detail than the Bastian (2021) analysis. Whereas the bulk of Goldhaber et al (2018) covered just grades 3-5, our analysis covers grades in elementary, middle, and high schools. We also use more recent data that allows us to associate students with their classroom teacher rather than the teacher who proctored their end-of-grade exam. While Bastian (2021) uses information spanning all K-12 grades, we look separately at five grade/subject sets of courses. Third, we supplement statewide results with evidence on teacher quality gaps in individual counties to assess the prevalence of disparities across the state. Fourth, we decompose the racial gaps in exposure to experienced teachers into portions attributable to differences, respectively, across counties, between schools within counties, and between classrooms within schools. We calculate this decomposition for

³ Teacher characteristics included inexperience, National Board certification, and measures of prior performance. Among other findings were that 10.4% of low-income Black students were taught by novice teachers, compared to 5.4% for white higher-income students.

various grade levels to enrich the more limited decompositions reported in Goldhaber et al. (2018, Table 2).

Data and Method

To determine the characteristics of teachers assigned to students by race and ethnicity, we assembled administrative data at the classroom level for a variety of grades and subjects. Specifically, we examine five sets of classes across the state in all public schools, including charter schools: 4th grade, 7th grade English, 7th grade math, 10th grade English, and 10th grade math. In selecting which courses to use to identify classes, we allowed for variation across school districts and schools in curricular configurations.⁴ For each classroom section, we matched the teacher with separate data on teachers' licensure, experience, certification, and teacher test information. We also have for each section the racial and ethnic composition of students, where students are classified according to their self-identified membership in one of three racial/ethnic groups: non-Hispanic Black or African American; Hispanic or Latino/Latina/Latinx; and non-Hispanic White. For these categories we use the familiar shortened terms of Black, Hispanic, and White, respectively. Students in other ethnic groups are not considered in the study.⁵

To gauge teacher quality, we defined six dichotomous measures, three indicating strong teacher credentials and three indicating weak credentials. The indicators of strong credentials were: *experienced* (five or more years of teaching experience), *high teaching test score* (a score on the Praxis test in the top quartile of all teachers in the sample), and

⁴ See Appendix A for a description of our method.

⁵ We exclude them because of their very small shares relative to the three main groups of interest for this study: Black, White and Hispanic.

National Board Certification.⁶ The indicators of weak credentials were: *inexperienced* (two or fewer years teaching experience), *low teaching test score* (a score on the Praxis test in the bottom quartile of all teachers in the sample), and *not certified* in the area of teaching.

Our aim is to determine whether and by how much schools are systematically favoring White students over Black and Hispanic students. To do this, we compare, for each of our six indicators of teacher quality, the exposure of White, Black, and Hispanic students to teachers possessing these characteristics. “Exposure” is measured simply by the share of students who had a teacher with a given characteristic. For simplicity, we summarize our findings in terms of “White advantage” which is based on the assumption that positive differences for strong credentials are comparable to negative differences for weak ones. To illustrate for one category of weak credentials, we report below that 11% of White 7th graders across the state in 2017 had inexperienced math teachers (two years of teaching or less), whereas the corresponding proportions for Black and Hispanic 7th graders were 18% and 16%, respectively. Given those different exposure rates to inexperienced teachers, we say that White 7th grade math students had an advantage over their Black and Hispanic peers.

Findings

Our statewide findings are summarized in Figure 1, which shows the average exposure rates of students to teachers possessing both weak and strong credentials, along with the corresponding confidence intervals. For each of our six measures and each of the

⁶ Uncertified in field includes teachers without any license or certified but not in their assigned teaching area. Information on teachers is based on the North Carolina Education Research Center data sets: Licensure-Salary Pay Snapshots, Licensure-Salary Test Snapshots, Licensure Snapshots, and National Board Certification. Standardization of Praxis scores was performed for the year in which a teacher took the test. The indicators of strong and weak teacher quality that we use here have often been associated, respectively, with high or low student achievement. See, e.g., Clotfelter, Ladd and Vigdor (2006).

five grade/subject levels, the three indicators show the average statewide exposure rates for White, Black, and Hispanic students. For example, the first panel shows that 78% of White students in 7th grade math had teachers with five or more years of experience, compared to only 68% of Black students and 71% of Hispanic students in that grade. The panel also shows that White students at the other four grade/subject levels similarly had the highest exposure rates to experienced teachers. Indeed, the figure makes very clear that White students enjoyed an advantage at almost every grade/subject level and measure of teacher credentials in that they had higher exposure rates to teachers with strong credentials and lower exposure rates to teachers with weak ones. Black students, by contrast, were most likely to have teachers with weak credentials and least likely to have teachers possessing strong credentials. In most cases, the exposure rates of Hispanic students were somewhere in between in those of the White and Black students. This figure is a striking illustration of the advantage typically enjoyed by White students in the state's public schools in terms of their assigned teachers.

