

A Quarter Century of Changes in the Elementary and Secondary Teaching Force: From 1987 to 2012

Statistical Analysis Report

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Richard Ingersoll

University of Pennsylvania and
Consortium for Policy Research in Education

Lisa Merrill

Research Alliance for New York City Schools, New York University

Chelsea Owens

Andrew Zukerberg

Project Officers

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Content Contact

Andrew Zuckerberg
(202) 245-6186
andrew.zuckerberg@ed.gov

Executive Summary

This report utilizes the nationally representative Schools and Staffing Survey (SASS) to examine changes in the elementary and secondary teaching force in the United States over the quarter century from 1987–88 to 2011–12. The report focuses on three key demographic characteristics: the size of the teaching force, the level of teaching experience of the teaching force, and the racial/ethnic composition of the teaching force.

SASS is a large-scale sample survey of elementary and secondary teachers and schools in the United States. SASS has been conducted seven times—in school years 1987–88, 1990–91, 1993–94, 1999–2000, 2003–04, 2007–08, and 2011–12. SASS was developed to obtain comprehensive data on teachers, including a wide range of information on teachers’ backgrounds, characteristics, qualifications, and workplaces (Haggstrom, Darling-Hammond, and Grissmer 1988; Ingersoll 1995). As a result, SASS is an excellent source of data for examining changes in the demographic characteristics of the teaching force in the United States. SASS is administered by the Institute of Education Sciences’ National Center for Education Statistics (NCES), which is the statistical agency of the U.S. Department of Education.

This report builds on and expands an earlier study by Ingersoll, Merrill, and Stuckey (2014) that analyzed SASS data to explore what demographic trends and changes have, or have not, occurred in the elementary and secondary teaching force since the late 1980s. This earlier study, summarized in a report (<http://www.cpre.org/7trends>) published by the Consortium for Policy Research in Education, found considerable changes in the teacher force, with significant, but under-recognized implications. Among the key findings were that the teaching force has become

- *larger*—The teaching force dramatically increased in size, growing at over twice the rate of student enrollment.
- *less experienced*—With increases in hiring there has also been a correspondingly large increase in the number of teachers who are beginners in their first several years of teaching. In 1987–88, the modal, or most common, teacher had 15 years of teaching experience. By 2007–08, the modal teacher was in his or her first year of teaching.
- *more diverse*—The teaching force has rapidly become more racially/ethnically diverse. Growth in the number of minority teachers has outpaced growth in minority students and has been more than twice the growth rate of White teachers.¹

The objective of the Ingersoll, Merrill, and Stuckey (2014) study was to provide a broad overview of national changes in the demographic characteristics of the teaching force and to

¹ Minority refers to all those who are not White, non-Hispanic. It includes: Hispanics or Latinos, regardless of race; Blacks or African Americans, non-Hispanic; Asians or Native Hawaiian/Pacific Islanders, non-Hispanic; American Indians/Alaska Natives, non-Hispanic; and those of Two or more races, non-Hispanic. For simplicity of presentation, “non-Hispanic” modifiers have been removed from the race-ethnicity categories in the text of the report. Asian in the text refers to Asian/Native Hawaiian/Pacific Islander, non-Hispanic. Black refers to Black, non-Hispanic. American Indian refers to American Indian/Alaska Native, non-Hispanic. Two or more races refers to Two or more races, non-Hispanic. White refers to White, non-Hispanic. Hispanic refers to Hispanics, regardless of race.

explore some of the possible reasons for, and implications of, the changes discovered. It did not disaggregate the data, nor did it investigate how the changes differ by type of teacher and by type of school.

These variations are the subject of this report. This analysis investigates how changes in these characteristics of the teaching force—the number of teachers, the level of teaching experience, and the racial/ethnic diversity of the teaching force—varied across different types of teachers and across types of schools in the 25 years between 1987–88 and 2011–12. The data analysis shows that these changes have not been distributed evenly across teacher and school types. The major findings are summarized below.

Changes in the Size of the Teaching Force

While the teaching force has grown overall (by 46 percent), there have been large differences in growth across different teaching fields. The number of teachers reporting main teaching assignments in English as a second language (ESL), English/language arts (ELA), mathematics, foreign language, natural science, and special education, all grew at above-average rates. In contrast, the fields of general elementary, vocational-technical education, and art/music each had below-average growth (table 1 and figure 4).

Additionally, the growth in the teaching force has not been equal across different types of schools. The teaching force in high-poverty public schools (those in which at least 75 percent of the students were approved for the free or reduced-price lunch program) grew by nearly 325 percent. In contrast, the number of teachers employed in low-poverty public schools (in which less than a third of the students were approved for the free or reduced-price lunch program) declined by one-fifth (table 2 and figure 5). Between 1987–88 and 2011–12, the proportion of the teaching force employed in high-poverty schools increased from about 8 percent to 22 percent. As of 2011–12 high- and mid-poverty public schools employed over two-thirds of all public school teachers. In contrast, the proportion of the teaching force employed in low-poverty schools decreased from about 60 percent to 33 percent.

There were also differences in growth between public and private schools. The number of teachers employed in private schools increased between 1987–88 and 2011–12 at a higher rate than in public schools (table 2). Nevertheless, private schools in the United States account for a small portion of the elementary and secondary teaching force (about 12 percent in 2011–12). Moreover, as shown in the Ingersoll, Merrill, and Stuckey study (2014), unlike the public sector, the number of students in private schools decreased during this same period.

Changes in the number of teachers also varied across different types of private schools. The period from 1987–88 to 2011–12 saw a relatively small (about 9 percent) increase in the number of teachers employed in Catholic schools. On the other hand, there were increases greater than 100 percent in the total number of teachers in the non-Catholic religious private school sector and in the nonsectarian/nonreligious private school sector.

Changes in the Experience Levels of the Teaching Force

Parallel to the growth in the teaching force, between 1987–88 and 2011–12, there was also an increase in the number of beginning teachers. While the percentage of all teachers who were beginners (about 22 percent) did not change between 1987–88 and 2011–12, the data show that the number of beginners (those with 5 or less years of experience) increased by 43 percent, representing a gain of over 250,000 beginning teachers (table 3). As might be expected, those types of schools with the greatest hiring and growth also often had the largest gains in numbers of beginning teachers. For example, between 1987–88 and 2011–12, the number of beginners in high-poverty public schools increased from 41,000 to 189,400—a more than 350-percent gain. Thus, in 2011–12, there were over four times as many beginners in high-poverty schools as in 1987–88 (table 4 and figure 6). In contrast, the number of beginning teachers employed in low-poverty schools declined by one-fifth during the same period.

The teaching force in the private school sector has been less experienced than that in public schools, but this gap decreased between 1987–88 and 2011–12. Beginners comprised 20 percent of public school teachers in 1987–88 and 38 percent of private school teachers that same year. In 2011–12, 21 percent of public school teachers were beginners compared to 27 percent of private school teachers (table 4).

Changes in the Racial/Ethnic Composition of the Teaching Force

The elementary and secondary teaching force in the United States has long been predominantly White and the proportion of minority students in schools has long been far greater than the proportion of minority teachers. For instance, in the 2011–12 school year, 44 percent of all elementary and secondary students were minorities, and only 17.3 percent of all elementary and secondary teachers were minorities (Ingersoll, Merrill, and Stuckey 2014 and table 5).

However, while minority teachers remain underrepresented in the teaching force, both the number and proportion of teachers who are minorities have increased. Between 1987–88 and 2011–12 the number of minority teachers grew by 104 percent, compared to 38 percent for White teachers (table 1). The percentage of all teachers who belonged to minority groups increased from 12.4 percent in 1987–88 to 17.3 percent in 2011–12. In 1987–88, there were about 327,000 minority teachers; by 2011–12, there were about 666,000 (table 5).

These changes in overall minority representation also have not been evenly distributed across different minority subgroups. The number of Asian and Hispanic teachers increased at a higher rate than Black teachers, and American Indian teachers sharply declined in number during this period (table 1). Teachers whose main fields were ESL, foreign language, ELA, math, science, social science and special education showed above-average gains in racial/ethnic diversity. In contrast, teachers whose main fields were general elementary, vocational-technical and art/music each had below-average growth of minority teachers (table 5).

Additionally, there have been some notable differences, by teacher sex, in these changes in the racial/ethnic composition of the teaching force. During the period from 1987–88 to 2011–12, the number of White female teachers increased by 49 percent, while the number of White male teachers increased by only 12 percent. In contrast, during this same period, the number of

minority female teachers increased by 102 percent, while the number of minority male teachers increased by 110 percent (figure 7).

In both 1987–88 and 2011–12, high-poverty public schools had the highest percentage of minority teachers of the types of schools examined in this report. Moreover, the number of minority teachers employed in high-poverty public schools grew during this period. In contrast, there was almost no growth in the number of minority teachers in low-poverty public schools (table 6 and figure 8). The result is that the distribution of minority teachers across schools, by poverty level, is uneven. For instance, in 2011–12, while high-poverty public schools employed about one-fifth of the entire teaching force, they employed 42 percent of all minority teachers. In contrast, in 2011–12, while low-poverty public schools employed about one-third of the entire teaching force, they employed only 15 percent of all minority teachers.

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Introduction

This report utilizes the nationally representative Schools and Staffing Survey (SASS) to examine changes in the demographic characteristics of the elementary and secondary teaching force in the United States over the quarter century from 1987–88 to 2011–12. The report focuses on three key characteristics: the size of the teaching force, the level of teaching experience of the teaching force, and the racial/ethnic diversity of the teaching force.

