Minority Teacher Recruitment, Employment, and Retention: 1987 to 2013

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LEARNING POLICY INSTITUTE

SEPTEMBER 2017

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Acknowledgments

The authors would like to thank Patrick Shields of the Learning Policy Institute for textual suggestions to this report. In addition, we thank Naomi Spinrad, Bulletproof Services, Gretchen Wright, and Penelope Malish for their editing and design contributions to this project, and Lisa Gonzales for overseeing the editorial process. Without the generosity of time and spirit of the aforementioned, this work would not have been possible.

This research drew from earlier studies that were supported by the Albert Shanker Institute, and Sally Hewlett and the Flora Family Foundation. Research in this area of work is funded in part by the S. D. Bechtel, Jr. Foundation. Core operating support for the Learning Policy Institute is provided by the Ford Foundation, the William and Flora Hewlett Foundation, and the Sandler Foundation.

External Reviewers

This report benefited from the insights and expertise of two external reviewers: Gloria Ladson-Billings, Kellner Family Chair in Urban Education at the University of Wisconsin in Madison; and Matthew Kraft, Assistant Professor of Education and Economics at Brown University. We thank them for the care and attention they gave the report. Any remaining shortcomings are our own.

The appropriate citation for this report is: Ingersoll, R., May, H., & Collins, G. (2017). *Minority teacher recruitment, employment, and retention: 1987 to 2013*. Palo Alto, CA: Learning Policy Institute.

This report can be found online at https://learningpolicyinstitute.org/product/minority-teacher-recruitment.

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Executive Summary

This study examines and compares the recruitment, employment, and retention of minority and nonminority school teachers over the past quarter century. Our objective is to empirically ground the debate over minority teacher shortages. The data we analyze are from the National Center for Education Statistics' nationally representative Schools and Staffing Survey (SASS) and its longitudinal supplement, the Teacher Follow-Up Survey (TFS).[1]

Our data analyses show that a gap persists between the percentage of minority students and the percentage of minority teachers in the U.S. school system. But this gap is not due to a failure to recruit new minority teachers. Over the past two and a half decades, from 1987 to 2012, the number of minority teachers has more than doubled, outpacing growth in both the number of nonminority teachers and the number of minority students. Minority teachers are also overwhelmingly employed in public schools serving high-poverty, high-minority, and urban communities. Hence, the data suggest that widespread efforts over the past several decades to recruit more minority teachers and employ them in hard-to-staff and disadvantaged schools have been very successful.

Over the past two and a half decades, turnover rates among minority teachers have been significantly higher than among nonminority teachers.

However, the data also show that over the past two and a half decades, turnover rates among minority teachers have been significantly higher than among nonminority teachers. Though schools' demographic characteristics appear to be highly important to minority teachers' initial employment decisions, this does not appear to be the case for their later decisions to stay or depart. Neither a school's poverty-level student enrollment, nor a school's minority student enrollment, nor a school's proportion of minority teachers, nor whether the school was in an urban or suburban community was strongly or significantly related to the likelihood that minority teachers would stay or depart, after controlling for other background factors.

In contrast, organizational and working conditions in schools were strongly related to minority teacher departures. Indeed, once organizational conditions were held constant, there was no significant difference in the rates of minority and nonminority teacher turnover. While the number of minority teachers has increased, the schools in which they have disproportionately been employed have had, on average, less positive organizational conditions than the schools where nonminority teachers are more likely to work, resulting in disproportionate losses of minority teachers. The organizational conditions most strongly related to minority teacher turnover were the level of collective faculty decision-making influence and the degree of individual classroom autonomy held by teachers. Schools with more individual teacher classroom autonomy and schools with higher levels of schoolwide faculty decision-making influence had far lower levels of turnover; these factors were more significant than were salary, professional development, or classroom resources.

Introduction

Over the past several decades, a shortage of minority school teachers has been an issue of national importance. Numerous scholars and commentators have argued that there is a growing mismatch between the degree of racial/ethnic diversity in the nation's student population and the degree of diversity in the nation's elementary and secondary teaching force.[2] Typically, critics have held that as the nation's population, and in turn the nation's student body, has grown more diverse, the teaching force has not kept pace. Some go further—arguing that the teaching force has changed in the opposite direction, becoming even less diverse and more homogeneously White.[3]

Critics make three related arguments for why this mismatch is detrimental and why increasing the racial/ethnic diversity of the teaching force would be beneficial. The first focuses on demographic parity. This argument holds that minority teachers are important as role models for both minority and nonminority students. The underlying assumption is that the racial/ethnic makeup of the teaching force should reflect that of the student population, as well as that of the larger society. With increasing racial/ethnic diversity in the larger society, proponents hold, there is accordingly a growing need for more minority teachers as role models in schools.[4]

Defining Our Terms

Throughout this study, our definitions of minority teachers and nonminority teachers are based on Census Bureau classifications of race/ethnicity. "Nonminority" refers to those identified as "White, non-Hispanic." We use these two terms interchangeably. "Minority" includes those identified as: Black/African American; native Hawaiian/Pacific/Islander or Asian; Native American/Indian/Alaska Native; Hispanic/Latino; and those of multiple races. "Hispanic/Latino" refers to ethnicity and includes those of all races. It is important to recognize that over half of those identifying as Hispanic also identify as White. Hence, the term "person of color" is not synonymous with minority, and, for clarity, we will not use the former term.

A second related argument focuses on what is often called "cultural synchronicity."[5] This view holds that minority students benefit from being taught by minority teachers, because minority teachers are likely to have "insider knowledge" due to similar life experiences and cultural backgrounds. The assumption is that synchronicity is a valuable resource in teaching and learning.[6] Proponents of this view cite a growing number of empirical studies showing that minority teachers have a positive impact on various outcomes for minority students.[7]

A third related argument concerns teacher shortages in disadvantaged schools. Minority teachers not only are likely to be well suited to teach minority students, this view holds, but they are also likely to be motivated by a "humanistic commitment" to making a difference in the lives of disadvantaged students. In turn, this argument holds, minority teachers are more likely than nonminority candidates to seek employment in schools serving predominantly minority student populations, often in low-income urban school districts.[8] Research has shown that these same kinds of schools—urban, poor public schools serving minority students—disproportionately suffer from general teacher shortages.[9] Hence, diversification of the teaching force in this view is a solution to the more general problem of teacher shortages in disadvantaged schools.

As a result of these various factors—a lack of minority teacher role models, insufficient cultural synchronicity between teachers and minority students, and a general dearth of qualified teachers in disadvantaged schools—some have concluded that the minority teacher shortage has resulted in

unequal access to adequately qualified teachers and, hence, to quality teaching, in poor urban public schools serving minority students. Unequal access to educational resources, such as qualified teachers, has long been considered a primary cause of the stratification of educational opportunity and, in turn, the achievement gap—and, ultimately, unequal occupational outcomes for disadvantaged students.[10]

Some have argued that there are several factors behind the insufficient employment of minorities in teaching.[11] These factors concern different stages in the labor supply pipeline into the teaching occupation. One prominent factor, some argue, has been that minority student underachievement in elementary and secondary education has resulted in fewer minority students entering the postsecondary level, and lower graduation rates for those who do enter higher education.[12] In turn, as career and employment options available to minorities have broadened, a decreasing share of this shrinking number of minority college graduates have entered teaching. In addition, critics hold, when minority candidates do seek to enter teaching, the growth of occupational entry tests, coupled with lower pass rates on these tests by minority teaching candidates, has meant that fewer minority candidates are successful.

Some have concluded that the minority teacher shortage has resulted in unequal access to adequately qualified teachers and, hence, to quality teaching, in poor, urban public schools serving minority students.

The prevailing policy response to these minority teacher staffing problems has been to attempt to increase the supply of minority teachers.[13] Over the past several decades, organizations such as the Education Commission of the States,[14] the American Association of Colleges for Teacher Education,[15] and the National Education Association[16] have advocated for and implemented a wide range of initiatives designed to recruit minority candidates into teaching. Beginning in the late 1980s, the Ford Foundation, the DeWitt Wallace-Readers' Digest Fund, and other foundations committed substantial funding to recruiting and preparing minority teachers. These efforts have included future educator programs in high schools, partnerships between community colleges with higher minority student enrollments and 4-year colleges with teacher education programs, career ladders for paraprofessionals already in the school system, and alternative certification programs.[17] Many of these initiatives are designed to recruit minority teachers to teach in schools serving predominantly minority student populations, often in low-income urban school districts. Some of these initiatives are designed to recruit male minority teachers, in particular—often considered the group in shortest supply.[18]

Given the importance of this issue and these questions, not surprisingly, there has been a large and growing body of empirical research evaluating the significance of the racial/ethnic composition of the teaching force, especially its relationship to student growth and learning. Much of this work focuses on the degree of match or mismatch between the race/ethnicity of students and that of their teachers, and to what extent this match is tied to various student achievement outcomes.[19]

In contrast, there has been a surprisingly limited amount of empirical investigation of the basic levels, trends, and distribution of the demographic characteristics of the teaching force. In particular, there has been little original empirical examination, especially using nationally representative data, of how the racial/ethnic character of the teaching force has changed over recent decades, to what extent there is—or is not—sufficient employment of minorities in teaching, and the sources of minority teacher staffing problems.

Underlying most of the commentary and policy on this issue has been the assumption, largely untested, that minority teacher staffing problems are rooted in the front end of the teacher supply pipeline. The assumption has been that an inadequate initial supply, coupled with barriers to entry, are the main reasons that insufficient numbers of minority teachers are employed. Thus, attention has tended to focus on identifying obstacles to recruiting minority candidates into teaching and, in turn, developing strategies to overcome these obstacles.[20]

Little attention has been paid to where minority teachers tend to be employed, what happens to minority teachers once they are employed, or the role of the employing organizations in teacher staffing problems.

In contrast, little attention has been paid to where minority teachers tend to be employed, what happens to minority teachers once they are employed, or the role of the employing organizations in teacher staffing problems. Moreover, relatively less attention has been paid to the exit end of the pipeline and the role of teacher turnover—the departures of teachers from schools—in these shortages and staffing problems.[21] In general, as one comprehensive review concluded, empirical research on minority teacher turnover has been limited, has had mixed findings, and has been inadequate to help policy address the magnitude, determinants, and consequences of minority teacher turnover, or to understand the implications of retention and turnover for shortages.[22] This study seeks to address these gaps.

The Study

This study uses nationally representative data to empirically ground the debate over minority teacher shortages and changes in the minority teaching force. We examine trends in the recruitment, employment, and retention of minority teachers to address several sets of research questions:

Has the number of minority teachers changed?

In recent decades, what changes have there been in the numbers of minority students and numbers of minority teachers in the school system, and how does this compare with nonminority students and teachers? Is there more or less racial/ethnic diversity in the teaching force?

Where are minority teachers employed?

What is the distribution of teachers across the school system by their race/ethnicity? In which types of schools are minority teachers employed? Are minority teachers more likely than nonminority teachers to be employed in schools serving high-poverty, urban, and high-minority student populations?

How high is minority teacher turnover?

In recent decades, what have been the rates of minority teacher turnover? How do these compare to the turnover rates of nonminority teachers?

What are the sources of minority teacher turnover?

What are the reasons behind the turnover of teachers, and do they differ by teachers' race/ethnicity? What role do retirement, school demographic characteristics, and school organizational conditions play in the turnover of minority teachers, and how does this compare with nonminority teachers?

What is the role of minority teacher attrition in the staffing problems of schools and in the minority teacher shortage?

What is the overall magnitude of minority teacher attrition—teachers leaving teaching altogether? How have minority teachers' exit rates from teaching compared to their entry rates into teaching? If minority teacher attrition rates had been lower in recent decades, would it have made any significant difference in the growth in the total number of minority teachers employed?

In the next section, we describe our data sources and define key terms and measures. In the following sections, we present the results of our data analyses sequentially for each of our five research questions. We then conclude by discussing the implications of our findings for understanding and addressing the minority teacher shortage.

The data for this study come from the National Center for Education Statistics' (NCES) nationally representative SASS and its supplement, TFS. See the appendix for a detailed discussion of the study's data, measures, and methods.