To see whether these statewide racial disparities are widespread or simply due to differences in just a few communities, we performed similar comparisons for each of the 50 largest counties.⁷ For each county, we calculated the average exposure rate by race for every one of the 30 possible comparisons (five grade/subject levels by six measures of teacher credentials). We then counted the number of comparisons in which White students had an advantage (higher exposure to strong ones or lower exposure to weak credentials) over Black or Hispanic students. Analogously we counted the number of comparisons for

⁷ Size was measured by the total enrollment of White, Black, and Hispanic public school students in the county.

which either Black or Hispanic students were at an advantage. These county-by-county calculations are reported in Figure 2, which shows the number of comparisons for which White students had an advantage and the number for which either Black or Hispanic students had an advantage. For the relatively few comparisons in which White students had the same exposure rate as the comparison group of students, no advantage is recorded either way.⁸

To illustrate the figure's construction, consider the state's largest county, Wake, home to the capital city of Raleigh. Out of our 30 comparisons, White students held an advantage over Black students in 27 and were at a disadvantage in only three.⁹ With respect to Hispanic students, White students in Wake had an advantage in 26 of the 30 comparisons, while the reverse was the case in just four.¹⁰ As the Figure makes clear, Wake County had one of the most one-sided showings of White advantage in the state.

Surveying the White-Black comparisons across all of the 50 largest counties reveals that White students had an advantage in more comparisons than did Black students in 43 of these 50 counties, while White students were at a net disadvantage in just five (the remaining two counties being equal), a one-sided outcome that is simply astounding. In

⁸ The most common reason for equal exposure rates for different racial groups is that either all or none of the teachers in a county in a certain grade/subject possessed a given characteristic, thus guaranteeing that all students would have the same exposure rate, 100% for that grade/subject to teachers with that characteristic.

⁹ In Wake County, Black students in 7th grade math and 10th grade English were more likely than White students to be assigned experienced teachers, and in 10th grade English classes they were less likely to have teachers who had low Praxis scores. In all other 27 comparisons, White students in Wake County had the advantage compared to Black students, based on our indicators of teacher quality.

¹⁰ The four comparison for which Wake County Hispanic students enjoyed an advantage of their White peers were these: in 7th grade math they were more likely than White students to have an experienced teacher and less likely to have a teacher not certified in math; in 10th grade English they were more likely to have a National Board certified teacher; and in 10th grade English they were less likely to have a teacher with a low Praxis score. In the remaining 26 comparisons, White students were more likely than Hispanic students to have teachers with indicators of high quality and less likely to have teachers with indicators of weak credentials.

the comparison between White and Hispanic students, the pattern of White advantage was only slightly less one-sided, but it was nonetheless stark. Among the largest 50 counties, White students had an advantage relative to Hispanic students in 35 counties and were at a disadvantage in 10, with five counties showing an equal number of instances of White and Hispanic advantage.

As suggested by Figure 2, the White advantage in teacher assignments tends to be greatest in the counties with the most students. Descriptive regressions (not reported here) show that the White advantage was not only greater in the larger counties but it also tended to be higher in districts characterized by more racial/ethnic segregation of students across classrooms. We defer to the next section, the policy implications of the statewide patterns. The key point here is that it was common in North Carolina's public schools for White students to enjoy an advantage over both Black and Hispanic students in their exposure to experienced, able, and strongly-credentialed teachers—a resource that is acknowledged to be one of the potent instruments provided by government for building human capital and promoting equal opportunity.