SASS is a large-scale sample survey of elementary and secondary teachers and schools in the United States. SASS has been conducted seven times—in school years 1987–88, 1990–91, 1993–94, 1999–2000, 2003–04, 2007–08, and 2011–12. SASS was developed to obtain comprehensive data on teachers, including a wide range of information on teachers’ backgrounds, characteristics, qualifications and workplaces (Haggstrom, Darling-Hammond, and Grissmer 1988; Ingersoll 1995). As a result, SASS is an excellent source of data for examining changes in the demographic characteristics of the teaching force in the United States. SASS has been administered and conducted by the Institute of Education Sciences’ National Center for Education Statistics (NCES), which is the statistical agency of the U.S. Department of Education.

Background

Elementary and secondary teaching is, as of 2012, the largest occupation in the United States, and teacher compensation is the single largest item in school district budgets (U.S. Bureau of the Census 2012). Right after World War II and before the post-war baby boom, there were just under one million elementary and secondary teachers in the United States. By 2011–12, there were about four times as many—almost 4 million elementary and secondary teachers. In the 2007–08 school year alone, almost a quarter of a million newcomers entered teaching (Snyder and Dillow 2013; Ingersoll, Merrill, and Stuckey 2014).

Researchers have long held that, along with out-of-school factors, the quality and characteristics of the teaching force are important factors in the learning and growth of students and in the performance of elementary and secondary schools. The latter is deemed among the most significant influences on the quality and character of the nation’s talent pool, which, in turn, is considered central to national economic, civic, and social progress (National Commission on Excellence in Education 1983; National Academy of Sciences 1987; National Research Council 2002; National Commission on Teaching and America’s Future 1996 and 1997; U.S. Department of Education 2002).

As a result, the characteristics of those who join the elementary and secondary teaching force have long been of great interest to policymakers, researchers, educators, and the public. Indeed, few educational issues have received more attention in the past few decades than the challenge of staffing the nation’s classrooms with a sufficient quantity, quality, and diversity of teachers (Cochran-Smith and Zeichner 2005; Finn, Kanstoroom, and Petrilli 1999; Guarino, Santibanez, and Daley 2006; Hirsch, Koppich, and Knapp 2001; Rice et al. 2009).

For example, in recent decades numerous highly publicized national reports have called attention to shortages in the supply of elementary and secondary school teachers (Darling-Hammond

1984; National Commission on Excellence in Education 1983; National Academy of Sciences 1987 and 2007; National Commission on Mathematics and Science Teaching for the 21st Century 2000; National Research Council 2002; National Academy of Sciences 2007). These reports hold that there has been a dramatic increase in the demand for new teachers, primarily resulting from two converging demographic trends—increasing student enrollments and rising teacher attrition due to an aging teaching force. This view holds that the production of new teachers has been insufficient in meeting the increased demand, especially in the fields of math, science, special education, and English as a second language (ESL). These reports argue that insufficient numbers of qualified teachers, in turn, has forced many school systems to resort to lowering standards to fill teaching openings, inevitably resulting in high levels of underqualified teachers and lower school performance.

In response, in recent decades numerous government and nongovernment organizations have instituted and funded a variety of initiatives designed to recruit new candidates into teaching. Among these are career-change programs, such as “Troops-to-Teachers,” designed to entice professionals into mid-career switches to teaching, and Peace Corps-like programs, such as Teach for America, designed to lure academically talented candidates into understaffed schools. Many states have instituted alternative certification programs, whereby college graduates can postpone some or all of their formal education training and begin teaching immediately. Some school districts have resorted to recruiting teaching candidates from overseas. Scholarships, financial incentives, student loan forgiveness, housing assistance, and tuition reimbursement have all been instituted to aid recruitment. These initiatives often have been targeted in particular to mathematics and science (National Commission on Teaching and America’s Future 1996 and 1997; National Research Council 2002; National Academy of Sciences 2007).

There has also long been concern over adequate student access to experienced and seasoned teachers. While there is debate over exactly how much the performance of teachers improves with each additional year spent in the classroom (Ingersoll and Merrill 2010; National Council on Teacher Quality 2010; New Teacher Project 2010), there is wide acceptance that classroom teaching experience is an important factor in the quality of teachers and teaching. A growing number of studies have shown that the growth in teaching knowledge and skill that individuals acquire increases significantly through their first several years on the job (e.g., Henry, Fortner, and Bastian 2012; Kane, Rockoff, and Staiger 2006). In short, there is wide recognition that experience in a teaching staff is a vital school asset (Zumwalt and Craig 2005a and 2005b; Rice et al. 2009). Moreover, many critics of educational inequality believe that teacher experience is an important educational resource that is not equally allocated (Oakes 1990; Zumwalt and Craig 2005a and 2005b). In this view, the neediest students—such as those from low-income communities—are often taught by the least experienced teachers. Such critics hold this up as a main reason why such students often perform poorly in educational assessments. In response, numerous government and nongovernment organizations in recent decades have instituted and funded a variety of programs and initiatives designed to recruit and retain experienced teachers to hard-to-staff and high-need schools (e.g., National Commission on Teaching and America’s Future 1996 and 1997; National Research Council 2002; National Academy of Sciences 2007).

For the past several decades, shortages of minority teachers have also been a major issue for the U.S. school system. It is widely held that, as the nation’s population and students have grown more racially and ethnically diverse, the teaching force has not kept pace (Torres, Santos, Peck,

and Cortes 2004; Villegas and Lucas 2004; Zumwalt and Craig 2005a and 2005b). The result, in this view, is that minority students in the nation's schools increasingly lack minority adult role models and contact with teachers who understand their racial and cultural background (Irvine 1988; Ladson-Billings 1995). Critics hold that this is especially true for male minority teachers—often considered the group in shortest supply. The shortage of minority teachers, in turn, is widely viewed as a key reason for the minority student academic achievement gap and, ultimately, unequal occupational and life outcomes for minorities (Oakes 1990; Zumwalt and Craig 2005a and 2005b). In response, numerous government and nongovernment organizations have instituted and funded a variety of minority teacher recruitment programs and initiatives in recent decades. By 2008, over half of the states had minority teacher recruitment initiatives or programs in place (Villegas and Irvine 2009).

These policy concerns regarding the quantity, quality, and diversity of the teaching force have also generated a long line of empirical “teacher effects” research devoted to evaluating the importance and impacts of a wide variety of characteristics of individual teachers, such as their ability, education, qualifications, sex, age, experience, and race/ethnicity on a wide variety of teacher and student outcomes (for examples and reviews, see: Evans 1992; Clotfelter, Ladd, and Vigdor 2006; Kane, Rockoff, and Staiger 2006; Dee 2007; Rice 2010; Rockoff 2004; Zumwalt and Craig 2005a and 2005b; Henry, Fortner, and Bastian 2012). However, there has been surprisingly little empirical research on the basic demographic characteristics of the teaching force, such as its size, experience levels and race/ethnicity composition, and the extent to which these characteristics have changed in recent decades.

Prior Research

This report builds on an earlier study by Ingersoll, Merrill, and Stuckey (2014) that analyzed SASS data to explore what demographic trends and changes have, or have not, occurred in the elementary and secondary teaching force since the late 1980s. This earlier study is summarized in a report published in April 2014 by the Consortium for Policy Research in Education (<http://www.cpre.org/7trends>). This study found that the teaching force has been greatly changing, with significant, but under-recognized, implications. Among the key findings, summarized below, were that the teaching force has become: larger, less experienced, and more racially and ethnically diverse.

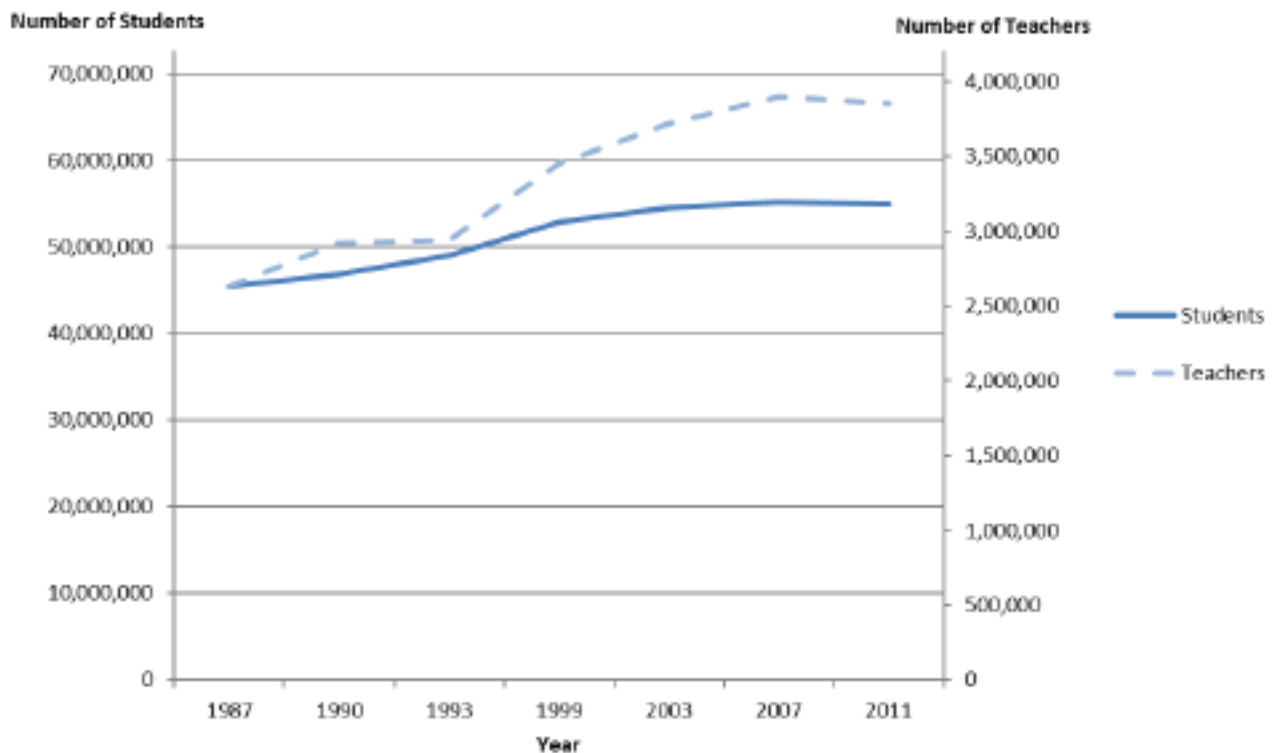
Changes in the Size of the Teaching Force. The teaching force has grown in size. The numbers of both students and teachers grew throughout the 20th century, and in the late 1940s the rate of growth for both groups began to soar with the post-World War II baby boom and the emergence of the comprehensive high school. Student enrollment peaked by 1970 and then declined until the mid-1980s. During this period, the numbers of teachers also peaked and then leveled off. In the mid-1980s, elementary and secondary student enrollment again began to grow. Since then, the teaching force also has grown in size (Snyder and Dillow 2013).