Results

1. Has the Number of Minority Teachers Changed?

The data show that minority teachers continue to represent a small portion of the teaching force and that a gap persists between the percentage of minority students and the percentage of minority teachers in the U.S. school system. For instance, in the 2011–12 school year, 44% of all elementary and secondary students were minority, and only 17.3% of all elementary and secondary teachers were minority (see Table 1). This student-teacher gap also exists for each of the major minority subgroups, as illustrated in Table 2. For example, in 2011–12, while 21% of elementary and secondary students in the U.S. were Hispanic, only 7.5% of teachers were Hispanic. To provide context, in the top half of Table 1, we also include data on the racial/ethnic composition of the national population and of the portion of the nation's population (age 25 or older) with a bachelor's degree or higher.[23] These data indicate that in 2011–12, 37% of the nation's population were minorities, and 25% of the college-educated were minorities.

But the data also show that this student-teacher parity gap is not due to a failure to recruit minority teachers. The gap has persisted in recent years largely because the number of nonminority students has decreased, while the number of minority students has increased—leading to an increase in the proportion of all students that are minority.

While there is still not parity between the proportions of minority students and eachers in schools, the U.S. teaching force has grown more diverse by race/ethnicity since the late 1980s.

After a period of decline during the 1970s, elementary and secondary student enrollments began to grow steadily in the U.S., beginning in the mid-1980s and continuing. As Table 1 shows, over the two and a half decades between the 1987–88 and 2011–12 school years, the elementary and secondary student population as a whole increased by 19%. But this varied by the race/ethnicity of students. While the number of nonminority students decreased by 5% during those decades, the number of minority students increased by 93%.

The teaching force, as a whole, also increased over this same two-and-a-half decade period—strikingly, by 46%, a rate over two times the overall growth rate for students of 19%. Elsewhere, we present a closer examination of the reasons behind this relatively dramatic growth in the teaching force;[24] our focus here is on the increase of teachers by their race/ethnicity. From the late 1980s to 2012, the number of minority teachers more than doubled from about 325,000 to 666,000. While the number of nonminority teachers increased by 38%, the number of minority teachers increased by 104% (see Figure 1)—at about the same rate as the growth in the nation's minority population (see Table 1).

Even as the size of the teaching force grew, the proportion of the teaching force that is minority increased steadily—from 12% to 17% (see bottom row of Table 1). Hence, the data show that, while there is still not parity between the proportions of minority students and minority teachers in schools, the U.S. teaching force has grown more diverse by race/ethnicity since the late 1980s.

Table 1
Trends in the Nation's Population, K-12 Student Enrollment, and Teaching Force by Race/Ethnicity (1987–2012)

	1987–88 School Year	1990–91 School Year	1993–94 School Year	1999–00 School Year	2003–04 School Year	2007–08 School Year	2011–12 School Year	% Increase From 1987–88 to 2011–12
Population of U.S.	244,499,000	252,153,000	260,327,000	281,422,000	292,805,000	304,060,000	313,914,000	28
Number of Minorities	56,479,000	61,273,000	66,644,000	79,080,000	93,991,000	104,597,000	116,148,000	106
% Minority Population	23.1	24.3	25.6	28.1	32.1	34.4	37.0	
Population With Bachelor's Degree or Higher	Data Not Available	Data Not Available	36,544,000	44,845,000	51,748,000	57,787,000	60,046,000	
Number of Minorities			5,590,000	8,139,000	10,754,000	13,107,000	15,037,000	
% Minority Degree Holders			15.3	18.1	20.8	22.7	24.7	
Total K-12 Student Enrollment	45,220,953	44,777,577	46,592,207	50,629,075	52,375,110	53,644,872	53,988,330	19
Number Nonminority Students	31,641,098	31,213,142	31,895,394	32,700,441	32,419,640	31,864,127	30,164,827	-5
Number Minority Students	12,335,372	13,564,435	14,696,813	17,928,634	19,955,470	21,780,745	23,825,612	93
% Minority Students	27.3	30.3	31.5	35.4	38.1	40.6	44.1	
Total K-12 Teaching Force	2,630,335	2,915,774	2,939,659	3,451,316	3,717,998	3,894,065	3,850,058	46
Number Nonminority Teachers	2,303,094	2,542,720	2,564,416	2,933,591	3,113,249	3,252,234	3,183,837	38
Number Minority Teachers	327,241	373,054	375,243	517,725	604,749	641,830	666,221	104
% Minority Teachers	12.4	12.8	12.8	15.0	16.3	16.5	17.3	

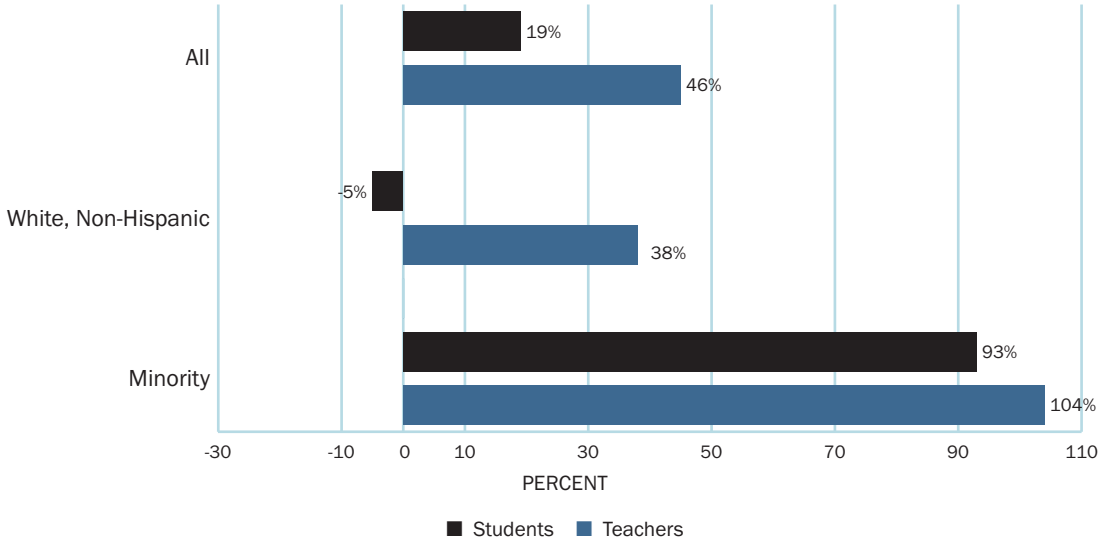
Table 2
Percentage of Students and Teachers by Race/Ethnicity (2011–12)

	Nonminority	Minority					
	Total	Total	*Black*	*Hispanic*	*Asian*	*Native American*	*Multiple Races*
Students	55.9	44.1	*14.4*	*21.2*	*5.1*	*1.2*	*2.3*
Teachers	82.7	17.3	*6.4*	*7.5*	*1.9*	*0.4*	*1.0*

There have also been some interesting differences in teacher race/ethnicity by teacher gender. Teaching has long been a predominantly female occupation and, in recent decades, it has become increasingly so.[25] But this varies by race/ethnicity. Over the two-and-a-half-decade period from 1987 to 2012, the number of nonminority male teachers increased by only 12%, but the number of minority male teachers increased by 109%. In 2011–12, males represented about 24% of all nonminority teachers and about 25% of all minority teachers.

The overall growth from 1987 to 2012 in the number of minority teachers also greatly varied across different minority subgroups and across different time periods. This is shown in Figures 2 and 3, which disaggregate the data in Figure 1 by both racial/ethnic group and time period.

Figure 1
Percent Change in Students and Teachers by Race/Ethnicity (From 1987–88 to 2011–12)



During the 20-year period from 1987 to 2008, both the overall number of teachers and the overall number of students increased. Moreover, with one exception, growth in minority teachers outpaced growth in minority students (see Figure 2). While the number of nonminority teachers increased by 41%, the number of Hispanic teachers increased by 245% and Asian teachers by 148%. Black teachers also grew in number, but at a far slower rate. The one exception to this growth was Native American teachers, who declined in number by 30%. Native Americans comprise only 1% of students and less than half a percent of the teaching force.

Figure 2
Percent Change in Students and Teachers by Race/Ethnicity (From 1987–88 to 2007–08)

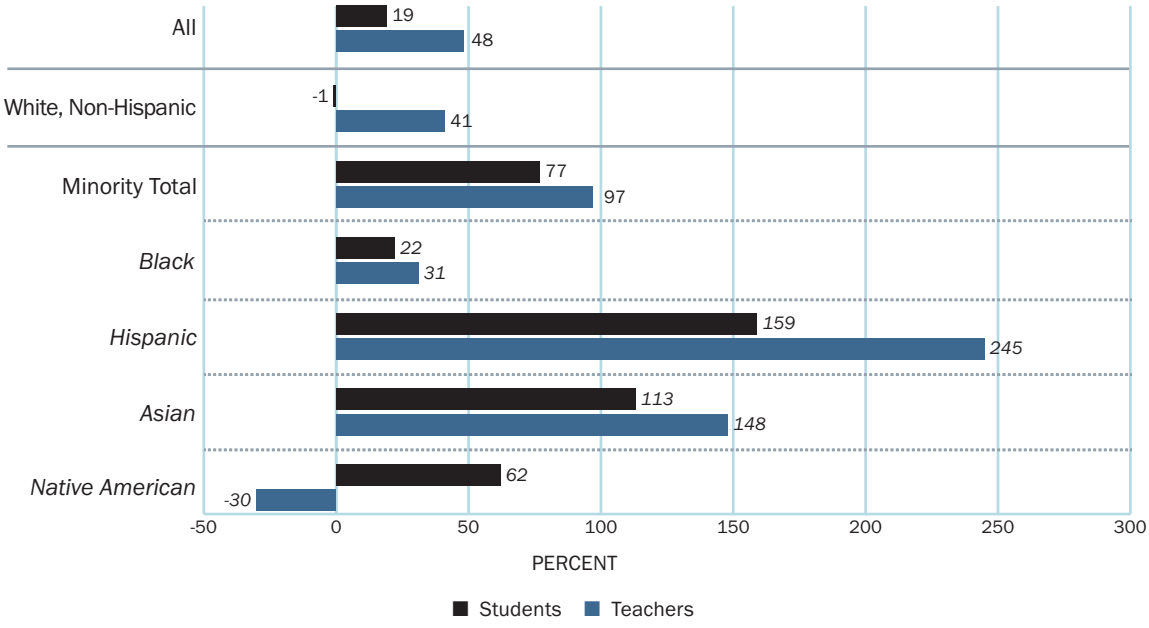
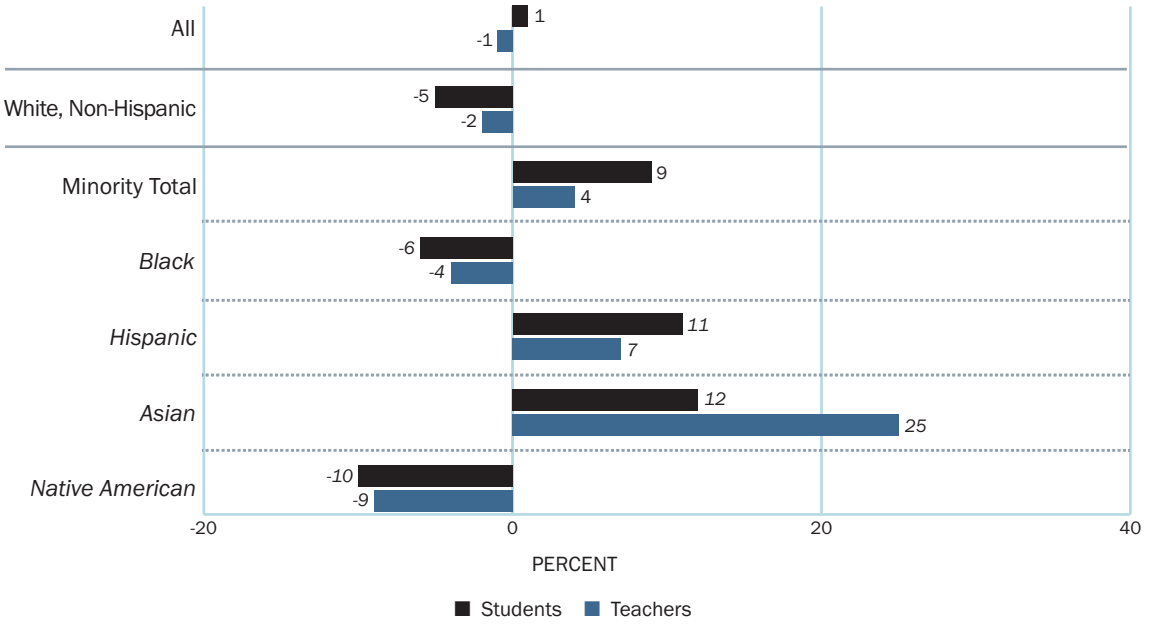


Figure 3
Percent Change in Students and Teachers by Race/Ethnicity (From 2007–08 to 2011–12)



This overall pattern subdivided after 2008, when the economic downturn and recession began. Figure 3 shows trends for the period from 2008 to 2012. During that period, there was a decline in the numbers of nonminorities, Blacks, and Native Americans for both teachers and students. In contrast, the number of Hispanic and Asian teachers and students both continued to increase.