Linking the sources of disparities to policy remedies

The statewide disparities could be attributable to racial differences of three types. One possibility is that the disparities result in part from differences between counties. That would be the case, for example, if White students were more likely than students of color to live in counties able to attract unusually large shares of high quality teachers, perhaps because of the counties' strong economies or their above-average teacher salaries. A second possible contributor to the statewide advantage for White students is racial differences between schools within counties in the exposure to strong teachers, a

possibility that could come about only in the presence of racially segregated schools within counties. Prior research suggests that schools enrolling higher proportions of White students appear to be more attractive to high quality teachers than schools attended by higher proportions of students of color, many of whom may be low performing or economically disadvantaged.¹¹ A third possible contributor to the statewide teacher quality gaps is differences across classrooms within schools, an outcome that would require that students be distributed unevenly by race across a school's classrooms. For example, White students may be more likely than students of color to be enrolled in advanced classes taught by highly qualified teachers or, even with no difference in the rigor of classes, to find their way into classrooms known to be taught by the stronger teachers.

To reduce racial gaps in exposure to strong teachers, education policy makers at both the state and local school levels would need to radically rethink their policies. For example, to the extent that the gaps reflect salary differences across counties, state level policy makers would need to revamp their policies regarding teacher salaries and related funding and support services. The state of North Carolina has a statewide uniform salary schedule, which by itself should help to minimize salary differences across counties. However, local districts are allowed to supplement the state salaries with local funds. Except to the extent that these supplements simply compensate teachers for differences across counties in the cost of living, they typically add to other attractions of urban areas, noted above, to give wealthier counties a decided edge in attracting and retaining good teachers. The equity challenge for state policy makers is to determine how far to go in

¹¹ See, for example, Clotfelter, Ladd and Vigdor (2011) for evidence from North Carolina and references to prior research on this question.

modifying state funding and teacher support policies, including, for example, attention to housing opportunities for teachers in rural areas, to make all counties equally attractive to quality teachers.

The second source of disparities, namely those between schools within counties, requires action at the county level (which in most cases correspond to school districts in North Carolina). The most obvious policy change, but not the easiest to implement, would be for district policy makers to reduce the degree to which their schools are racially segregated. That would require redrawing school attendance zones or pursuing policies to reduce residential segregation. Another policy option would be to take steps to reduce the tendency for experienced teachers to cluster in certain schools.¹² Such a change would probably mean eliminating the fairly standard practice of giving preference to experienced teachers who wish to move from one school to another. Districts might also try boosting salaries for experienced teachers willing to teach in schools serving large proportions of disadvantaged students. As documented by Clotfelter et al. (2011), however, the pay differential required to induce teachers with strong qualifications to remain in such schools is likely to be prohibitively high. That is because, compared to less qualified teachers, teachers with strong qualifications tend to be both more averse to teaching in such schools and less responsive to salary differentials.

Turning to the third possible source of disparities, differences within schools, the policy options are well known and vigorously debated. Numerous studies have clearly

¹² To reflect this clustering, we calculated dissimilarity indices between experienced teachers (those with five or more years of experience) and all other teachers. The calculated indices suggest a high degree of clustering: 0.67 in 4th grade, 0.66 in 7th grade English, 0.67 in 7th grade math, 0.51 in 10th grade English, and 0.48 in 10th grade math.

shown the connection between academic tracking and other practices of grouping students into classrooms and various forms of within-school segregation (see, for example, Mickelson 2001; Lucas and Berends 2007; Kalogrides and Loeb 2013; Clotfelter, Ladd, Clifton and Turaeva, 2021).

In deciding which public policies might be effective in reducing racial disparities of the sort we have identified, it would be useful to know the extent to which the statewide disparities at each grade level are attributable to differences across counties, across schools within counties or across classrooms within schools. To this end, we describe here a method for decomposing the statewide gaps at each grade and subject level into the three sources. Although it would be possible to do so for each of our six teacher characteristics, we decompose the racial teacher quality gaps here for a single measure – teachers with more than five years of experience. The greater is the contribution to statewide quality gaps of county level differences, the stronger is the argument for state level policies to reduce them. In contrast, significant contributions of differences across schools within counties or across classrooms within schools, imply the need for local or school-level policy responses.

To decompose the overall racial gaps in the selected measure of teacher quality, having five or more years of teaching experience, we begin by calculating the following four actual or hypothetical statewide exposure rates of students separately for each of the three student groups (where g refers to Whites, Blacks or Hispanics) and also separately for each of our five grade/subject categories:

E_g = actual exposure rate of group g students to experienced teachers

E_g^* = hypothetical exposure rate if there were no disparities within schools

E_g^{**} = hypothetical exposure rate if there were no disparities across schools within counties

E = student-weighted proportion of teachers who are experienced

The difference between a group's actual exposure rate (E_g) and the statewide proportion of experienced teachers (E) may then be divided into three pieces, where ($E_g - E_g^*$) is the portion due to disparities within schools; ($E_g^* - E_g^{**}$) is the portion due to disparities between schools within counties, and ($E_g^{**} - E$) is the portion due to disparities across counties.