The more recent rate of these teacher and student increases has not matched those of the baby-boom years—with one large difference. In recent decades, the rate of increase for teachers has far outpaced the rate of increase for students—that is, the number of teachers increased at a higher rate than the number of students. From 1987–88 to 2011–12, total K–12 student enrollment in the nation's schools (public, private, and charter combined) increased by 19.4

percent. During the same period, the teaching force employed in schools increased at over two times that rate, by 46.4 percent. This resulted in a decrease in the overall pupil-teacher ratio in schools, from 17.3 to 14. The increases in the number of teachers all took place between 1987–88 and 2007–08 (see figure 1). Since the economic downturn that began after 2008, growth in the teaching force leveled off. Between 2007–08 and 2011–12, while the student population slightly increased (by less than 1 percent), the teaching force slightly decreased (by about 1 percent).

The report also revealed that, during the 25-year period from 1987 to 2012, the number of teachers in private schools increased at a faster rate than in public schools, while the number of students in private schools decreased. The result was a decrease in the average pupil-teacher ratio in private schools, which was already lower than in public schools. The data showed that private schools in the United States account for a small portion of the elementary and secondary teaching force (about 12 percent in 2011–12) and of the student population (about 8.3 percent in 2011–12).

Figure 1. Number of elementary and secondary school teachers, 1987–88 to 2011–12



NOTE: This figure is based on analyses of data from seven cycles of the Schools and Staffing Survey—1987–88, 1990–91, 1993–94, 1999–2000, 2003–04, 2007–08, and 2011–12.

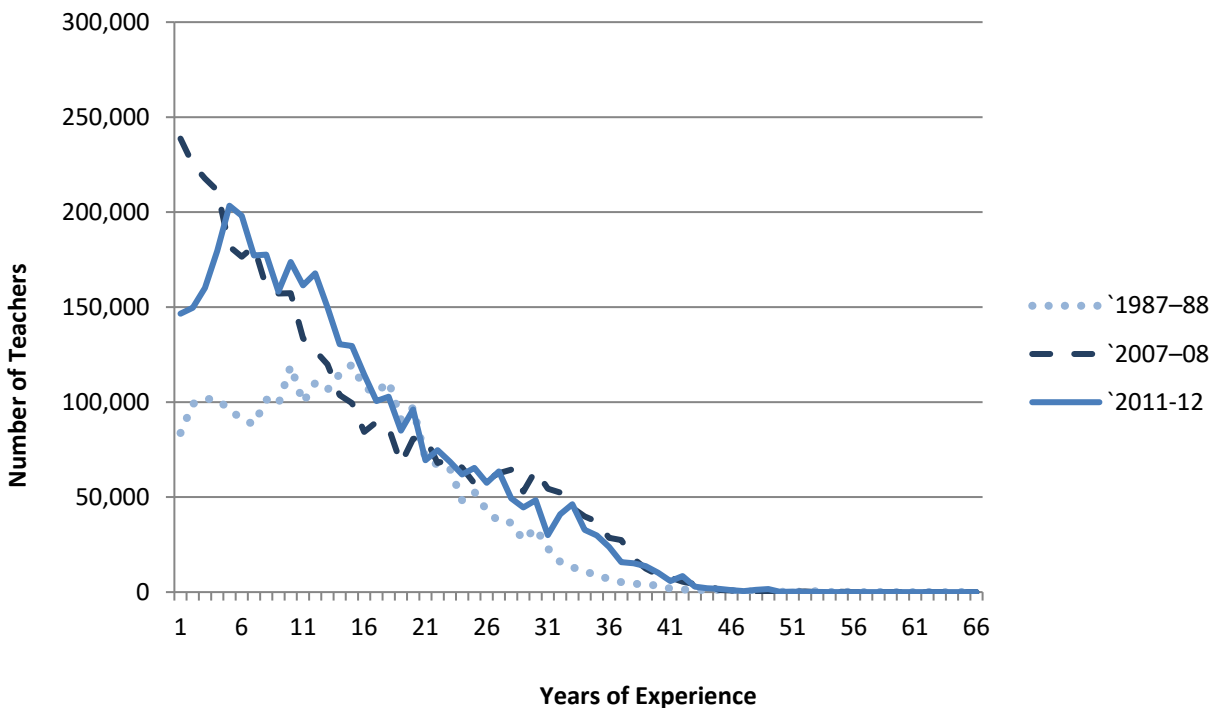
SOURCE: Ingersoll, R., Merrill, E., and Stuckey, D. (2014). *Seven Trends: The Transformation of the Teaching Force, Updated* (CPRE Report RR-80). Philadelphia: Consortium for Policy Research in Education, University of Pennsylvania.

Changes in the Experience Levels of the Teaching Force. Increases in the hiring of new teachers has been one factor leading to a second change—a dramatic increase in the number of teachers who are beginners—a trend referred to in the Ingersoll, Merrill, and Stuckey study (2014) as a “greening” of the teaching force. This trend is illustrated by the distribution of

teachers by their years of teaching experience. As shown in the earlier study, in 1987–88, the modal, or most common, school teacher had 15 years of teaching experience. By 2007–08, the modal teacher was not an experienced classroom teacher; he or she was a beginner in his or her first year of teaching. With the advent of the economic downturn beginning in 2007–08 and the subsequent decrease in hiring, which was accompanied by layoffs—usually of beginners—this greening of the teaching force slowed down. By 2011–12, the modal teacher was someone in his or her fifth year.

However, because the teaching force has dramatically grown, *numerically* there are far more beginners than before. For example, in 1987–88, there were about 135,400 first-year teachers; by 2007–08, there were over 239,000. By 2011–12, despite several years of layoffs and little hiring, there were still about 149,000 first-year teachers (see figure 2). Similarly, in 1987–88, approximately 1 million teachers (about 42 percent of all teachers) had 10 or fewer years of teaching experience; in 2007–08, this number had nearly doubled to 1.9 million (about half of the teaching force). By 2011–12, there were still over 1.7 million teachers (about 45 percent of the teaching force) with 10 or fewer years of experience (Ingersoll, Merrill, and Stuckey 2014). There are, of course, still large numbers of more experienced teachers; in 2011–12, about half of all school teachers had 11 or more years of teaching experience.

Figure 2. Teaching experience of school teachers, 1987–88, 2007–08, and 2011–12

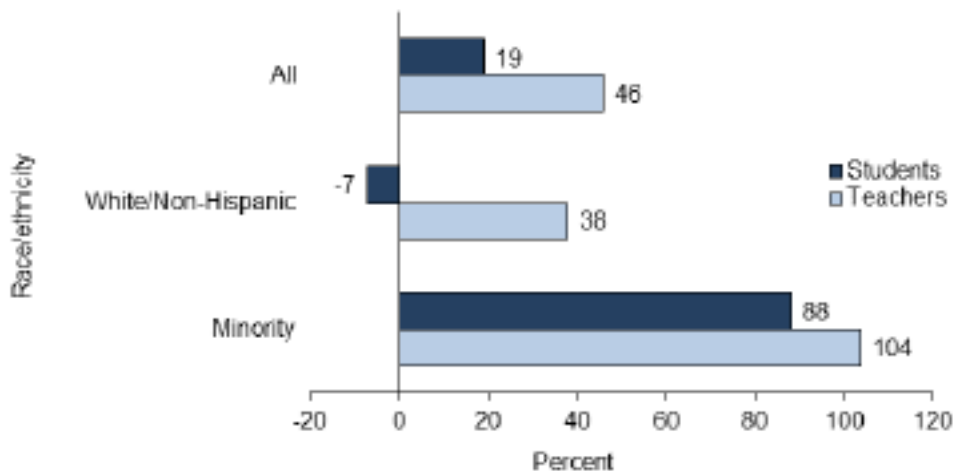


NOTE: this figure is based on analyses of data from three cycles of the Schools and Staffing Survey—1987–88, 2007–08, and 2011–12.