2. Where Are Minority Teachers Employed?

While there has been a dramatic increase in minority teachers, this growth has not been equally distributed across different types of schools. As shown in Table 3, in 2011–12, 92% of minority teachers were employed in public schools. Moreover, of those employed in public schools, minority teachers were overwhelmingly working in high-poverty, high-minority, urban communities.[26] For example, almost two-thirds of minority teachers worked in schools serving predominantly minority students. A similar proportion was employed in high-poverty schools.

> Of those employed in public schools, minority teachers were overwhelmingly working in high-poverty, high-minority, urban communities.

Table 3
Percentage of Minority and Nonminority Teachers Employed in Different Types of Schools (2011–12)

School Type	Nonminority	Minority					
	Total	Total	*Black*	*Hispanic*	*Asian*	*Native American*	*Multiple Races*
Public	87.1	91.9	*93.2*	*91.5*	*87.5*	*97.6*	*91.5*
Urban	25	45	*50*	*44*	*49*	*19*	*33*
Suburban	33	29	*27*	*32*	*28*	*20*	*38*
High poverty	31	62	*68*	*63*	*52*	*59*	*42*
Low poverty	23	11	*8*	*11*	*18*	*7*	*21*
High minority	21	64	*67*	*67*	*59*	*43*	*41*
Low minority	21	3	*1*	*3*	*5*	*5*	*8*
Private	12.9	8.1	*6.8*	*8.5*	*12.5*	*2.4*	*8.5*

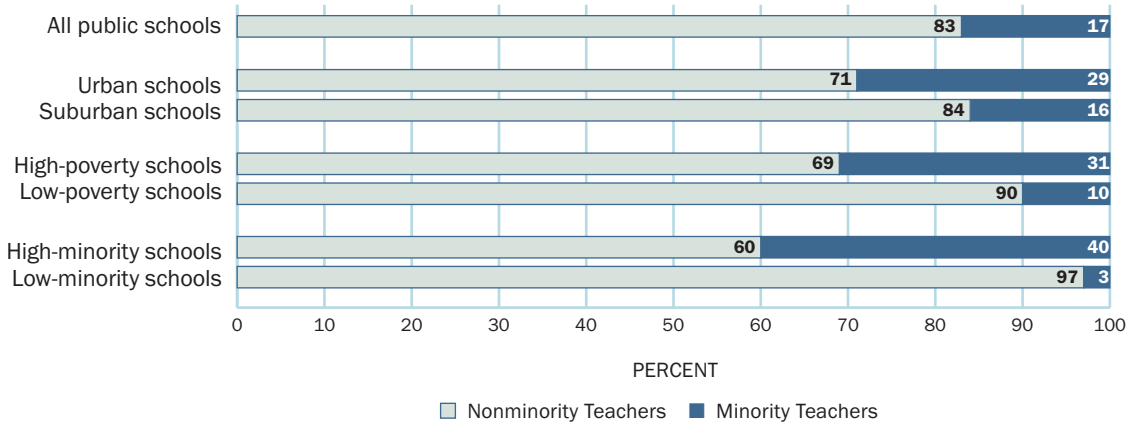
Note: High-poverty schools are those in which 60% or more of the students are eligible for the federal free or reduced-price lunch program for students from families below poverty level. Low-poverty schools are those in which less than 20% of the students are eligible for the federal free or reduced-price lunch program. High-minority schools are those in which 75% or more of the students are minority. Low-minority schools are those in which less than 10% of the students are minority.

Minority teachers were two to three times more likely than nonminority teachers to work in such schools. In contrast, only 3% of minority teachers were in low-minority schools (those in which less than a 10th of the students were minority). Elsewhere, we have examined trends over recent decades in the employment of minority teachers across different types of schools and have documented the persistence of this uneven distribution of teachers by race/ethnicity. For instance, during the two-and-half-decade period between 1987 and 2012, the number of minority teachers in higher-poverty schools increased by 288%; the increase in the number of minority teachers in lower-poverty schools was only 1% for the same period.[27]

It is also important to recognize that since minority teachers represented only 17.3% of the teaching force in 2011–12, in the same types of schools where minority teachers were disproportionately employed, the teaching staff overall was nevertheless predominantly nonminority. Figure 4 illustrates this continuing lack of demographic parity. For instance, in high-minority public schools (i.e., those with 75% or more minority students), only 40% of teachers were minority. Likewise, in high-poverty public schools, only 31% of teachers were minority.

In sum, a large student-teacher racial and ethnic parity gap persists in schools. However, the data also show that efforts over recent decades to recruit more minority teachers and place them in schools serving disadvantaged and minority students have been very successful.

Figure 4
Race/Ethnicity of Teaching Staff in Public Schools (2011–12)



3. How High is Minority Teacher Turnover?

In the two-and-a-half-decade period from 1987 to 2012, despite some fluctuations, the annual rate of teacher turnover increased overall. Moreover, during this period, the data also indicate that minority teachers tended to have higher rates of turnover than nonminority teachers. Table 4 presents turnover, attrition, and migration data for teachers by race/ethnicity.[28] As illustrated, for five of the seven cycles of the TFS data, total turnover rates for minorities were higher than those for nonminority teachers, at a statistically significant level. In none of the cycles were minority turnover rates lower than those of nonminority teachers at a statistically significant level. Moreover, this gap appears to have widened in the past decade. In the 2004–05, 2008–09, and 2012–13 school years, minority turnover was, respectively, 18%, 24%, and 25% higher than nonminority teacher turnover.

> Minority teachers tended to have higher rates of turnover than nonminority teachers. Moreover, this gap appears to have widened in the past decade.

This gap also appears to hold for each of the major minority subgroups, but given smaller sample sizes, such data must be interpreted with caution. For instance, the 2008–09 TFS data suggest that Black, Hispanic, Asian, and Native American teachers each had higher rates of turnover than did nonminority teachers.

Table 4
Public and Private Teacher Migration and Attrition by Race/Ethnicity of Teachers, by Year

	Minority Teachers (Percent)			Nonminority Teachers (Percent)		
Year	Moves	Leaves	Total	Moves	Leaves	Total
1988–89	9.2	5.9	15.1	7.9	6.5	14.4
1991–92	7.0	6.1	13.1	7.2	6.0	13.2
1994–95	9.2	7.6	16.8	6.7	7.2	13.9
2000–01	8.4	7.5	15.9	7.7	8.2	15.9
2004–05	9.0	10.4	19.4	7.6	8.8	16.4
2008–09	10.1	9.2	19.3	6.7	8.9	15.6
2012–13 (public only)	10.6	8.3	18.9	7.5	7.6	15.1

4. What Are the Sources of Minority Teacher Turnover?

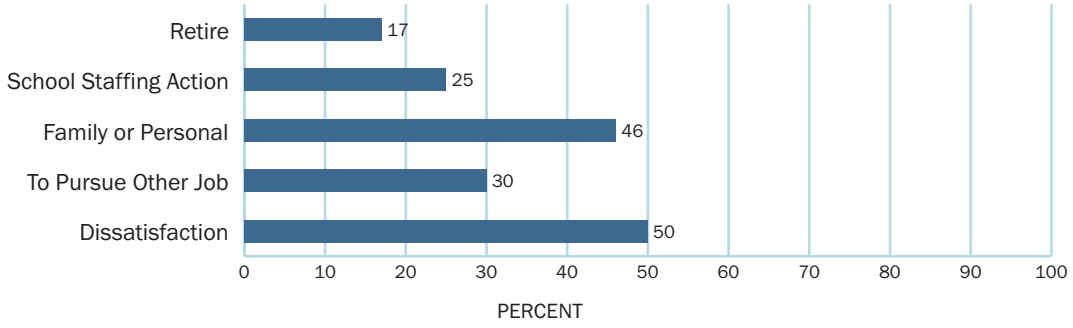
Self-report data

These data raise an important question: What are the reasons for, and sources of, these levels and patterns of nonminority and minority teacher turnover? One way to answer this question is to examine self-report data from those who departed. Figures 5 and 6 present data on the percentage of teachers in the TFS who reported that particular reasons were "very" or "extremely" important in their decisions to move or leave, on a five-point scale from "not important" to "extremely important." We grouped the individual reasons into categories as shown. Note that the percentages in the tables add up to more than 100% because respondents could indicate more than one reason for their departures. We focus here on public schools.

Retirement is not an especially prominent factor (see Figure 5). The latter was reported by only 17% of those who departed. At 25%, school staffing cutbacks due to layoffs, terminations, school closings, and reorganizations account for a larger proportion of turnover than does retirement. These staffing actions result in migration to other teaching jobs more often than to leaving the teaching occupation altogether.

Figure 5

Percent of Minority Public School Teachers Reporting General Types of Reasons for Their Turnover (2012–13)

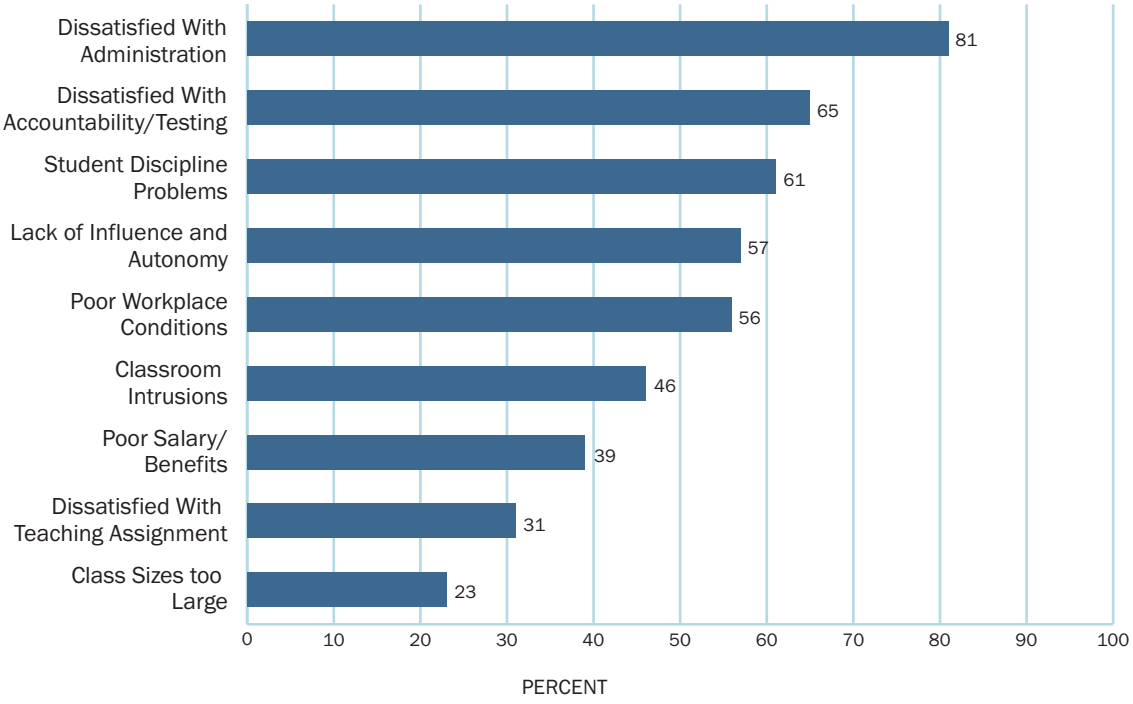


A third category of turnover—personal reasons—includes departures for pregnancy, child rearing, health problems, and family moves. These account for more turnover than either retirement or staffing actions, and they are probably common to all occupations and all types of organizations. The two final sets of reasons are directly related to the organizational and working conditions of teaching. Over half of all those who depart report as a reason either job dissatisfaction, the desire to pursue a better job or another career, or to improve career opportunities in or out of education. Individually, each of these categories accounts for more turnover than does retirement; together, they are the most prominent source of turnover.