Table 1 illustrates this decomposition for each of the 10 subject/grade categories for experienced teachers. (See Appendix B for a more detailed explanation of the decomposition method.) Each of the entries in the row labeled "Total racial gap" corresponds to the gaps in exposure to experienced teachers that are visible in Figure 1 above. For example, consider the White-Black entry for 7th grade math. Consistent with Figure 1, the 0.098 W-B racial gap corresponds to the difference between the 0.776 exposure rate for Whites and the 0.677 exposure rate for Blacks. Similarly the 0.069 White-Hispanic racial gaps corresponds to the difference between the 0.776 exposure rate for Whites and the 0.706 exposure rate for Hispanics. The bottom three lines of the table show the portions of the racial gaps that are due to the three mechanisms. For example, for grade 7 math, the table shows that only 0.4 percentage points of the White-Black gap can be attributed to differences across classrooms within schools, 2.9 points to differences between schools within counties and 6.5 points to differences across counties. Although the gaps in exposure between White and Hispanic students are somewhat smaller, the relative contributions of the three sources are similar.

Based on the 10 grade/subject categories shown in the table, we draw the following conclusions. First, our calculations suggest that differences across classrooms within

schools make at most a limited contribution to the overall magnitude of teacher quality differentials, a finding that is consistent with the findings for grades 3-5 reported in the working paper form (CALDER 2016) of Goldhaber et al. (2018). The only grade/subject for which we find that within-school disparities explain an appreciable amount of overall disparities in exposure to experienced teachers is 10th grade math.¹³ The limited contribution of within-school differences implies that efforts by school principals to redistribute their teachers and students across classrooms within their schools will do little, in most cases, to reduce the teacher quality advantage for White students.

Second, the contributions of the other components differ by grade and subject. The table shows that the largest contributor (about 2/3) to the White advantage in grade 4 is differences across schools within counties. Because this pattern undoubtedly reflects significant segregation of students by race and ethnicity across elementary schools within North Carolina counties (which, in most cases, are also school districts), it implies that the main way to reduce the White advantage at this level would be for local counties to take actions to minimize the racial and ethnic segregation of their elementary schools. For reasons we cited earlier, efforts to supplement that strategy with salary differentials to offset the aversion of high quality teachers to schools with high proportions of disadvantaged students is likely to be very costly.

In contrast, the largest contributor to the White advantage in grade 7 for both math and reading is differences between counties. This pattern most likely reflects not only differences in the racial compositions of individual counties, but also differences in other

¹³ The importance of within school teacher quality gaps for 10th grade math parallels our findings related to classroom level segregation (Clotfelter, Ladd, Clifton, and Turaeva, 2021).

factors that affect their ability to attract and retain high quality teachers. This being the case, the responsibility for reducing the overall White advantage would lie, at least in part, with state policy makers who would face the challenge of designing a teacher salary and funding system that would be effective in equalizing the quality of teachers across counties.

The picture is more mixed at the 10th grade level, where between-school and between-county factors both contribute significantly to the White advantage in 10th grade reading and all three factors contribute to the White advantage in 10th grade math. These patterns imply that a combination of state level and local level policies would be needed to reduce the White advantage of students in grade 10 reading, while the White advantage in grade 10 math would also require attention to how students and teachers are distributed among classrooms within schools.

Public policy and the inequity agenda

Our finding of pervasive and substantial racial gaps in students' exposure to strong and weak teachers indicate a clear teacher-quality advantage for White students in North Carolina. We find gaps between White and Black students and between White and Hispanic students; we find gaps in 4th grade and in both math and English courses in 7th and 10th grades. Moreover, we find gaps in many different counties. The two main sources of these gaps, judging from one of our indicators of teacher quality, are differences across counties and differences between schools within counties. To a limited extent, quality gaps are also due to differences in classroom assignments within schools. For states such as North Carolina to address these gaps, policy makers will have to confront patterns of racial and ethnic segregation head on and develop policy instruments to counter their effects.