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

Changes in the Racial/Ethnic Composition of the Teaching Force.¹ The Ingersoll, Merrill, and Stuckey (2014) study also documented large changes in the racial/ethnic composition of the teaching force. To be sure, teaching remains a primarily White workforce, and 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, 37 percent of the nation’s population belonged to minority groups (U.S. Bureau of the Census 2012), 44 percent of all elementary and secondary students were minorities, but only 17.3 percent of all elementary and secondary teachers were minorities.

Figure 3. Percentage change in students and teachers, by race/ethnicity, 1987–88 to 2011–12



NOTE: This figure is based on analyses of data from two cycles of the Schools and Staffing Survey—1987–88 and 2011–12. SOURCE: Ingersoll, R., Merrill, E., and Stuckey, D. (2014). *Seven Trends: The Transformation of the Teaching Force, Updated* (CPRE Report RR-80). Philadelphia: Consortium for Policy Research in Education, University of Pennsylvania.

But the persistence of this gap has not been due to a failure to recruit minority teachers. The gap has persisted in recent years largely because the number of White students has decreased, while the number of minority students has increased. And, though persistent, the gap decreased. The percentage of all teachers who belonged to minority groups increased from 12.4 percent in 1987–88 to 17.3 percent in 2011–12. Moreover, these percentages do not take into account the growth of the teaching force. Because the teaching force dramatically grew, *numerically* there are far more minority teachers than before. In 1987–88, there were about 327,000 minority teachers; by 2011–12, there were over 666,000. Growth in the number of minority teachers (104 percent) has

¹ Minority refers to all those who are not White, non-Hispanic. It includes: Hispanics or Latinos, regardless of race; Blacks or African Americans, non-Hispanic; Asians or Native Hawaiian/Pacific Islanders, non-Hispanic; American Indians/Alaska Natives, non-Hispanic; and those of Two or more races, non-Hispanic. For simplicity of presentation, “non-Hispanic” modifiers have been removed from the race-ethnicity categories in the text of the report. Asian in the text refers to Asian/Native Hawaiian/Pacific Islander, non-Hispanic. Black refers to Black, non-Hispanic. American Indian refers to American Indian/Alaska Native, non-Hispanic. Two or more races refers to Two or more races, non-Hispanic. White refers to White, non-Hispanic. Hispanic refers to Hispanics, regardless of race.

outpaced growth in minority students (88 percent) and was over twice the growth rate of White teachers (38 percent) (see figure 3).

So, although the proportion of minority students in schools still remains greater than the proportion of minority teachers, the teaching force has become more racially and ethnically diverse (for detailed analyses of the SASS data on minority teacher recruitment, retention and shortages, see, Ingersoll and May 2011; Ingersoll 2015; Ingersoll, May, and Collins 2017).

The objective of the earlier study was to provide a broad overview of national changes in the demographic characteristics of the teaching force and to explore some of the possible reasons for, and implications of, the changes discovered. It also raised a number of questions. Among them is the question of how widespread and uniform these demographic changes were across the nation—the subject of this report.

Study Objectives

This Statistical Analysis Report builds on the Ingersoll, Merrill, and Stuckey (2014) study, using SASS data to further examine three demographic characteristics of the teaching force—size, levels of teaching experience, and racial/ethnic diversity. This is a descriptive study. The objective is not to explain the reasons behind the trends, nor to evaluate the implications of these trends. The objective of this report is to expand the earlier investigation to examine and describe variations in these demographic characteristics, and their changes, across subgroups. This analysis takes advantage of the depth and breadth of the SASS data to examine these differences across a variety of types of teachers and types of schools, over the quarter century from the first SASS, administered in 1987–88, to the most recent SASS available, administered in 2011–12. There are three parts to this report, corresponding to the three characteristics of the teaching force examined. These three parts are described below.

Changes in the Size of the Teaching Force

This report opens with an investigation of variations in growth across the teaching force. Tables 1 and 2 detail changes in the numbers of teachers by various teacher and school characteristics between 1987–88 and 2011–12. The analysis examines to what extent increases in the number of teachers have disproportionately occurred for males or females and, in particular age, and experience subgroups and among racial/ethnic groups. The analysis also examines which fields of teaching have, or have not, shared in the overall growth. For example, has there been growth in fields, such as math, science, special education, and ESL, long deemed to suffer from shortages (National Commission on Teaching and America’s Future 1996 and 1997, National Commission on Mathematics and Science Teaching for the 21st Century 2000, National Research Council 2002, National Academy of Sciences 2007)? It compares changes in the size of these fields to increases in the number of teachers in other fields, such as English and social studies, long deemed in the literature to not suffer from shortages. This report also analyzes variations in growth in the number of teachers across different types of schools. The characteristics of schools considered in the report include school level, size, poverty level, and sector. Have particular types of schools had more growth than others?

Changes in the Experience Levels of the Teaching Force

This report then moves to an investigation of changes in the experience levels of the teaching force. It specifically focuses on the numbers and distribution of beginners (those with 5 or fewer years of experience). Tables 3 and 4 detail changes in the numbers and percentages of beginners across various teacher and school types between 1987–88 and 2011–12. For instance, this report disaggregates the data to examine whether increases in the number of beginners has differed among males or females, in particular, age and experience subgroups, among different racial/ethnic groups, and across different teaching fields.

Moreover, the analysis examines to what extent growth in beginning teachers has varied across different types of schools and documents which types of schools have the least experienced teaching staffs. For example, are schools in high-poverty communities likely to have more beginning teachers than schools in more affluent communities, and has this changed over time?

Changes in the Racial/Ethnic Composition of the Teaching Force

This report closes with an investigation of the changes in the number of minority teachers across the teaching force. Tables 5 and 6 detail changes in the number and percentage of minority teachers across different types of teachers and types of schools between 1987–88 and 2011–12. For example, the analysis examines which teacher subgroups—males and females, age and experience subgroups, and different teaching fields—shared in the increase in the number of minority teachers and which did not. Likewise, the analysis examines variations in the number of minority teachers across different types of schools.

Data, Measures, and Statistical Comparisons

Data

The data presented in this report are from National Center for Education Statistic’s (NCES) SASS. This is the largest and most comprehensive source of data on teachers in the United States. NCES has administered seven cycles of SASS over a 25-year period—1987–88, 1990–91, 1993–94, 1999–2000, 2003–04, 2007–08, and 2011–12. In each cycle, NCES administered questionnaires to a nationally representative sample of about 50,000 teachers, 11,000 school-level administrators, and 5,000 district-level officials, collecting an unusually broad and deep array of information on teachers, their students, and their schools. This report focuses on comparisons of teacher data from the first and the most recent cycles of SASS: 1987–88 and 2011–12 (see appendix B for further information on both the 1987–88 SASS and the 2011–12 SASS).

Measures

Tables 1 and 2 focus on all elementary and secondary school teachers employed in public (including charter) and private schools. The data in these two tables focus on the first of the three characteristics, described above—changes in the numbers of teachers and in the size of the teaching force.

Tables 3 and 4 focus solely on beginning teachers—defined as those with 5 or fewer years of experience—to investigate the second of the characteristics, described above: changes in the experience levels of the teaching force. There are several reasons to focus on this group. The first 5 years of a teacher’s career is a key period. Numerous studies have documented that the relationship between teachers’ departures and teachers’ experience follows a U-shaped curve. Teachers’ attrition rates are very high through their first 5 years on the job, then subsequently slow down through mid-career, and then again increase as teachers approach retirement (Murnane, Singer, and Willett. 1988; Hafner and Owings 1991; Grissmer and Kirby 1987 and 1992; Ingersoll 2003; Ingersoll and Perda forthcoming). Moreover, a growing body of research shows that the growth in teaching knowledge and skill that individuals acquire increases significantly through their first several years on the job (e.g., Henry, Fortner, and Bastian 2012; Kane, Rockoff, and Staiger 2006). Finally, for analytic purposes, defining beginners as those in their first 5 years is useful because it provides sample sizes large enough for the analysis to make more accurate conclusions about how the number of beginners varies across types of teachers and types of schools.²

² This focus on teachers in their first 5 years of teaching differs from that used in the Ingersoll, Merrill, and Stuckey study (2014). The latter examined changes in the overall distribution of teaching experience across the teaching force from 1987–88 to 2011–12 and focused in particular on changes in the numbers of teachers in their first year of teaching. In addition, the method of measuring teaching experience used in this report also differs from that used in the earlier study. As a result of these differences in both focus and measure, the estimates of experience and of beginners slightly differ between this report and the earlier study. See appendix C for further details on these differences.

Finally, tables 5 and 6 present data on minority teachers—defined as non-White teachers and Hispanic teachers, regardless of race—to focus on the third characteristic to be examined—changes in the racial/ethnic composition of the teaching force.

For each of the above three teaching force characteristics—numbers, experience, and race/ethnicity—and their accompanying pair of tables, the analysis disaggregates the data by key teacher and school characteristics. Following previous research on teachers and schools and other NCES reports, this analysis disaggregates the data by several key individual teacher characteristics: sex; race/ethnicity; age, teaching experience, and teaching field. In addition, this analysis disaggregates the data by several key school characteristics: school level, school size, the proportion of students from poverty-level families, school sector, and private school classification. These teacher-level and school-level measures are listed with definitions in Exhibits 1 and 2, and are described in detail in appendix C.