Of those who depart because of job dissatisfaction, most link their turnover to the way their school is administered, to how student assessments and school accountability affected teaching, to student discipline problems, and to a lack of input into decisions and lack of classroom autonomy over their teaching (see Figure 6). The data (not shown here) also show that nonminority teachers report similar reasons behind their turnover, and that, in general, similar kinds of dissatisfactions underlie both teacher migration and teacher attrition.

Figure 6

Of Those Minority Public School Teachers Reporting Dissatisfaction, Percent Reporting Particular Reasons for Their Turnover (2012–13)



In sum, the data indicate that minority teachers depart their jobs for a variety of reasons. Retirement accounts for a relatively small number of total departures. Some departures are due to school staffing actions; a large proportion of departures is for personal reasons; and another large proportion is for job dissatisfaction or to seek better jobs or other career opportunities. These findings are important because of their policy implications. Unlike explanations that focus on external demographic trends, these findings suggest there is a role for the internal organization and management of schools in minority teacher staffing problems.

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But, as discussed in the Data, Measures, and Methods section, there are limitations to these self-report data. We follow up below with a multivariate analysis examining the relationship between turnover and a specific set of school organizational characteristics and conditions, based on data from the full set of respondents in SASS, while controlling for other factors, such as teacher age, gender, school grade level, school size, and the demographic characteristics of schools.

Individual, school, and organizational predictors of minority teacher turnover

We estimated a series of regression models using the SASS/TFS data to examine whether our predictor variables (see Appendix Tables A1 and A2) were associated with teacher turnover. The predictor variables and associated regression estimates from each model are shown in Tables 5a and 5b. To evaluate whether relationships between the predictors and turnover differed by the teachers' race/ethnicity, we separately estimated our models for minority teachers and for nonminority teachers; these are displayed side by side in the tables. Again, we focus here on public schools.

In Table 5a, we sequentially entered the sets of measures for teacher characteristics and school characteristics, then added the school demographic measures separately and, finally, included all the measures in a full model. In Table 5b, we sequentially added each of the organizational condition variables to a basic model that included the set of teacher characteristics, the set of school characteristics, and the set of school demographic measures. Tables 5a and 5b present the maximum likelihood estimates for logistic regression, along with significance tests for individual parameters. To make the results more understandable to the reader, in the text we transformed these estimates into odds ratios. The odds ratios are measures indicating the odds of teachers departing (i.e., the ratio of the probability of staying or departing) for particular types of teachers (e.g., male teachers) or for particular types of schools (e.g., small schools). As shown in Model 1 of Table 5a, our analyses found that individual demographic characteristics of teachers were related to their likelihood of staying or departing at a statistically significant level, after controlling for other factors. But this differed by the race/ethnicity of the teachers. The age of teachers was a salient predictor of the likelihood of turnover, but only for nonminority teachers. Both younger (less than 30) and older (greater than 50) nonminority teachers were far more likely to depart than were middle-aged nonminority teachers. For instance, the relative odds of young nonminority teachers departing were more than two times higher than for middle-aged nonminority teachers. In contrast, younger and older minority teachers did not depart at higher rates than other minority teachers (Model 1). Gender was also a factor, but only for minority teachers. The odds of male minority teachers departing were over 50% higher than for female minority teachers; for nonminorities, there was little or no gender difference.

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Some school characteristics were also related to turnover, but, again, this differed by the race/ethnicity of the teachers. Minority teachers in smaller schools departed at higher rates; an enrollment difference of 100 students was associated with a 3% difference in the odds of minority teachers departing. For nonminority teachers, the relationship with school size was very small and not statistically significant.

As shown in Models 2, 3, 4, and 5, schools in urban areas, schools with higher percentages of low-income students, schools with higher percentages of minority students, and schools with higher percentages of minority teachers each had higher nonminority turnover. For instance, a 10-percentage-point increase in the proportion of poverty-level students was associated with a 6% increase in the odds of nonminority teachers departing.

Table 5a
Logistic Regression Analysis of the Likelihood of Minority and Nonminority Teacher Turnover

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Minority	Non-minority	Minority	Non-minority	Minority	Non-minority	Minority	Non-minority	Minority	Non-minority	Minority	Non-minority
Teacher N	6,766	36,378	6,766	36,378	6,181	34,014	6,753	36,346	6,181	34,014	6,181	34,014
School N	3,304	8,223	3,304	8,223	2,977	7,549	3,294	8,213	2,977	7,549	2,977	7,549
Intercept	-1.70***	-2.10***	-1.68***	-1.94***	-1.69***	-2.11***	-1.72***	-2.10***	-1.80***	-2.08***	-1.77***	-2.09***
Teacher Characteristics												
Younger	0.08	0.84***	0.07	0.83***	0.05	0.84***	0.08	0.82***	0.05	0.84***	0.04	0.82***
Older	-0.08	0.34***	-0.08	0.33***	-0.06	0.34***	-0.08	0.33***	-0.06	0.33***	-0.07	0.33***
Male	0.41**	0.10	0.41**	0.10~	0.48**	0.10	0.41**	0.10~	0.49**	0.10	0.48**	0.10
School Characteristics												
Secondary Level	0.06	-0.10	0.09	-0.07	0.02	-0.02	0.06	-0.04	0.07	-0.05	0.05	0.00
School Size (in 100s)	-0.03**	0.00	-0.04**	0.00	-0.04**	0.00	-0.03**	-0.01	-0.04**	-0.01	-0.04**	-0.01
School Demographics												
Rural			-0.33~	-0.26***							-0.20	-0.01
Suburban			0.05	-0.20**							0.11	0.03
Poverty Enrollment (in 10s)					-0.02	0.06***					-0.03	0.01
Minority Enrollment (in 10s)							0.01	0.05***			-0.02	0.05**
Minority Faculty (in 10s)									0.02	0.11***	0.05	0.04~

Note: ~p<.10, *p<.05, **p<.01, ***p<.001

In contrast, there was no consistent or statistically significant relationship between the likelihood of minority teachers departing and these demographic characteristics of schools (with the exception of lower minority turnover in rural compared to urban schools). In other words, after controlling for the background characteristics of teachers and schools, minority teachers, on average, did not depart at significantly different rates from schools with different poverty levels, with different minority student levels, or with different proportions of minority faculty.

Model 6 includes all of these predictors simultaneously; it examines whether the effects of the different measures of school demographics were independent or redundant. Interestingly, after controlling for the other school demographic characteristics, the student poverty enrollment of schools was no longer significantly related to nonminority teacher turnover; minority enrollment and minority faculty remain related, but with only borderline statistical significance. This suggests that the percentage of poverty-level students in schools is not independently related to nonminority teachers' likelihood of departing, once the percentage of minority students in schools is held equal. Conversely, this also suggests that the percentage of minority students in schools is significantly and independently related to nonminority teacher turnover, even after holding school poverty levels constant. In contrast, for minority teachers, as in the other models, none of the demographic characteristics of schools was significantly related to turnover.

The percentage of minority students in schools is significantly and independently related to nonminority teacher turnover. … In contrast, for minority teachers, none of the demographic characteristics of schools was significantly related to turnover.

After controlling for these demographic characteristics of teachers and schools, were the organizational conditions of schools associated with turnover? In each of the models shown in Table 5b, the introduction of the organizational variable improved the model likelihood statistic by a statistically significant amount; moreover, after controlling for the background characteristics of teachers and schools, most of the measured conditions were significantly associated with turnover. But, again, this depended on the race/ethnicity of the teacher.

The measure for top salaries (the highest annual salary in the school district's teacher salary scale) had a statistically significant negative bivariate relationship with turnover before controlling for school characteristics; not surprisingly, higher salaries were associated with lower turnover. However, once other background factors were held constant, as shown in Table 5b, the coefficient for highest salaries was of only borderline statistical significance for nonminority teachers. The coefficient for minority teachers was the same magnitude (-.06) as for nonminority teachers but was not statistically significant. The SASS data indicate that in 2003–04, the average starting salary in public schools for a teacher with a bachelor's degree and no experience was about $32,000, and the average maximum salary (the measure used here) was about $61,000.

As shown in Model 8, in schools with higher levels of student discipline problems, turnover rates were distinctly higher for nonminority teachers; the relationship was in the same direction for minority teachers but not at a statistically significant level. The former is one of the stronger relationships we found. A one-unit increase in average reported student discipline problems between two schools (on a five-unit scale) was associated with a 31% increase in the odds of a nonminority teacher departing.

Table 5b
Logistic Regression Analysis of the Likelihood of Minority and Nonminority Teacher Turnover

	Model 7		Model 8		Model 9		Model 10		Model 11		Model 12	
	Minority	Non-minority	Minority	Non-minority	Minority	Non-minority	Minority	Non-minority	Minority	Non-minority	Minority	Non-minority
Teacher N	5,418	28,957	6,181	34,014	6,181	34,014	6,181	34,014	6,181	34,014	6,181	34,014
School N	2,558	6,408	2,977	7,549	2,977	7,549	2,977	7,549	2,977	7,549	2,977	7,549
Intercept	-1.99***	-2.07***	-1.76***	-2.07***	-1.77***	-2.08***	-1.77***	-2.09***	-1.79***	-2.09***	-1.88***	-2.15***
Teacher Characteristics												
Younger	0.10	0.88***	0.03	0.82***	0.03	0.82***	0.04	0.82***	0.03	0.82***	0.04	0.82***
Older	0.05	0.36***	-0.08	0.33***	-0.07	0.33***	-0.07	0.33***	-0.10	0.32***	-0.08	0.32***
Male	0.50**	0.12~	0.47**	0.08	0.48**	0.09	0.48**	0.1	0.49***	0.10	0.49***	0.11~
School Characteristics												
Secondary Level	0.02	-0.02	0.00	-0.07	0.04	-0.02	0.05	-0.01	0.02	0.00	0.11	0.06
School Size (in 100s)	-0.04*	-0.01	-0.04**	-0.01*	-0.04**	-0.01	-0.04**	-0.01	-0.04**	-0.01	-0.04**	-0.01~
School Demographics												
Rural	-0.09	-0.07	-0.17	0.02	-0.18	-0.02	-0.21	0.00	-0.16	-0.01	-0.08	0.05
Suburban	0.29~	0.01	0.13	0.05	0.12	0.03	0.10	0.03	0.14	0.03	0.15	0.04
Poverty Enrollment (in 10s)	-0.02	0.00	-0.03	-0.01	-0.03	0.01	-0.03	0.01	-0.03	0.01	-0.04	0.01
Minority Enrollment (in 10s)	0.00	0.06**	-0.02	0.05**	-0.02	0.05**	-0.01	0.05**	-0.02	0.05**	-0.02	0.05**
Minority Faculty (in 10s)	0.04	0.04	0.05	0.04~	0.05	0.04~	0.05	0.04~	0.05	0.04~	0.05	0.04~
Organizational Conditions												
Highest Salary (in $10,000s)	-0.06	-0.06~										
Student Discipline Problems			0.13	0.27***								
School Leadership Support					-0.11	-0.25***						
School Resources							0.06	-0.10				
Faculty Influence									-0.47**	-0.19*		
Teacher Autonomy											-0.51*	-0.38***

Note: ~p<.10, *p<.05, **p<.01, ***p<.001

As shown in Model 9, in schools that provide better principal leadership and administrative support, as reported by teachers, turnover rates for both minority and nonminority teachers were lower. However, again, the relationship with minority teacher turnover was not strong enough to reach a statistical significance. A one-unit difference between schools in average reported leadership support (on a four-unit scale) was associated with a 22% decrease in the odds of a nonminority teacher departing. In schools where teachers reported that necessary materials were available, such as textbooks and supplies, turnover appeared lower for nonminority teachers, but not at a level of statistical significance (Model 10).

As shown in Model 11, schools with higher levels of schoolwide faculty decision-making influence had lower levels of turnover for both nonminority and minority teachers. This is one of the strongest relationships we found, and especially so for minority teachers. A one-unit increase in reported faculty influence between schools (on a four-unit scale) was associated with a 37% decrease in the odds of a minority teacher departing.

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As shown in Model 12, schools with higher average levels of individual teachers' classroom autonomy had lower levels of turnover—and, again, this was especially true for minority teachers. This is the strongest relationship we found. A one-unit difference in reported teacher classroom autonomy (on a four-unit scale) was associated with a 40% difference in the odds of a minority teacher departing.

We also examined the relationship to turnover of whether teachers participated in, and found useful, two types of professional development: (1) professional development focused on student discipline and classroom management, and (2) professional development focused on the content of the subjects taught. For both types of development, and for both nonminority and minority teachers, the association with turnover was small and not statistically significant and, hence, we did not display them here.