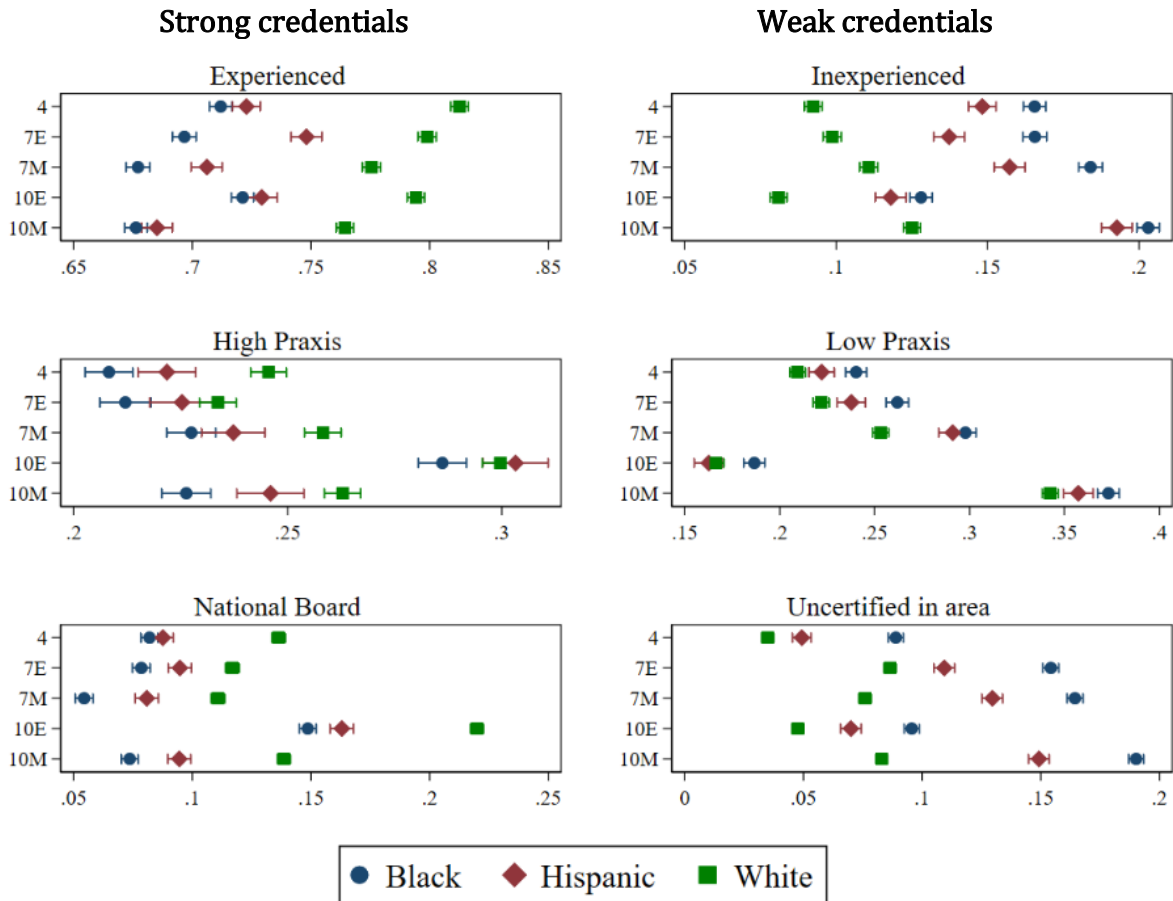
The persistence of such gaps suggests, however, that achieving equity on this front has not been a high priori for policy makers.