Statistical Comparisons

The analyses undertake cross-tabulations and descriptive data analyses, examining changes and differences over time between 1987–88 and 2011–12. All bivariate comparisons in this study were tested for statistical significance using a two-tailed Student’s *t* statistic to ensure that the differences were larger than might be expected due to sampling variation. Unless specifically noted, all differences cited in the report were statistically significant at the .05 level. Given large sample sizes, differences that were statistically significant at the .05 level are not necessarily substantively significant. Adjustments were not made for multiple comparisons; consequently, some differences noted here might not be significant if a multiple comparison procedure was used. Standard errors for all the table estimates are provided in appendix A. The standard errors were calculated using PROC SURVEY FREQ in SAS with the SASS replicate weights to account for the complex sampling design. The analyses follow NCES standards for displaying data in the tables: noting where standard errors are 30 percent or more of the estimate value; or where standard errors are more than 50 percent of the estimate value.

Exhibit 1. Teacher-level measures used in the analyses

Measure	Definition
Sex	
Female	Teacher self-identifies as female
Male	Teacher self-identifies as male
Race/ethnicity	
White, non-Hispanic	Teacher self-identifies as non-Hispanic and race as White
Minority	Teacher self-identifies as non-White or Hispanic
Hispanic or Latino, regardless of race	Teacher self-identifies as Hispanic and any race
Black or African American, non-Hispanic	Teacher self-identifies ethnicity as non-Hispanic and race as Black or African American
Asian or Native Hawaiian/Pacific Islander, non-Hispanic	Teacher self-identifies ethnicity as non-Hispanic and race as Asian or Native Hawaiian/Pacific Islander
American Indian/Alaska Native, non-Hispanic	Teacher self-identifies ethnicity as non-Hispanic and race as American Indian/Alaska Native
Two or more races, non-Hispanic	Teacher self-identifies with more than one race
Age	
Teacher’s age as of fall of the school year	
Teaching experience	
Teacher’s adjusted years of teaching experience. Experience is calculated as the sum of years taught full- or part-time in public and private schools.	
Field	
General elementary	Teacher’s main assignment as early childhood or general elementary

Continued next page.

Exhibit 1. Teacher-level measures used in the analyses—Continued

Measure	Definition
Mathematics	Teacher's main assignment reported to be mathematics (algebra I, II, or III, basic and general mathematics, business and applied math, calculus and precalculus, computer science, geometry, pre-algebra, statistics and probability, or trigonometry)
Natural science	Teacher's main assignment reported to be natural sciences (e.g., science, general, biology or life sciences, chemistry, earth sciences, engineering, integrated science, physical sciences, or physics)
Social science	Teacher's main assignment reported to be social sciences (e.g., social studies, general, anthropology, economics, geography, government or civics, history, native American studies, psychology, or sociology)
English/language arts (ELA)	Teacher's main assignment reported to be English and language arts (e.g., communications, composition, English, journalism, language arts, reading, or speech)
Foreign language	Teacher's main assignment reported to be foreign language (e.g., French, German, Latin, Spanish, or other foreign language)
Vocational-technical education	Teacher's main assignment reported to be vocational, career, or technical education (e.g., agricultural and natural resources, business management, business support, marketing and distribution, healthcare occupations, construction trades, mechanics and repair, manufacturing, communications and related technologies, personal and public services, family and consumer sciences education, industrial arts, or other career or technical education)
Art and music	Teacher's main assignment reported to be arts or arts and crafts, or music
Drama or dance	Teacher's main assignment reported to be drama or theater, or dance
Health and physical education	Teacher's main assignment reported to be health or physical education
English as a second language (ESL)	Teacher's main assignment reported to be ESL or bilingual education
Special education	Teacher's main assignment reported to be special education
Other	Those not included in above fields, such as, gifted and talented, alternative education, and leadership

Exhibit 2. School-level measures used in the analyses

Measure	Definition
Sector	
Public	Includes teachers working at both traditional public and charter schools. A charter school is a public school that, in accordance with an enabling state statute, has been granted a charter exempting it from selected state or local rules and regulation.
Private	Private school is a nonpublic, noncharter school
School level	
Elementary	Elementary school has any grades K–6 and none of grades 9–12
Secondary	If school has any grades 7–12 and none of grades K–6
Combined elementary and secondary	All other cases
Student enrollment	
Less than 100 students	Total K–12 and ungraded student enrollment in the school is less than 100 students
Between 100 and 749 students	Total K–12 and ungraded student enrollment in the school is more than 100 and less than 750 students
750 or more students	Total K–12 and ungraded student enrollment in the school is greater than 750 students
Percent poverty-level students	Based on the percentage of students in a school who were approved for free or reduced-price lunches but the National School Lunch Program, which is a proxy measure equivalent to the percentage of families below the federal poverty line
0 to 33 percent	Less than 33 percent of students in a school were approved for free or reduced-price lunches by the National School Lunch Program
Between 33 and 75 percent	Thirty-three percent or more, and less than 75 percent of students in a school were approved for free or reduced-price lunches by the National School Lunch Program
75 percent or more	Seventy-five percent or more of students in a school were approved for free or reduced-price lunches by the National School Lunch Program
Private school classification	Based on the religious or nonreligious orientation of a school
Catholic	If the school was a Catholic—Parochial, Catholic—Diocesan, or Catholic—Private school
Nonsectarian	If the school was another religious, conservative Christian; other religious, affiliated with a religious school association; or other religious, not affiliated with a religious school association
Other religious	If the school identifies as a nonsectarian-regular, nonsectarian-special emphasis, or nonsectarian special education school

Limitations of the Measures

The 1987–88 and 2011–12 cycles of SASS differed in several aspects that pose limitations for the analyses contained in this report. These limitations are described below.

The 1987–88 SASS did not include measures of the teaching fields of drama and dance, while the 2011–12 SASS did include these measures. Similarly, the 1987–88 SASS did not contain a teacher race/ethnicity measure for those of Two or more races, while the 2011–12 SASS did contain a measure for those of Two or more races. Hence, in tables 1, 3, and 5 of this report, these categories are left blank in the columns for 1987–88 and in the columns for changes from 1987–88 to 2011–12. Note, that in both cases—dance/drama and multiple races, the category represents a very small proportion of the teaching force—respectively, .5 and 1 percent of teachers in 2011–12.

The 1987–88 and 2011–12 cycles of SASS differed in their definitions of urban, suburban, and rural school communities or locales. As a result, it is not possible to calculate accurate comparisons by locale across cycles. Hence, this report does not disaggregate and compare teachers by these categories.³

The 1987–88 and 2011–12 cycles of SASS differed in the use of imputation for missing values. As described in detail in appendix B, in the 2011–12 SASS, all missing values were fully imputed. However, in the 1987–88 SASS, while missing values due to item nonresponse were later imputed, other missing values were not all imputed. See Hammer and Gerald (1990) for details on missing data in the 1987–88 SASS. In particular, NCES did not impute variables for nonresponding schools on the school and district files. In the 1987–88 SASS, a number of teachers were sampled for which the School Questionnaire was not completed by a school administrator and, hence, for which school-level data are not available. Because teachers without school information could not be included in their calculation, the values reported in the 1987–88 columns in tables 2, 4, and 6, of the number of teachers, by school-level characteristics (school level, student enrollment, percent low-income students, private school classification), may underestimate the true values. Weighting adjustments were made at the school level in the 1987–88 SASS to adjust for school level nonresponse, and effectively correct for nonresponse for school-level estimates. Characteristics of teachers within nonresponding schools may vary from those of teachers within responding schools, however, and the school-level nonresponse adjustments may not correct for all teacher-level differences. As a result, the estimates of changes in the number of teachers by school characteristics between 1987–88 and 2011–12 could be underestimates, and caution should be exercised when interpreting these estimates. Table B-4 in appendix B provides both the unweighted and weighted numbers of teachers in the 1987–88 SASS with missing school-level data on school characteristics. See Bobbitt and McMillen (1995) for an example of an NCES report, similar to this current report, in that it compares the 1987–88 SASS with another SASS (1990–91) dataset. The authors of this earlier NCES report were also

³ In the 1987–88 SASS, the multiple Census Bureau locale categories were collapsed into three general types of communities: Urban, Suburban and Rural. However, in the 2011–12 SASS, the categories were collapsed into four types of communities: city, suburban, town and rural. Moreover, the decisions as to which of the multiple locales were included in which Census categories was changed. For a detailed examination, see Speicher, 2002.

unable to impute those missing values for analytic purposes, but they provided useful clarification of the amount and consequences of missing data.

The 1987–88 SASS data were weighted and the weights were adjusted for nonresponse; hence, the 1987–88 data represent accurate national estimates. But, weighting for nonresponse may not always fully compensate for missing data due to nonresponding schools, especially if the latter represent a relatively large proportion of the sample. In this report the weighted number of teachers missing school-level data are included in the 1987–88 columns in tables 2, 4, and 6. Because teachers without school information could not be included in their calculation, the values reported in the 1987–88 columns in tables 2, 4, and 6, of the number of teachers, by school-level characteristics (school level, student enrollment, percent low-income students, private school classification), could underestimate the true values. Moreover, as a result of these missing data, the estimates of changes in the number of teachers between 1987–88 and 2011–12 could be underestimates. Hence, some caution must be exercised in the interpretation of estimates of the change in the number of teachers, by school characteristics, between 1987–88 and 2011–12 in tables 2, 4, and 6.