Moreover, we estimated our sequential sets of models in Tables 5a and 5b on several permutations of our teacher data file. First, we tested our models (table not displayed here) using a comprehensive data file combining both nonminority and minority teachers, while adding a predictor for minority teachers. Consistent with our descriptive statistics in Figure 5, minority teachers had a statistically significantly higher likelihood of turnover than did nonminority teachers. The odds of minority teachers departing were almost 50% higher than for nonminority teachers, even after controlling for the characteristics of teachers and schools. However, once organizational conditions were controlled, the coefficient for minority teachers became statistically insignificant and small (the odds of minority teachers departing were less than 5% higher than the odds for nonminority teachers). In other words, we found that less positive organizational conditions in schools accounted for the higher rates of minority teacher turnover.

Second, we also estimated our same set of models separately for movers and leavers to explore differences in the predictors of each component of turnover (table not displayed here). This analysis necessarily used the smaller TFS sample. Given the smaller sample, as expected, some of the coefficients for organizational conditions failed to achieve statistical significance. However, in almost all cases, the direction and magnitude of the coefficients for organizational conditions were similar to those found in the models analyzing the full sample in Tables 5a and 5b. In other words, organizational conditions associated with differences in rates of teacher migration were similarly associated with differences in rates of teacher attrition.

> Less positive organizational conditions in schools accounted for higher rates of minority teacher turnover.

There were, however, some interesting differences in the relationship of school demographic characteristics to these types of departures. For nonminority teachers, school demographic characteristics, especially minority student enrollment, had a stronger relationship to moving than to leaving. After controlling for our other variables, schools with higher percentages of low-income students, higher percentages of minority students, and higher percentages of minority teachers had higher nonminority teacher migration to other schools; for nonminorities leaving teaching altogether, the differences were small and not statistically significant.

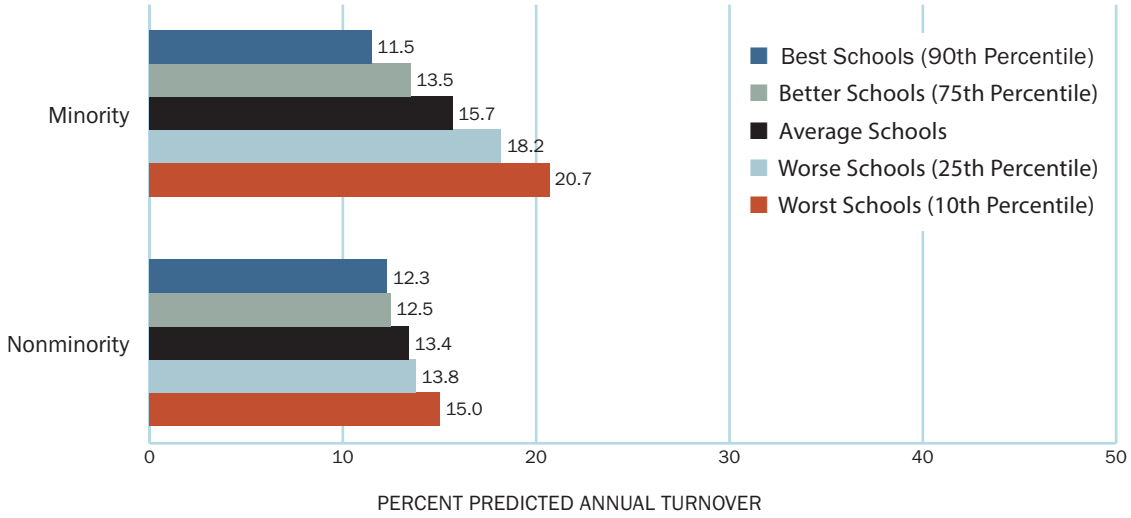
In contrast, for minority teachers, there continued to be little relationship between school demographic characteristics and the likelihood that minority teachers would either move between schools or leave teaching, with one interesting exception: There was a small but statistically significant relationship between poverty enrollment and minority teacher migration. Minority teachers were slightly less likely to move from schools with higher poverty-level enrollments.

Third, and finally, we estimated our same set of models on a subset of turnover that excluded those who departed because of retirement, layoffs, terminations, or school closings in order to test our findings, focusing on only voluntary departures. When looking at departures that are, ostensibly, a matter of choice, we would expect organizational conditions to have a clearer and stronger relationship to turnover. However, to do this analysis, it was necessary to use the smaller TFS sample; given the smaller sample, we would expect some variables to have a weaker relationship. We found that the magnitude of the association of many of our predictors increased and that the findings were highly consistent with those in the models in Tables 5a and 5b.

The separate models in Table 5b estimate the independent relationships to turnover of each organizational condition. However, as discussed in the Data, Measures, and Methods section, the above organizational conditions do not exist in isolation; schools with higher levels of one were also likely to have higher levels of others. To get a sense of the joint association with turnover of multiple organizational conditions, we first estimated an overall model that included all eight organizational conditions, along with the background controls. We then utilized the coefficients from this model to predict turnover rates for a range of values of the set of organizational variables. Holding the control variables constant at the sample mean, we set the eight organizational condition variables to values corresponding to the 10th percentile, the 25th percentile, the mean, the 75th percentile, and the 90th percentile for the sample. This allowed us to predict the turnover rates of minority and nonminority teachers for a range of hypothetical schools, beginning with

those that have the worst organizational conditions (i.e., at the 10th percentile on each of the eight organizational measures) and concluding with those that have the best organizational conditions (i.e., at the 90th percentile on each of the eight organizational measures). Results from this analysis are depicted in Figure 7 and reveal a clear collective relationship between organizational conditions and turnover. This relationship is remarkably strong for minority teachers, whose predicted annual turnover rates are only 12% in the schools with the best organizational conditions versus nearly 21% in schools with the worst organizational conditions. For nonminority teachers, the relationship is not as strong, ranging from 12% in the best schools to 15% in the worst schools.

Figure 7
Predicted Turnover Rates by Public School Organizational Conditions



5. What Is the Role of Minority Teacher Attrition in the Staffing Problems of Schools and in the Minority Teacher Shortage?

It is important to recognize that teacher turnover is not necessarily detrimental. In general, theory and research from the fields of organizational theory, economics, and sociology have long held that some degree of employee turnover is normal and inevitable, and can be efficacious for individuals, for organizations, and for the economic system as a whole.[29] Across a range of occupations and industries, job and career changes are normal and common, perhaps increasingly so, and some hold that high levels of employee turnover are a sign of economic opportunity and a dynamic, well-functioning economy.[30] Moreover, researchers have concluded that effective organizations usually promote some degree of employee turnover and benefit from it by the departure of low-caliber performers and the recruitment of "new blood" to facilitate innovation.

> The relationship between organizational conditions and turnover is remarkably strong for minority teachers, with predicted annual turnover rates 12% in schools with the best conditions and 21% in schools with the worst.

However, though there can be benefits to employee turnover, theory and research in these fields have also long held that employee turnover is not cost-free. There is a general consensus that a variety of costs and consequences are associated with employee turnover, including the loss of human capital and investments in employee development, the cost of replacement hiring and training, and the cost of disruption of production processes, and that such costs vary by industry and occupation.

A variety of costs and consequences are associated with employee turnover, including the loss of human capital and investments in employee development, the cost of replacement hiring and training, and the cost of disruption of production processes.

In the education sector, from the viewpoint of those managing schools and those seeking to employ more minority teachers in school classrooms, all of these types of departures have the same effect: They reduce the number of minority teachers in the organization. One consequence of attrition in particular, our analysis reveals, is that it undermines efforts to increase the number of minorities in the teaching force as a whole.

As shown in Table 1, between the 1987–88 and 2011–12 school years the minority teaching force grew from about 327,000 to 666,000, a gain of 104%. In 1987–88, minorities represented 12.4% of the teaching force; in 2011–12, minorities represented 17.3%. But, notably, this increase in the minority teaching force occurred in spite of the high attrition rate among minority teachers, as shown in Table 4. For instance, the SASS/TFS data indicate that at the beginning of the 2003–04 school year, about 47,600 minority teachers entered teaching; however, by the following school year, 20% more—about 56,000—had left teaching altogether. Of these, about 18,500 retired, 20,000 indicated that they left to pursue another job or career, and 20,000 indicated that they left because of job dissatisfaction (the discrepancy in numbers is because teachers could pick more than one reason for leaving). This raises the question: If minority teacher attrition rates could have been lower in recent decades, what would have been the gain in the total number of minority teachers employed?

To answer this question, we undertook simulation analyses designed to predict the growth in the minority teaching force over the past two-and-a-half decades under two alternative hypothetical scenarios, wherein rates of minority teacher attrition were lower.[31] We drew from the results in our earlier analyses, in Tables 4 and 5b, to choose two examples of lower attrition rates. Figure 8 displays the actual growth of the minority teaching force as estimated in SASS and the hypothetical growth under our two alternative scenarios.

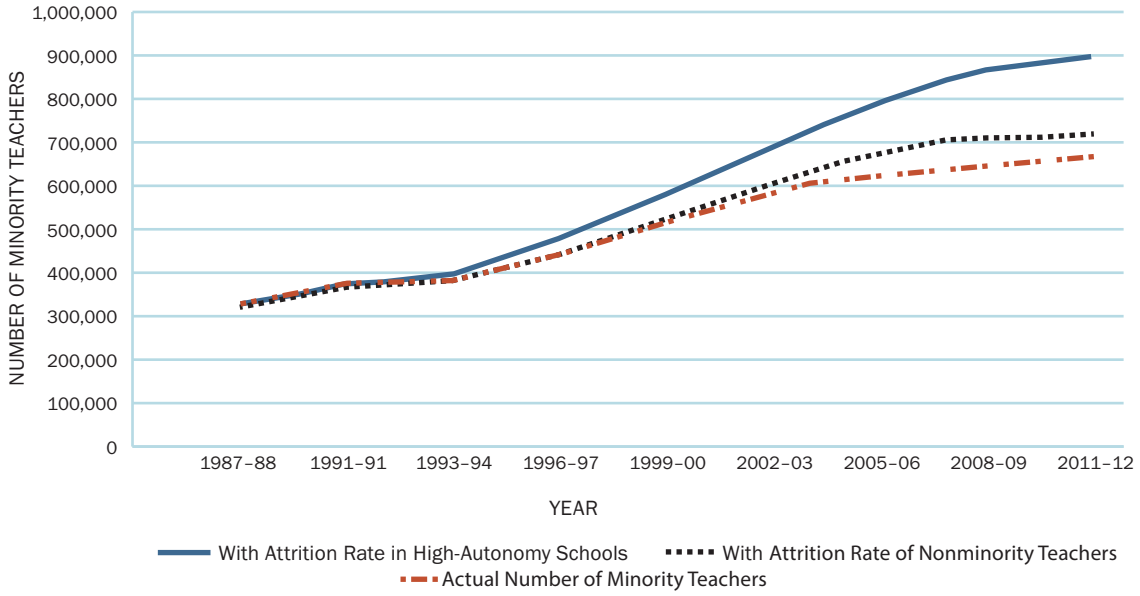
In the first scenario, we estimated the growth in the number of minority teachers if the attrition rates for minority teachers had been the same as those for nonminority teachers from 1987–88 to 2011–12. Recall from Table 4 that for most years of the survey, minority attrition rates were higher than those of nonminority teachers. In this scenario, our simulation indicates that, by 2012, the minority teaching force would have grown to 721,000—a gain of 55,000 teachers over the actual levels. Under this scenario, by 2012, minorities would have represented 18.7% of the teaching force, rather than 17.3%.

In our second scenario, we estimated the growth in the number of minority teachers if their attrition rates had been equal to those in schools with high levels of teacher classroom autonomy. We chose this factor because, as shown earlier in our regression analyses displayed in Table 5b, the association between teachers' classroom autonomy and turnover was a relatively strong relationship. In this second scenario, our simulation indicates that, by 2012, the minority teaching force would have grown to 897,000—a gain of 213,000 teachers over the actual levels. Under this scenario, by 2012, minorities would have represented 23% of the teaching force—still far less than the percentage of students that were minority (44% in Table 1), but close to the percentage of the college-educated population that were minority (25% in Table 1).

Our second simulation analysis suggests that had the schools in which minority teachers have been working afforded them the classroom autonomy held by teachers employed in schools that were in the top 10th percentile of teacher classroom autonomy, it is conceivable that the U.S. would have had nearly a quarter million more minority teachers by 2012.