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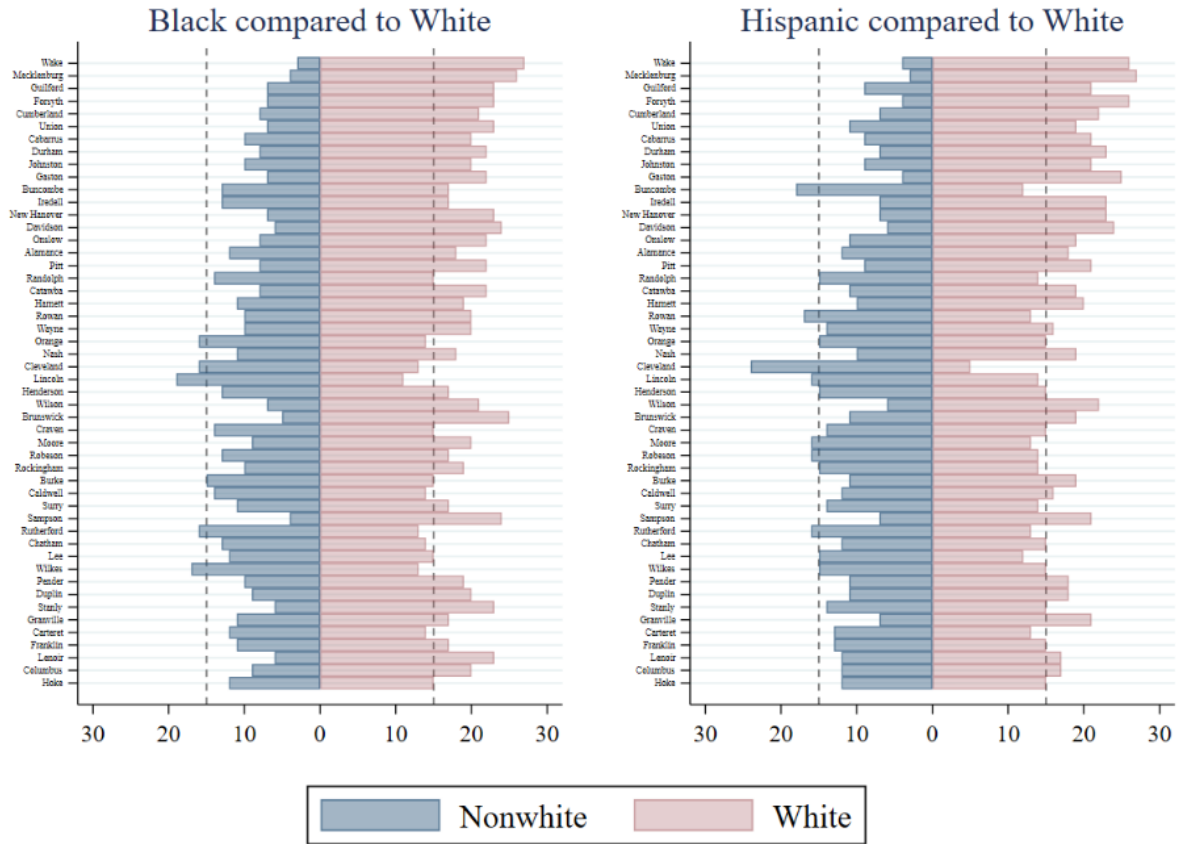
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Figure 1. Average Exposure to Teachers with Weak and Strong Credentials, by Students' Race/Ethnicity, 2017



Note: figure shows the share of students by race/ethnicity who had teachers with various traits. Characteristics are defined as follows: Experienced—five or more years of teaching experience; High Praxis—a score in the top quartile in the statewide teacher qualifying exam; National Board—National Board certified; Inexperienced—two or fewer years of teaching experience; Low Praxis—a score in the bottom quartile in the statewide teacher qualifying exam; Uncertified in area—no certification or not certified in area of teaching assignment. Source: North Carolina Education Research Data Center, Course Membership the North Carolina Education Research Center data sets: Licensure-Salary Pay Snapshots, Licensure-Salary Test Snapshots, Licensure Snapshots, and National Board Certification.

Figure 2. Frequency of White Advantage in Credentials of Assigned Teacher, Largest 50 Counties in North Carolina, 2017
 (Bars to the right of 0 indicate instances of White advantage; those to the left show instances of White disadvantage)



Note: In the left panel, bars to the right of 0 show the number of White-Black comparisons from among 30 comparisons (five grade and subject levels and six teacher characteristics) in which White students had a statistically significant advantage in the proportion who had teachers with either weak or strong characteristics and bars to the left of 0 show the number of comparisons in which White students had a disadvantage compared to Black students. Bars on the right part of the figure report the comparable counts regarding White and Hispanic students.

Table 1. Decomposition of Racial/Ethnic Gaps in Exposure to Experienced Teachers, 2017

	4		7E		7M		10E		10M	
Racial gaps	W-B	W-H	W-B	W-H	W-B	W-H	W-B	W-H	W-B	W-H
Total racial gap	0.101	0.090	0.102	0.051	0.098	0.069	0.073	0.065	0.088	0.079
Portion due to										
Within schools	0.003	0.005	0.006	0.006	0.004	0.001	-0.001	0.005	0.019	0.020
Between schools	0.066	0.060	0.027	0.019	0.029	0.026	0.031	0.035	0.041	0.036
Between counties	0.031	0.024	0.070	0.025	0.065	0.043	0.043	0.025	0.027	0.023