To assess the implications of the missing school-level data for the report’s findings, this analysis undertook two steps. First, appendix B includes a table (B-5) comparing the 1987–88 SASS and 1990–91 SASS distributions of public and private school teachers across the types of schools examined in this report. This table reveals that the teacher distributions across school types for the 1987–88 SASS are similar to those for the 1990–91 SASS. This suggests that the teachers missing school data in the 1987–88 SASS are not concentrated within one category of school.

Second, the analysis undertook additional tests to determine which of the significant school-level findings, discussed in reference to tables 2, 4, and 6 in the report, would not remain significant if the teachers with missing data were entirely nonrandomly distributed (i.e., were entirely located in one category of a school type) an unlikely event and a very high standard.

For instance, the data displayed in table 2 show a large increase in teachers in high-poverty public schools between 1987–88 and 2011–12. Further tests found that even if the 166,000 public school teachers missing school poverty data in 1987–88 had been employed in the high-poverty public schools category alone, the increase in teachers in those schools by 2011–12, would still be above average, and at a statistically significant level. The results of these additional tests of the school-level findings are reported in the relevant sections of the report.

Findings

Changes in the Size of the Teaching Force

Teacher-level characteristics

The earlier Ingersoll, Merrill, and Stuckey (2014) study established the magnitude of growth in the size of the teaching force and explored some of the reasons for, and implications of, this increase in teachers. This section investigates to what extent these changes, and the growth in the number of teachers employed, varied across different kinds of teachers and schools.

As shown in table 1, the two-decade growth in the number of teachers was not evenly spread across teachers' sex, race/ethnicity, age, experience, and teaching field. For instance, the number of female teachers increased at a higher rate (56 percent) than male teachers (22 percent) ($T = 203, p < .001$). The result is that teaching, while it has been a female-dominated occupation since the advent of the public school system (Tyack 1974), has become increasingly so in recent decades—from 71 percent of all teachers in the late 1980s being female to about 76 percent of teachers in 2011–12.

Moreover, the number of minority teachers increased at a significantly higher rate (104 percent) than the number of White teachers (38 percent) ($T = 1756, p < .001$). The result is that the teaching force, while it remains predominantly White, has become more racially/ethnically diverse—from about 12 percent of all teachers in the late 1980s being minority to about 17 percent of teachers in 2011–12. However, this growth was not distributed evenly across the major minority subgroups. The number of Asian and Hispanic teachers while still a relatively small portion of all teachers (2 percent and 7.5 percent, respectively in 2011–12) increased at higher rates (209 and 270 percent, respectively) than both Black teachers (25 percent) ($T = 446, p < .001$) and White teachers (38 percent) ($T = 425, p < .001$). On the other hand, the number of American Indian teachers, who made up less than 1 percent of the teaching force in 2011–12, declined during this period. (Note: changes in the racial/ethnic composition of the teaching force are examined in more detail in a later section of the findings).

The distribution of age across the teaching force has changed. The numbers and proportions of both younger (less than 30 years old) and older (age 50 or more) teachers increased at higher rates (89 and 128 percent, respectively) than middle-aged (30–49) teachers (12 percent) since the late 1980s⁴ ($T = 703, p < .001$; $T = 981, p < .001$).

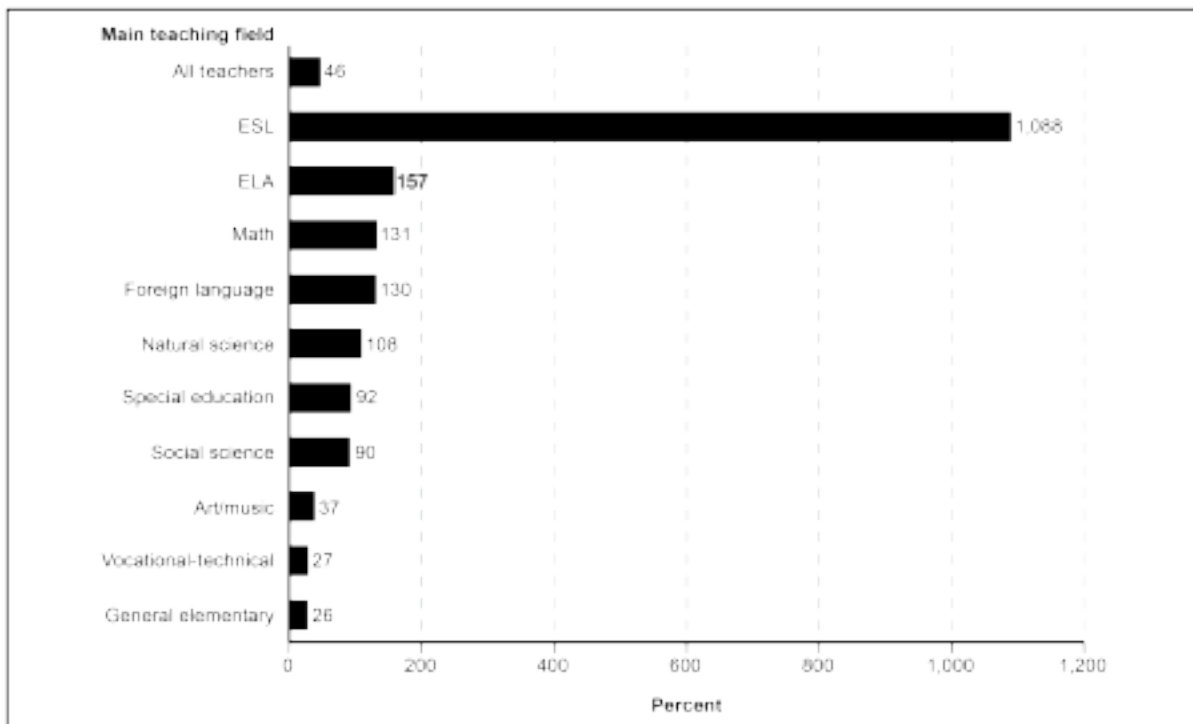
The distribution of teaching experience across the teaching force also changed during this period. Both the number of beginners (5 or less years of teaching experience) and those of mid-level experience (6 to 10 years) grew at higher rates (43 and 72 percent, respectively) than the number of veteran teachers (11 or more years) ($T = 57, p < .001$; $T = 589, p < .001$). (Note: changes in

⁴ While there was an overall increase in the number of older teachers between 1987–88 and 2011–12, it should also be noted that the data suggest the aging trend in the teaching force has recently peaked. The Ingersoll, Merrill, and Stuckey study (2014) found that the number of teachers 50 years or older has begun to decline, from about 1.3 million in 2007–08 to about 1.2 million in 2011–12, a drop of about 170,000 teachers.

the number and distribution of beginning teachers are examined in more detail in a later section of the findings).

There were also large differences in growth across teaching fields—some with large gains and others with small gains. ESL, a small field, had phenomenal growth—a 1,088-percent increase in the past two-and-a-half decades of the number of teachers reporting it as their main field ($T = 532, p < .001$). Those whose main field was special education, the second-largest field in teaching, grew 92 percent—twice the average rate of 46 percent ($T = 600, p < .001$). Three of the four core academic fields—English/language arts, mathematics, and science—already relatively large fields, each also grew at above-average rates ($T = 1,110, p < .001$; $T = 10,000, p < .001$; $T = 7,294, p < .001$). Foreign language, a smaller field, also had above-average levels of growth ($T = 671, p < .001$). In contrast, general elementary school teachers, by far the largest field in teaching and comprising almost a third of all teachers, had below-average growth ($T = 555, p < .001$). Vocational-technical ($T = 357, p < .001$) and art/music ($T = 775, p < .001$) each also had below-average growth (table 1 and figure 4). The number of teachers in the “Other” field category decreased—perhaps because new field categories were introduced in later cycles of SASS that included those that were originally contained in “other” in 1987–88.

Figure 4. Percentage increase in teachers, by main teaching field: 1987–88 to 2011–12



NOTE: ELA refers to English/language arts and ESL refers to English as a second language.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

Table 1. Total number and percentage of elementary and secondary teachers, by teacher characteristics: 1987–88 and 2011–12

Teacher characteristics	1987–88		2011–12		Change from 1987–88 to 2011–12	
	Number of teachers	Percent of teachers	Number of teachers	Percent of teachers	Change in the number of teachers	Percent change in the number of teachers
All teachers	2,630,300	100.0	3,850,100	100.0	1,219,700	46.4
Sex						
Female	1,878,600	71.4	2,931,100	76.1	1,052,500	56.0
Male	751,800	28.6	919,000	23.9	167,200	22.2
Race/ethnicity						
Hispanic, regardless of race	77,800	3.0	287,800	7.5	209,900	269.8
White, non-Hispanic	2,303,100	87.6	3,183,800	82.7	880,700	38.2
Black, non-Hispanic	197,900	7.5	247,900	6.4	50,000	25.3
Asian, Native Hawaiian/ Pacific Islander, non-Hispanic	24,500	0.9	75,500	2.0	51,100	208.6
American Indian/Alaska Native, non-Hispanic	27,000	1.0	17,100	0.4	-10,000	-36.9
Two or more races, non-Hispanic ¹	—	—	37,900	1.0	—	—
Age						
Less than 30	379,800	14.4	717,000	18.6	337,200	88.8
30–49	1,722,900	65.5	1,929,500	50.1	206,600	12.0
50 or more	527,600	20.1	1,203,500	31.3	675,900	128.1
Teaching experience						
0–5 years	591,400	22.5	845,500	22.0	254,000	43.0
6–10 years	513,100	19.5	883,800	23.0	370,700	72.2
11 or more years	1,525,800	58.0	2,120,800	55.1	595,000	39.0
Field						
General elementary	974,400	37.0	1,231,700	32.0	257,200	26.4
Math	140,900	5.4	326,000	8.5	185,100	131.4
Natural science	124,700	4.7	259,900	6.8	135,200	108.4
Social science	126,200	4.8	239,700	6.2	113,500	89.9
English/language arts	169,800	6.5	435,800	11.3	266,000	156.7
Foreign language	56,900	2.2	130,900	3.4	74,000	130.1
Vocational-technical	125,900	4.8	159,200	4.1	33,300	26.5
Art and music	164,400	6.3	225,600	5.9	61,200	37.2
Drama or dance ¹	—	—	19,600	0.5	—	—
Health and P.E.	127,400	4.8	202,000	5.2	74,600	58.6
English as a second language (ESL)	6,000	0.2	71,600	1.9	65,600	1,088.3
Special education	235,200	8.9	450,500	11.7	215,300	91.6
Other	378,400	14.4	97,500	2.5	-281,000	-74.3

— Not available.