Figure 8

Trends in the Number of Minority Teachers by Actual and Alternative Attrition Conditions (1987–2013)



Summary and Implications

It is widely believed that the nation's schools suffer from dire shortages of minority teachers. Numerous scholars and commentators have held that there is a growing mismatch between the degree of racial/ethnic diversity in the nation's student population and the degree of diversity in the nation's elementary and secondary teaching force, and this is detrimental to the growth and learning of students. In response, in recent decades, numerous government and non-government organizations have implemented a variety of minority teacher recruitment programs and initiatives. Have these efforts been successful? Has the teaching force grown more diverse?

The national data show a gap persists between the percentage of minority students and the percentage of minority teachers in the U.S. school system. For instance, in 2012, 37% of the nation's population was minority, and 44% of all elementary and secondary students were minority, but only 17.3% of all elementary and secondary teachers were minority. But the data also show this gap is not due to a failure of teacher recruitment. Indeed, since the late 1980s, the number of minority elementary and secondary teachers has increased by over 100%, outpacing growth in the number of nonminority teachers and outpacing growth in the number of minority students. The result is that the teaching force has rapidly grown more diverse.

Moreover, minority teachers are overwhelmingly employed in public schools serving high-poverty, high-minority, and urban communities. Minority teachers are two to three times more likely than nonminority teachers to work in such hard-to-staff schools. Hence, the data suggest that, in spite of a purported host of barriers to entry and competition from other occupations for minority college graduates, efforts over recent decades to recruit more minority teachers and place them in schools serving disadvantaged and minority student populations have been very successful. This has been somewhat of an unheralded victory. While commentators and researchers have tended to discuss the minority teacher shortage in dire and pessimistic terms, the data suggest that such efforts and expenditures have been working.

However, overall, the data show that, over the past two-and-a-half decades, minority teachers were also more likely to depart from their schools than nonminority teachers. This was especially true for male minority teachers. The result has been that, numerically, there has been a large degree of job transition among minority teachers each year.

Over the past two-and-a-half decades, minority teachers were more likely to depart from their schools than nonminority teachers. This was especially true for male minority teachers.

Some turnover of teachers is, of course, normal, inevitable, and beneficial. For individuals, departures leading to better jobs, either in teaching or not, can be a source of upward mobility. For schools, departures of low-performing employees can enhance organizational outcomes. For the educational system, some teacher outflows, such as cross-school migration, temporary attrition, or those leaving classroom teaching for other education-related jobs, do not represent a net or permanent loss of human capital to the education system as a whole.

However, from an organizational level of analysis, and from the viewpoint of those managing schools, none of these types of departures are cost-free, whether permanent, to other schools, or to other education jobs. All have the same effect; they typically result in a decrease in minority classroom instructional staff in that organization. One consequence of attrition, in particular, our analysis reveals, is that it undermines efforts to address the minority teacher shortage.

Why do minority teachers depart schools at higher rates? Strikingly, while the demographic characteristics of schools appear to be highly important to minority teachers' initial employment decisions, this does not appear to be the case for their later decisions about whether to depart. A school's enrollment of poverty-level students, a school's minority student enrollment, the school's proportion of minority teachers, or whether the school lies in an urban or suburban community were not strongly or consistently related to the likelihood that minority teachers would decide to stay or depart. Contrary to the argument that minority teachers have a cultural synchronicity with, and commitment to, minority students,[32] when it comes to the turnover of minority teachers, there almost seems to be a kind of cultural immunity to the demographic characteristics of the students. This also appears to be true for Black teachers. A companion study focused specifically on Black teachers and compared them to nonminority teachers.[33] The findings on turnover were similar to those reported in our study.

Among the most prominent reasons minority teachers gave for leaving or moving were a desire to obtain a better job or career, or dissatisfaction with some aspect of their teaching job. The data further specify that particular school working and organizational conditions were strongly related to minority teacher departures. Hard-to-staff schools that are more likely to employ minority teachers often also have less desirable organizational conditions. And less desirable conditions, our data suggest, account for the higher rates of minority teacher turnover. In other words, the data indicate that minority teachers departed at higher rates because the schools in which they were employed tended to have less positive organizational conditions. The strongest organizational factors for minority teachers were the levels of collective faculty decision-making influence in their school and the degree of individual instructional autonomy held by teachers in their classrooms. Schools that provided more teacher classroom discretion and autonomy, as well as schools with higher levels of faculty input into school decision-making influence, had lower levels of minority teacher turnover. Other factors, such as salaries, the provision of professional development, or the availability of classroom resources, had much less association with turnover rates.

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What are the implications of these results for the widespread efforts to diversify the teaching force? In supply and demand theory, any imbalance between labor demand and supply can be referred to as a shortage, in the sense that there is an inadequate quantity of individuals able and willing to offer their services under given wages and conditions. From this perspective, the problems many schools encounter retaining minority teachers can technically be referred to as a shortage. However, in the context of minority teachers and schools, the term "shortage" is typically given a narrower connotation—an insufficient production and recruitment of new minority teaching candidates in the face of increasing minority student enrollments. These terminological and diagnostic differences have crucial implications for prescription and policy.

As noted in the beginning of this report, increased production and recruitment of minority candidates has long been the dominant strategy to diversify the teaching force and address the minority teacher shortage. Numerous high-profile reports have called for dramatic increases in the recruitment of new minority teachers across the nation.[34] Beginning in the late 1980s, such efforts received substantial support and funding—the Ford Foundation and the DeWitt Wallace Readers' Digest Fund alone committed over $60 million.

Nothing in our research suggests that bringing new qualified minority candidates into teaching is not a worthwhile step. But the data indicate that new teacher recruitment strategies alone do not directly address a major source of minority teacher staffing problems: attrition. This is especially true for minority teacher recruitment efforts aimed at male teachers, because male minority teachers have especially high turnover. Indeed, the increase in the number of minority teachers is all the more remarkable because it has occurred in spite of the high attrition rate among minority teachers. Improving the retention of minority teachers brought into teaching by recruitment initiatives could prevent the loss of the investment and help to lessen the ongoing need for more recruitment initiatives. However, nothing in our research suggests that improving minority teacher retention alone will close the parity gap. Our perspective suggests the efficacy of developing teacher recruitment and retention initiatives together in order to solve the minority teacher shortage. This study's findings support the view that school organization, management, and leadership matter, and they shift attention to discovering which policy-amenable aspects of schools as organizations—their practices, policies, characteristics, and conditions—are related to their ability to retain minority teachers. The data suggest that poor, high-minority, urban schools with improved organizational conditions will be far more able to do so. To be sure, the data do not suggest that altering any of the organizational conditions we examined would be easy. However, unlike reforms such as teacher salary increases, professional development, and class-size reduction, changing some conditions, such as teachers' classroom autonomy and faculty member's schoolwide influence, would appear to be less costly financially—an important consideration, especially in low-income settings and in periods of budgetary constraint.

Improving the retention of minority teachers brought into teaching by recruitment initiatives could prevent the loss of the investment and help to lessen the ongoing need for more recruitment initiatives.

Promising examples of schools with high levels of teacher autonomy and decision-making influence have sprung up in recent years in the U.S. For example, there is a growing network of schools that are operated and run by teachers.[35] These schools are often referred to as "partnership schools" because they are modeled after law partnerships, where lawyers both manage, and ultimately are accountable for, the organization and its success.[36] In this approach, the focus of reform would shift from solely attracting or developing "better people for the job" to also securing "a better job for the people."[37] Rather than simply forcing the existing arrangement to work better, this alternative perspective suggests the importance of also viewing the roots of shortages as an organizational and occupational design issue, implying the need for a different arrangement, better built for those who do the work of teaching.

Appendix: Data, Measures, and Methods

Data

The data for this study come from the National Center for Education Statistics' (NCES) nationally representative SASS and its supplement, TFS. This is the largest and most comprehensive data source available on the staffing, occupational, and organizational aspects of elementary and secondary schools. The U.S. Census Bureau collects the SASS data for NCES from a random sample of schools stratified by state, public/private sector, and school level.[38] There have been seven SASS cycles to date: 1987–88; 1990–91; 1993–94; 1999–00; 2003–04; 2007–08; 2011–12. Each cycle of SASS includes separate (but linked) questionnaires for school and district administrators and for a random sample of teachers in each school. After 12 months, the same schools are again contacted, and all those in the original teacher sample who had departed from their school are given a second questionnaire to obtain information on their departures. The TFS comprises this latter group, along with a representative sample of those who stayed in their teaching jobs. Unlike most previous data sources on teacher turnover, the TFS is large, comprehensive, and nationally representative, and it includes the reasons teachers themselves give for their departures, along with a wide range of information on the characteristics and conditions of the schools that employ teachers. It also is unusual in that it does not focus solely on a particular subset of separations but includes all types of departures.[39]

Our analysis uses data from all seven cycles of SASS/TFS to address our questions. This analysis uses data weighted to compensate for the over- and under-sampling of the complex stratified survey design. Each observation is weighted by the inverse of its probability of selection in order to obtain unbiased estimates of the national population of schools and teachers in the year of the survey.

Measures and Methods

As discussed earlier, throughout this study, our definitions of minority teachers and nonminority teachers are based on Census Bureau classifications of race/ethnicity. "Nonminority" refers to those identified as "White, non-Hispanic." We use these two terms interchangeably. "Minority" includes those identified as Black/African American; native Hawaiian/Pacific/Islander or Asian; Native American/Indian/Alaska Native; Hispanic/Latino; and those of multiple races. "Hispanic/Latino" refers to ethnicity and includes those of all races. It is important to recognize that over half of those identifying as Hispanic also identify as White. Hence, the term "person of color" is not synonymous with minority, and, for clarity, we will not use the former term. Our classification of minority teachers and nonminority teachers is based on the SASS teacher-respondents' self- identification of their race/ethnicity in the SASS questionnaires. These minority subgroups are, of course, not homogeneous, between or within. Hence, drawing conclusions about minority teachers as a whole runs the risk of overgeneralizing. Throughout our study, where sample sizes permit, we disaggregate minority by subgroup. But also underlying our study is the assumption that common patterns across all subgroups can be informative. An earlier related study focused specifically on Black teachers and compared them to nonminority teachers. The findings on turnover were similar to those reported here from our study.[40]

Our data analyses involve three different methods and stages. In the first stage, we estimate mostly descriptive statistics to address our first four research questions. In the second stage, we follow up with a detailed multiple logistic regression analysis of the predictors of turnover to further address the fourth research question. In a third stage, we address our fifth research question by undertaking simulations of the minority teaching force under hypothetical minority teacher attrition scenarios.

Stage 1

In the first stage, we examine data on trends in the relative numbers of minority and nonminority students and minority and nonminority teachers, data on differences in the types of schools in which minority and nonminority teachers are employed, and data on trends in the turnover rates of minority and nonminority teachers.

Research on teacher turnover has often focused solely on those leaving the occupation altogether, here referred to as teacher attrition, and has often de-emphasized those who transfer or move to different teaching jobs in other schools, here referred to as teacher migration. The logic is that teacher migration is a less significant form of turnover because it does not increase or decrease the overall supply of teachers, as do retirements and career changes and, hence, does not contribute to overall shortages. From a systemic level of analysis, this is correct. However, from the perspective of schools, employee migration is as relevant as employee attrition. The premise underlying our perspective is that whether those departing are moving to a similar job in another organization or leaving the occupation altogether, their departures similarly impact and are impacted by the organization. For this same reason, the distinction between attrition and migration is rarely noted in the larger literature on employee turnover, and research on other occupations and organizations almost always includes both.[41] In our analysis, we examine migration and attrition, both together and separately.

Whether those departing are moving to a similar job in another organization or leaving the occupation altogether, their departures similarly impact and are impacted by the organization.

For our fourth question, we examine the reasons teachers themselves give for their turnover, drawn from sets of items in the TFS questionnaire that asked teacher-respondents to indicate the importance of various factors for their departures. Self-report data such as these are useful because those departing are, of course, often in the best position to know why they are leaving. But such data are also based on subjective attributions by those who departed, introducing possible attribution bias.

Stage 2

To address these limits, we follow up in a second stage of our analysis with a logistic regression analysis that examines the association of teacher turnover with individual, school, and organizational predictors. For this part of our analysis, we utilize the 2003–04 SASS and the 2004–05 TFS. The 2004–05 TFS has the advantage of having a larger sample size than the more recent 2008–09 and 2012–13 cycles of the TFS. The 2003–04 SASS sample comprises

43,358 nonminority and 7,865 minority elementary and secondary teachers. The 2004–05 TFS sample comprises 6,118 nonminority and 1,311 minority elementary and secondary teachers.

In the regression models, the dependent variable—teacher turnover—is dichotomous based on whether each teacher remained with the school or either moved to another school or left teaching within 1 year after the 2003–04 SASS administration. The TFS includes only about 12% of teachers from the original SASS sample. To increase the sample size for our regression analyses, we combined the TFS measure of turnover with another measure of turnover collected from school principals—the Teacher Status variable—for the entire SASS teacher sample, increasing our effective sample size from about 7,500 to 51,000 teachers.[42]

We cumulatively examine three groups of predictors of turnover: teacher characteristics, school characteristics, and organizational conditions. Table A1 defines these variables. Table A2 provides mean teacher characteristics, school characteristics, and organizational conditions associated with the teachers in the combined SASS/TFS sample.

Following previous research on teacher turnover, in the regression models we include control variables for two key individual teacher characteristics: gender and age. Because it has been found to have a U-shaped relationship to turnover,[43] we transform age into a three-category set of dummy variables—younger (less than 30), middle-aged (31–50), and older (greater than 50).

Following previous research on school organization,[44] in the regression models we include, as independent variables, school characteristics typically found to be important in this literature: school level and school size. To examine the role of school demographic characteristics, we also include measures of whether the school is urban, rural, or suburban, the proportion of each school's student population at or below the poverty level (i.e., eligible for free or reduced-price lunch), the proportion of each school's student population that is minority, and the proportion of the school faculty that is minority. Because these demographic factors are often highly intercorrelated and confounded, we estimate their effects both separately and simultaneously in conjunction to discern the extent to which they are independent or redundant.

Finally, after controlling for the above teacher and school factors, we focus on the relationship to turnover of eight key aspects of the organizational character and conditions in schools: teacher salary, student discipline problems, school leadership and support, school resources, faculty schoolwide decision-making influence, teacher classroom autonomy, teacher professional development activities focused on student discipline and classroom management, and professional development activities focused on the teacher's subject-area content. This study does not attempt to provide a comprehensive analysis of all the many aspects of schools that may impact the turnover of minority teachers. We focus on this set of eight particular characteristics of schools because they have long been considered among the important aspects of effective school organization,[45] are ostensibly policy amenable, and are available from our data source.

The second stage of the analysis examines whether the likelihood that individual teachers will move from or leave their teaching jobs is related to the above measures of school organizational characteristics and conditions, while controlling for individual-level characteristics of teachers and school-level characteristics. Because different school organizational conditions are often interrelated, and their relationship to turnover is possibly confounded, we estimate the coefficients for each measure of school organizational conditions both in separate models and simultaneously.

Table A1
Definitions of Measures Utilized in the Regression Analysis

Teacher Turnover: a dichotomous variable where 1 = not teaching in same school as last year and 0 = stayer/currently teaching in same school.

Teacher Characteristics

- **Young**: a dichotomous variable where 1 = teacher less than 30 years of age and 0 = other teachers
- **Old**: a dichotomous variable where 1 = teacher older than 50 years of age and 0 = other teachers
- **Male**: a dichotomous variable where 1 = male teacher and 0 = female teacher

School Characteristics

- **Rural**: a dichotomous variable where 1 = rural and 0 = suburban or urban
- **Suburban**: a dichotomous variable where 1 = suburban and 0 = rural or urban
- **Secondary Level**: a dichotomous variable where 1 = junior or senior secondary and 0 = elementary or middle or combined (k-12)
- **Size**: student enrollment of school
- **Poverty Enrollment**: percentage of students eligible for the federal free or reduced-price lunch program for students from families below poverty level
- **Minority Enrollment**: percentage of minority students
- **Minority Faculty**: percentage of minority teachers

Organizational Characteristics/Conditions

- **Highest Salary**: for districts with a salary schedule for teachers, normal yearly base salary highest step, or if no district salary schedule, the highest teacher yearly base salary, as reported by school administrators.
- **Student Discipline Problems**: on a scale of 1 = never happens to 5 = happens daily, the school mean of teachers' reports for eight kinds of student discipline problems: (1) disruptive behavior, (2) absenteeism, (3) physical conflicts among students, (4) robbery, (5) vandalism, (6) weapon possession, (7) physical abuse of teachers, and (8) verbal abuse of teachers.
- **School Leadership Support**: on a scale of 1 = strongly disagree to 4 = strongly agree, the school mean of teachers' reports for five items: (1) principal communicates expectations, (2) administration is supportive, (3) principal enforces rules for student discipline, (4) principal communicates objectives, and (5) staff are recognized for job well done.
- **School Resources**: on a scale of 1 = strongly disagree to 4 = strongly agree, the school mean of teachers' reports for one item: necessary materials such as textbooks, supplies, and copy machines are available as needed by the staff.
- **Schoolwide Faculty Influence**: on a scale of 1 = none to 4 = a great deal, the school mean of collective faculty influence over seven areas: (1) student performance standards, (2) curriculum, (3) content of in-service programs, (4) evaluating teachers, (5) hiring teachers, (6) school discipline policy, and (7) deciding spending of budget.
- **Classroom Teacher Autonomy**: on a scale of 1 = none to 4 = a great deal, the school mean of individual teachers' control over six areas: (1) selecting textbooks and other instructional materials; (2) selecting content, topics, and skills to be taught; (3) selecting teaching techniques; (4) evaluating and grading students; (5) determining the amount of homework to be assigned; and (6) disciplining students.
- **Student-Discipline-Focused Professional Development**: on a scale of 1 = not received or not useful to 4 = very useful, the school mean of teachers' reports of the usefulness of any professional development activities that focused on student discipline and management in the classroom.
- **Subject-Content-Focused Professional Development**: on a scale of 1 = not received or not useful to 4 = very useful, the school mean of teachers' reports of the usefulness of any professional development activities that focused on the content of the subjects they taught.

We used factor analysis (with varimax rotation method) to evaluate our indices of student discipline problems, school leadership, faculty influence, and teacher autonomy. We considered item loadings of at least .4 necessary for inclusion in a factor. No items loaded on more than one factor. Each factor had high internal consistency ($a > .7$).

The measures of student discipline problems, leadership, resources, faculty influence, teacher autonomy, and professional development are all school means of the reports of the total SASS teacher sample for each school and not limited to the reports of those in the smaller TFS sample.

Table A2
Descriptive Statistics for Independent Variables Utilized in Regression Analysis

Categorical Predictor Variables	Proportion		
	All Teachers	Nonminority	Minority
Teacher Characteristics			
Young	.17	.16	.17
Old	.30	.31	.25
Male	.25	.25	.24
Minority	.17		
School Characteristics			
Rural	.19	.21	.11
Suburban	.52	.55	.39
Secondary	.30	.30	.28

Continuous Predictor Variables	Mean (Std. Dev.)		
	All Teachers	Nonminority	Minority
School Characteristics			
School Size (in 100s)	8.04 (6.07)	7.87 (5.94)	8.9 (6.59)
Poverty Enrollment (in 10s)	4.12 (2.93)	3.7 (2.73)	6.22 (2.99)
Minority Enrollment (in 10s)	4.12 (2.93)	3.54 (3.3)	7.49 (2.98)
Minority Faculty	4.12 (2.93)	10.1 (6.04)	42.83 (30.62)
Organizational Characteristics/Conditions			
Highest Salary (in $10,000s)	6.08 (1.30)	6.06 (1.33)	6.20 (1.18)
Student Discipline Problems (scale 1–5)	2.29 (0.71)	2.28 (0.7)	2.35 (0.73)
School Leadership Support (scale 1–4)	3.32 (0.65)	3.32 (0.65)	3.33 (0.67)
School Resources (scale 1–4)	3.14 (0.89)	3.17 (0.87)	3.0 (0.95)
Faculty Influence (scale 1–4)	2.21 (0.61)	2.21 (0.6)	2.24 (0.68)
Teacher Autonomy (scale 1–4)	3.38 (0.52)	3.40 (0.51)	3.3 (0.54)
Discipline-Focused Prof. Dev. (scale 1–4)	1.77 (1.04)	1.73 (1.01)	1.97 (1.14)
Content-Focused Prof. Dev. (scale 1–4)	2.64 (1.03)	2.60 (1.02)	2.79 (1.04)

Note: Means and deviations are at the teacher level and associated with teachers in the sample.

Unlike most empirical analyses, which use either individual teachers' salaries or the school's mean teacher salary, we use the normal yearly base salary for teachers at the highest step on the district or school salary schedule because it better assesses differences in the organizational-level compensation structure.[46] Our measures of organizational conditions, other than salaries, are based on teachers' self-reports. Teachers' responses in any individual school, of course, may vary because teachers in the same building may perceive various conditions differently. In background analyses, we partitioned the variance of each measure of organizational conditions into within-school and between-school components. The intraclass correlation, or the portion of the variation that lies between schools, ranged from 13% for subject-area professional development to 43% for student discipline, indicating that part of each measure is unique to each teacher-respondent and that part is common to all teachers within a school. Elsewhere, we have explicitly compared the relative association with turnover of these two levels of measures of organizational conditions.[47] Our focus here is on whether particular schoolwide organizational conditions on average are related to minority and nonminority turnover. Hence, as defined in Table A1, other than salary, for our measures of organizational conditions, we calculate averages across the entire sample of teachers in each school.

Our analysis used PROC GENMOD in SAS (version 9.2) because it adjusts for the non-random clustering of teachers within schools resulting from the multilevel structure of the sample and uses within-school and between-school predictor variables to estimate separate effects across multiple levels. This procedure also supports logistic regression and allows for inclusion of sampling design weights. Weights are necessary because the SASS and TFS over- or under-sample certain segments of the teaching population. Though the TFS data are longitudinal in the sense that the turnover outcomes transpired a year after the collection of the SASS measures of school characteristics and organizational conditions, it is important to note that any relationships found between these variables and turnover represent statistical associations between measures and do not imply causality.

Stage 3

In the third stage of our analysis, to address our fifth and final research question, we undertook several analyses of the TFS data to document the magnitude of minority teacher attrition and to illustrate its role in the minority teacher staffing problems of the school system. To assess the latter, we undertook simulation analyses to estimate the growth in the minority teaching force that could have occurred over the past two and a half decades under alternative hypothetical scenarios in which the rates of minority teacher attrition had been lower.

Endnotes

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19 For reviews, see Villegas, A. M. & Lucas, T. (2004). "Diversifying the teacher workforce: A retrospective and prospective analysis," in M. A. Smylie & D. Miretky (Eds.), *Developing the Teacher Workforce (103rd Yearbook of the National Society for the Study of Education, Part 1)* (pp. 70–104). Chicago, IL: University of Chicago Press; Villegas, A. M. & Irvine, J. J. (2010). Diversifying the teaching force: An examination of major arguments. *Urban Education,* 42, 175–192.; Achinstein, B., Ogawa, R. T., Sexton, D., & Freitas, C. (2010). Retaining teachers of color: A pressing problem and a strategy for "hard-to-staff" schools. *Review of Educational Research, 80*(1), 71–107; Villegas, A. M., Strom, K., & Lucas, T. (2012). Closing the racial-ethnic gap between students of color and their teachers: An elusive goal. *Equity and Excellence in Education, 45*(2), 283–301; Albert Shanker Institute. 2015.

20 Villegas, A. M. & Lucas, T. (2004). Diversifying the teacher workforce: A retrospective and prospective analysis. In M. A. Smylie & D. Miretky (Eds.), *Developing the Teacher Workforce (103rd Yearbook of the National Society for the Study of Education, Part 1)* (pp. 70–104). Chicago, IL: University of Chicago Press; Villegas, A. M. & Irvine, J. J. (2010). Diversifying the teaching force: An examination of major arguments. *Urban Education,* 42, 175–192; Rogers-Ard, R., Knaus, C. B., Epstein, K. K., & Mayfield, K. (2013). Racial diversity sounds nice; systems transformation? Not so much: Developing urban teachers of color. *Urban Education, 48*(3), 451–479.

21 Rice, J., Roellke, C., Sparks, D., & Kolbe, T. (2008). Piecing together the teacher policy landscape: A policy-problem typology. *Teachers College Record.* http://www.tcrecord.org/Content.asp?ContentId=15223; Albert Shanker Institute. (2015). *The State of Teacher Diversity in American Education.* Washington, DC: Albert Shanker Institute.