¹ The 1987–88 SASS did not include measures of the teaching fields of drama and dance, nor did it include a teacher race/ethnicity measure for those of Two or more races. Hence, these categories are left blank in the 1987–88 columns.

NOTE: Due to rounding, frequencies may not sum to totals.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

School-level characteristics

As shown in table 2, the two-decade growth in the number of teachers also was not spread evenly across different types of schools.⁵

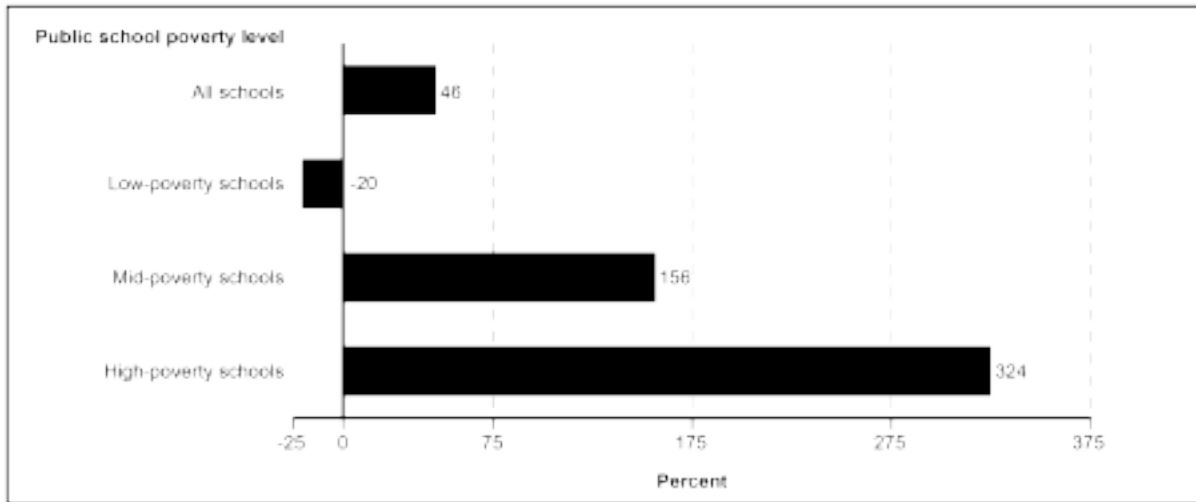
Considering public school teachers, there were larger-than-average increases in the numbers employed in combined schools (K–12), elementary schools, large schools, and especially in high-poverty schools. Among private school teachers, there were significant increases in the numbers employed in non-Catholic schools.

In general, the number of teachers employed in public schools increased by 46 percent between 1987–88 and 2011–12. Public school teachers working in combined schools represented a small proportion of all public school teachers in 2011–12 (about 9 percent), but the number of such teachers increased by 187 percent ($T = 2,366, p < .001$) during the period from 1987–88 to 2011–12. The teaching force in public elementary schools grew at over double the rate of that in public secondary schools ($T = 357, p < .001$). However, as mentioned above, this was not due to large increases in regular general elementary teachers.⁶ The growth of teachers in large public schools (those enrolling 750 or more students) also increased at above-average rates ($T = 649, p < .001$).

⁵ Table 2 indicates that in the 1987–88 SASS, of all public schools teachers, 7 percent are missing school data and of all private school teachers, 11.7 percent are missing school data. To assess the implications of teachers missing school-level data, the analysis tested which school-level findings, discussed above, would not hold if the missing data were entirely nonrandom (i.e., were entirely located in one category of a school type), an unlikely event and a very high standard. The results showed that the above findings on increases in teachers in elementary public schools, large public schools, high-poverty public schools, non-Catholic religious private schools and nonsectarian private schools, while of course of a lower magnitude, all remained statistically significant. For instance, even if the 166,000 public school teachers missing school poverty data in 1987–88 were all employed in high-poverty schools alone, the increase in teachers in those schools by 2011–12 was still above average, and at a statistically significant level. There was one exception: the finding on an increase in teachers in public combined schools did not remain statistically significant because these are small in size and number (elem: $T = 83, p < .001$; large: $T = 55, p < .001$; high-poverty: $T = 82, p < .001$; nonsectarian: $T=55, p < .001$; other relig: $T = 49, p < .001$).

⁶ Additional analyses have shown there have been above-average increases in the number of elementary-level enrichment teachers and subject specialists, such as in math, English, reading, or computer science (Ingersoll, Merrill, and Stuckey 2014), which may account for the overall teacher growth in public elementary schools.

Figure 5. Percentage change in teachers, by public school poverty level: 1987–88 to 2011–12



NOTE: Low-poverty schools refers to those with less than 33 percent students approved for free or reduced-price lunches; mid-poverty schools refers to those with 33 to 74 percent students approved for free or reduced-price lunches; high-poverty schools refers to those with 75 or more students approved for free or reduced-price lunches.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

Table 2. Total number and percentage of elementary and secondary teachers, by school characteristics: 1987–88 and 2011–12

School characteristics ¹	1987–88		2011–12		Change from 1987–88 to 2011–12	
	Number of teachers	Percent of teachers	Number of teachers	Percent of teachers	Change in the number of teachers	Percent change in the number of teachers
All schools	2,630,300	100.0	3,850,100	100.0	1,219,700	46.4
All public schools	2,323,200	88.3	3,385,200	87.9	1,062,000	45.7
School level						
Elementary	1,263,600	54.4	2,087,300	61.7	823,700	65.2
Secondary	789,200	34.0	998,300	29.5	209,200	26.5
Combined	104,300	4.5	299,600	8.8	195,200	187.1
Missing	166,100	7.2				
Student enrollment						
Less than 100	33,000	1.4	57,900	1.7	24,900	75.4
100–749	1,393,000	60.2	2,002,400	59.2	609,300	43.7
750 or more	731,000	31.2	1,324,900	39.1	593,900	81.2
Missing	166,100	7.2				
Percent poverty-level students						
Less than 33 percent	1,383,800	59.6	1,108,000	32.7	-275,800	-19.9
33–74 percent	595,200	25.6	1,522,700	45.0	927,500	155.8
75 percent or more	178,100	7.7	754,500	22.3	576,400	323.7
Missing	166,100	7.2				
All private schools	307,100	11.7	464,900	12.1	157,800	51.4
School classification						
Catholic	131,500	42.8	143,100	30.8	11,600	8.8
Nonsectarian	53,400	17.4	138,700	29.8	85,300	159.8
Other religious	86,200	28.1	183,100	39.4	96,900	112.5
Missing	36,100	11.7				
School level						
Elementary	145,000	47.2	201,000	43.2	56,000	38.6
Secondary	52,100	16.9	72,000	15.5	20,000	38.4
Combined	74,000	24.1	191,800	41.3	117,800	159.3
Missing	36,100	11.7				
Student enrollment						
Less than 100	37,800	12.3	92,500	19.9	54,800	145.1
100–749	201,400	65.7	309,000	66.5	107,500	53.4
750 or more	31,900	10.3	63,400	13.6	31,500	99.0
Missing	36,100	11.7				

¹ Because of missing school data, the values in the 1987–88 columns of the number of teachers, by school-level characteristics, are underestimates. Hence, caution must be exercised in the interpretation of estimates of the change in the number of teachers, by school characteristics, between 1987–88 and 2011–12.

NOTE: Due to rounding, frequencies may not sum to totals.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

There were large gains in the number of teachers employed in public schools with relatively high concentrations of students from lower-income families. The number of teachers in high-poverty schools (in which three-quarters of the students in a school were approved for the free or reduced-price lunch program) increased to nearly 325 percent. The increase in teachers in mid-poverty public schools (in which a third to three-quarters of the students were approved for the free or reduced-price lunch program) was about half that rate ($T = 730, p < .001$). As of 2011–12, these two categories of schools employed about two-thirds of all public school teachers. In contrast, the number of teachers in low-poverty public schools (in which less than a third of students were approved for the free or reduced-price lunch program) declined by one-fifth (see figure 5).