22 Achinstein, B., Ogawa, R. T., Sexton, D., & Freitas, C. (2010). Retaining teachers of color: A pressing problem and a strategy for "hard-to-staff" schools. *Review of Educational Research, 80*(1), 71–107.

23 U.S. Bureau of the Census. (2012). *The Statistical Abstract* (141st ed.). Washington, DC: U.S. Department of Commerce.

24 Ingersoll, R., Merrill, L., & Stuckey, D. (2014). *Seven Trends: The Transformation of the Teaching Force.* CPRE Report (#RR-80). Philadelphia: Consortium for Policy Research in Education, University of Pennsylvania.

25 Ingersoll, R., Merrill, L., & Stuckey, D. (2014). *Seven Trends: The Transformation of the Teaching Force.* CPRE Report (#RR-80). Philadelphia: Consortium for Policy Research in Education, University of Pennsylvania.

26 To illustrate the public sector distribution for 2011–12, we subdivided the public teaching force into quartiles according to the poverty and minority student enrollments of their schools. In Table 5 and Figure 4, high-poverty schools refer to those in which 60% or more of the students are eligible for the federal free or reduced-price lunch program for students from families below poverty level. Low-poverty schools refer to those in which less than 20 % of the students are eligible for the federal free or reduced-price lunch program. High-minority schools refer to those in which 75% or more of the students are minority. Low-minority schools refer to those in which less than 10% of the students are minority. Note: These categories represent quartiles of the total SASS sample of public school teachers; these categories are not of equal size in number of schools or students.

27 Ingersoll, R. & Merrill, L. (2017). *A Quarter Century of Changes in the Elementary and Secondary Teaching Force: From 1987 to 2012.* Statistical Analysis Report (NCES 2015-076). Washington, DC: National Center for Education Statistics.

28 Unlike in earlier data cycles, the 2012–13 TFS did not include turnover data for teachers in private schools. In Table 6, the apparent decrease in minority and nonminority turnover rates between the 2008–09 and 2012–13 TFS cycles is due to the omission of private school teachers in the latter. Turnover rates are, on average, higher in private schools. Our examination of only public school teacher turnover shows that minority teacher turnover in public schools also increased slightly during this period.

29 See, e.g., Price, J. (1977). *The study of turnover.* Ames, IA: Iowa State University Press; Price, J. (1989). The impact of turnover on the organization. *Work and Occupations, 16,* 461–473; Jovanovic, B. (1979a). Job matching and the theory of turnover. *Journal of Political Economy, 87*(5), 972–990; Jovanovic, B. (1979b). Firm-specific capital and turnover. *Journal of Political Economy, 87*(6), 1246–1260; Mobley, W. (1982). *Employee turnover: Causes, consequences and control.* Reading, MA: Addison-Wesley; Abelson, M. A., & Baysinger, B. D. (1984). Optimal and dysfunctional turnover: Toward an organizational level model. *The Academy of Management Review, 9*(2), 331–341; Hom, P. & Griffeth, R. (1995). *Employee turnover.* Cincinnati, OH: South-Western; Siebert, S. W., & Zubanov, N. (2009). Searching for the optimal level of employee turnover: A study of a large U.K. retail organization. *Academy of Management Journal, 52*(2), 294–313.

30 See, e.g., Kimmitt. R. (2007, Jan. 23). Why job churn is good. *The Washington Post* (p. A17).

31 We simulated racial/ethnic representation in the teaching force by modeling entry to, and exit from, teaching by minority and nonminority teachers for each year from 1987–88 through 2011–12. We projected the number of minority teachers in each year by subtracting from the previous year's total the number of minority teachers who left teaching and adding the number of minority teachers hired under each of our two alternative attrition rate scenarios.

To determine the number of minority attriters, we applied our hypothetical attrition rates to the simulated total number of minority teachers from the previous year. In our first simulation scenario, we applied nonminority attrition rates for each year to minority teachers. We estimated these rates from SASS/TFS data for the 7 on-cycle years and linearly interpolated for years for which no survey was administered. Under the second simulation scenario, we applied to minority teachers the attrition rate for teachers employed in schools scoring in the top decile of teachers' classroom autonomy in the 2011–12 SASS/TFS.

To project the number of minority teachers hired in each year, we multiplied the actual contemporaneous proportion of new teachers who were minorities by the simulated total number of teachers hired in that year. We estimated the proportions of new teachers who were minorities from SASS/TFS data for on-cycle years and linearly interpolated for years for which no survey was administered. To project the number of teachers hired in any year, we assumed that the total size of the labor force would not change between attrition scenarios. That is, the total numbers of teachers in each year of each of our simulations match the historical estimates from SASS. From these annual totals, we calculated the growth (or decline) in the teacher labor force each year. We added to this growth the total number of teachers who would have left the occupation under each attrition scenario each year, as teachers would need to be hired to replace those exiting teaching. To this total number of teachers hired, we applied the proportion of new teachers who were minorities to arrive at the number of minority teachers hired each year.

32 See, e.g., Irvine, J. J. (1988). An analysis of the problem of the disappearing Black educator. *Elementary School Journal, 88*(5), 503–514.

33 Connor, R. (2010). *Examining African American teacher turnover, past & present.* Unpublished PhD Dissertation, University of Pennsylvania.

34 See, e.g., Education Commission of the States. (2003). *Recruiting teachers of color: A 50-state survey of state policies.* Denver, CO: Author; American Association of Colleges for Teacher Education. (1999). *Teacher education pipeline IV: Schools and departments of education enrollments by race, ethnicity, and gender.* Washington, DC: Author.

35 Kolderie, T. (2008). *The other half of the strategy: Following up on systemic reform by innovating with school and schooling.* St. Paul, MN: Education Evolving; Kolderie, T. (2014). *The Split Screen Strategy: How to Turn Education Into a Self-Improving System.* Edina, MN: Beaver's Pond Press.

36 Hawkins, B. (2009). Teacher cooperatives: What happens when teachers run the school? *Education Next, 9,* 37–41.

37 Kolderie, T. (2008). *The other half of the strategy: Following up on systemic reform by innovating with school and schooling.* St. Paul, MN: Education Evolving; Kolderie, T. (2014). *The Split Screen Strategy: How to Turn Education Into a Self-Improving System.* Edina, MN: Beaver's Pond Press.

38 For information on the SASS, see National Center for Education Statistics. (2005). *Schools and Staffing Survey (SASS) and Teacher Follow-up Survey (TFS).* Data File. Washington, DC: U.S. Department of Education. http://nces.ed.gov/surveys/SASS.

39 For information on the TFS, see Chandler, K., Luekens, M., Lyter, D., & Fox, E. (2004). *Teacher attrition and mobility: Results from the Teacher Follow-up Survey (TFS), 2000–01.* Washington, DC: National Center for Education Statistics.

40 Connor, R. (2010). *Examining African American teacher turnover, past & present.* Unpublished Ph.D. Dissertation, University of Pennsylvania.

41 See, e.g., Price, J. (1977). *The study of turnover.* Ames, IA: Iowa State University Press.

42 The Teacher Status variable has some error in distinguishing between migration (movers) and attrition (leavers). Essentially, school principals tend to over-report the number of leavers because teachers who quit their jobs often do not inform their previous schools that they have moved to another school. However, this measure is quite accurate in correctly identifying who is and is not still working at the original school. By comparing individual teachers' values for the Teacher Status variable from SASS with confirmed final turnover from the TFS, we found the Teacher Status variable was about 93% accurate in distinguishing teachers who had departed from those who had not.

More specifically, the Teacher Status variable from the SASS accurately identified 90% of confirmed leavers (i.e., 2,385 out of 2,650) as having left the teaching occupation. However, the Teacher Status variable classified 29% of confirmed movers (i.e., 559 out of 1,911) as having left the teaching occupation, and an additional 1% of confirmed movers (i.e., 18 out of 1,911) as stayers. When no distinction is made between movers and leavers, the Teacher Status variable was 92% sensitive (i.e., 4,471 out of 4,886 teachers identified as departing did, in fact, move from or leave their teaching jobs), and Teacher Status was 96% specific (i.e., 2,442 out of 2,532 teachers identified as not turning over those who did, in fact, stay in their teaching jobs). This translates to an overall accuracy rate of 93% (i.e., 6,913 out of 7,418).

In our merger of the SASS and TFS measures, we corrected the Teacher Status measure using TFS data, making the former approximately 96% accurate. Applying the sensitivity and specificity rates above to the uncorrected ATTRIT data (i.e., 40,563 stayers and 3,064 movers/leavers) and assuming 100% accuracy for those teachers included in the TFS data (i.e., 2,864 stayers and 4,565 movers/leavers), we end up with an overall accuracy rate of 96% (i.e., [(40,563 x .96) + (3,064 x .92) + (2,864 x 1.00) + (4,565 x 1.00)] / 51,056 = 0.96).

43 Ingersoll, R. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal, 38*(3), 499–534.

44 See, e.g., Bryk, A., Lee, V., & Holland, P. (1993). *Catholic schools and the common good*. Cambridge, MA: Harvard University Press; Chubb, J. E., & Moe, T. (1990). *Politics, markets and America's schools*. Washington, DC: Brookings Institute; Coleman, J., & Hoffer, T. (1987). *Public and private schools: The impact of communities*. New York, NY: Basic; Ingersoll, R. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal, 38*(3), 499–534; Ingersoll, R. M. (2003). *Who Controls Teachers' Work? Power and Accountability in America's Schools.* Cambridge, MA: Harvard University Press.

45 See, e.g., Goodlad, J. (1984). *A place called school: Prospects for the future.* St. Louis, MO: McGraw-Hill; Coleman, J., & Hoffer, T. (1987). *Public and private schools: The impact of communities.* New York, NY: Basic; Grant, G. (1988). *The world we created at Hamilton High.* Cambridge, MA: Harvard University Press; Chubb, J. E., & Moe, T. (1990). *Politics, markets and America's schools.* Washington, DC: Brookings Institute; Bryk, A., Lee, V., & Holland, P. (1993). *Catholic schools and the common good.* Cambridge, MA: Harvard University Press.

46 Especially with an aging teaching workforce, it can be unclear if differences in average salary levels are due to real differences in the compensation offered to comparable teachers at different schools or are due to differences in the experience and education levels of the teachers employed. That is, a school with older teachers may appear to offer better salaries, when, in fact, it does not. A more accurate method of comparison across schools is to compare the normal salaries paid by schools to teachers at common points in their careers. Teacher salary levels are often standardized by school districts according to a uniform salary schedule, based on the teachers' education levels and years of experience. In this analysis, we tested two salary schedule measures—each based on a different point on school salary schedules: (1) the normal yearly base salary for a teacher with 10 years of experience and a master's degree; and (2) the normal yearly base salary for a teacher at the highest possible step on the salary schedule. The latter measure had a slightly stronger association with turnover than the former, and it also had relatively fewer missing data; hence, it is used in this study. This measure represents the organizational financial rewards

teachers can look forward to at an advanced point in their careers if they stay at their particular schools and, hence, we expect could affect their decisions to depart or stay.

This measure also may have limitations. Some might argue that school salary schedules do not accurately capture the effect of salary on rates of teacher turnover because candidates can obtain this information in deciding whether to accept a particular teaching job. From this viewpoint, since public school teachers are compensated according to published salary schedules that change only infrequently, new entrants can predict with almost complete certainty how much they will be paid in each year in the future. Hence, if a teacher did accept a job, it suggests that they are satisfied with their school's salary levels and, consequently, most likely low salaries would not be a factor in future turnover.

However, sometimes teachers may, of course, accept jobs with salaries below what they would prefer and then move in a few years when a better-paying job opens up. Goodlad (1984) and others have argued that, while money is not a major factor in teachers' choice of a job, it is a major factor in their decision to move or leave teaching. In this view, beginning teachers are primarily motivated by nonpecuniary and intrinsic values, but if these kinds of expectations are frustrated, salaries can become a source of considerable dissatisfaction. Hence, from this viewpoint, salary schedules would be related to turnover precisely because they allow teachers to predict how much they will be paid in the future. This analysis does not presume the validity of either view but simply tests whether differences in advanced salaries among schools are related to turnover.

47 Ingersoll, R., & May, H. (2012). The magnitude, destinations and determinants of mathematics and science teacher turnover. *Educational Evaluation and Policy Analysis. 34*(4), 435–464.

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