The private school sector differed from the public school sector in its teacher growth pattern. In recent decades, as shown in table 2, the number of teachers employed in private schools

increased at a higher rate than in public schools ($T = 156, p < .001$). Nevertheless, private schools continue to account for a relatively small portion of the teaching force (about 12 percent in 2011–12).⁷ However, growth in teachers varied by type of private school. The period from 1987–88 to 2011–12 saw a well below-average increase in the number of teachers employed in Catholic schools ($T = 491, p < .001$). In contrast, there were large increases in the number of teachers in non-Catholic religious private schools and in nonsectarian/nonreligious private schools.

Changes in the Experience Levels of the Teaching Force

Teacher-level characteristics

As documented in the Ingersoll, Merrill, and Stuckey (2014) study, with the large increase in the hiring and employment of new teachers since the late 1980s, there has been an accompanying increase in the numbers of beginning teachers. This section investigates to what extent the increase in beginners varies—depending on what kinds of teachers and schools are examined. Tables 3 and 4 present data on teacher and school differences in the relative proportions of beginners, which are defined here as teachers with 5 or fewer years of teaching experience.⁸ While the percent of all teachers who were beginners (about 22 percent) did not change between 1987–88 and 2011–12, the data show that the number of beginners increased by 43 percent—representing a gain of over 250,000 beginning teachers. As might be expected, those types of teachers and schools with the greatest growth, as illustrated in tables 1 and 2, also often had the largest gains in numbers of beginners. The main findings are summarized below.

As shown in table 3, Asian and Hispanic teachers both had well above-average growth in beginners, 220 and 244 percent, respectively ($T = 201, p < .001$; $T = 354, p < .001$). However, because of the large growth in the number of Hispanic teachers, the proportion that were beginners actually declined slightly between 1987–88 and 2011–12, from 31 percent to 27 percent. On the other hand, American Indian teachers have been a small and declining portion of the teaching force.

Many fields, including ESL, math, English/language arts, social science, foreign language, and natural science, had above-average growth in beginners (ESL: $T = 184, p < .001$; math: $T = 178, p < .001$; ELA: $T = 233, p < .001$; social science: $T = 223, p < .001$; language: $T = 209, p < .001$; science: $T = 107, p < .001$). By 2012, of those teachers reporting these as their main field, a fifth or more had 5 or fewer years of experience. It should be noted that, while there was above-average growth in the number of beginning teachers in ESL (595 percent), its percentage of

⁷ Interestingly, while the number of teachers employed in private schools increased between 1987–88 and 2011–12 and at a higher rate than in public schools, unlike the public sector, the number of students in private schools decreased during this same period—by 13 percent. The overall result has been a sharp decrease in the average pupil-teacher ratio in private schools, which was already lower than in public schools (Ingersoll, Merrill, and Stuckey 2014).

⁸ The measure of teaching experience here differs from that used in the Ingersoll, Merrill, and Stuckey study (2014). For details on the rationale for, and measures of, teaching experience, see section on Measures, footnote #2, and appendix C.

beginners actually declined over this time period because of the even larger growth of ESL as a field (1,088 percent).

Table 3. Total number and percentage of beginning teachers (5 or less years), by teacher characteristics: 1987–88 and 2011–12

Teacher characteristics	1987–88		2011–12		Change from 1987–88 to 2011–12	
	Number of beginning teachers	Percent beginning teachers	Number of beginning teachers	Percent beginning teachers	Change in the number of beginning teachers	Percent change in the number of beginning teachers
All beginning teachers	591,400	22.5	845,500	22.0	254,000	43.0
Sex						
Female	464,100	24.7	639,800	21.8	175,700	37.9
Male	127,300	16.9	205,700	22.4	78,300	61.5
Race/ethnicity						
Hispanic, regardless of race	24,100	31.0	77,100	26.8	53,000	219.6
White, non-Hispanic	523,100	22.7	676,600	21.3	153,500	29.3
Black, non-Hispanic	33,000	16.7	56,500	22.8	23,500	71.4
Asian, Native Hawaiian/ Pacific Islander, non-Hispanic	5,700	23.3	19,600	26.0	13,900	243.8
American Indian/Alaska Native, non-Hispanic	5,600	20.6	3,200 ¹	18.8 ¹	-2,400	-42.5
Two or more races, non-Hispanic ¹	—	—	12,500	33.0	—	—
Age						
Less than 30	316,400	83.3	527,700	73.6	211,300	66.8
30–49	253,300	14.7	267,000	13.8	13,700	5.4
50 or more	21,800	4.1	50,700	4.2	29,000	133.0
Field						
General elementary	213,500	21.9	251,100	20.4	37,600	17.6
Math	28,000	19.9	80,000	24.6	52,000	185.6
Natural science	28,300	22.7	64,600	24.9	36,300	128.5
Social science	17,500	13.9	52,000	21.7	34,500	197.1
English/language arts	30,900	18.2	87,500	20.1	56,700	183.4
Foreign language	13,800	24.3	32,500	24.9	18,700	135.3
Vocational-technical	23,100	18.4	38,200	24.0	15,100	65.2
Art and music	42,900	26.1	47,900	21.2	5,000	11.6
Drama or dance ¹	—	—	3,500	17.6	—	—
Health and P.E.	27,500	21.6	37,800	18.7	10,300	37.6
English as a second language (ESL)	2,500	40.8	17,100	23.9	14,600	595.4
Special education	62,900	26.8	111,700	24.8	48,800	77.5
Other	100,500	26.6	21,500	22.1	-79,000	-78.6

— Not available.

¹ Interpret data with caution. The coefficient of variation (CV) for this estimate is between 30 and 50 percent.

¹ The 1987–88 SASS did not include measures of the teaching fields of drama and dance, nor did it include a teacher race/ethnicity measure for those of Two or more races. Hence, these categories are left blank in the 1987–88 columns.

NOTE: Due to rounding, frequencies may not sum to totals.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

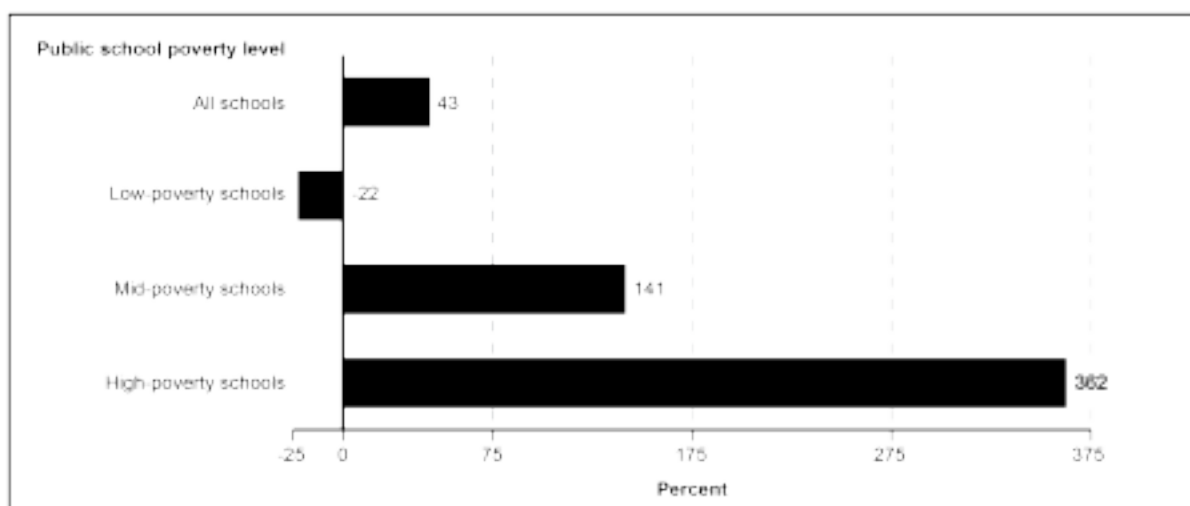
In contrast, slow-growth fields generally became less “green.” These include teachers whose main fields were general elementary, art/music, and physical education (Elem: $T = 178, p < .001$; a/m: $T = 140, p < .001$; PE: $T = 24, p < .001$). Interestingly, middle-aged beginners (those between age 30 and 49), often referred to as mid-career switchers, increased at a well below-average rate in recent decades ($T = 190, p < .001$).

School-level characteristics

The increase in the number of beginning teachers has not been spread evenly across different kinds of schools. Among public schools combined (K–12) schools, large schools, and high-poverty schools all showed large gains in their numbers of beginning teachers.⁹ Among private schools, there were large gains in beginners in nonsectarian schools and combined (K–12) schools.

Parallel to their very high levels of growth in the number of teachers employed in combined public schools, as earlier illustrated in table 2, the number of beginning teachers in such schools almost trebled between 1987–88 and 2011–12 ($T = 241, p < .001$). However, also because of the increase in teachers employed in such schools, the proportion that were beginners actually remained the same in 1987–88 and 2011–12. In addition, the number of beginners in large public schools also increased at above-average rates ($T = 228, p < .001$).

Figure 6. Percentage change in beginning teachers, by public school poverty level: 1987–88 to 2011–12



NOTE: Low-poverty schools refers to those with less than 33 percent of students approved for free or reduced-price lunches; mid-poverty schools refers to those with 33 to 74 percent of students approved for free or reduced-price lunches; high-poverty schools refers to those with 75 percent or more of students approved for free or reduced-price lunches.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

⁹ Table 4 indicates that in the 1987–88 SASS, of all the public school teachers missing school-level data, about 21 percent were beginners and of all the private school teachers missing school-level data, about 36 percent were beginners. To assess the implications of teachers missing school-level data, the analysis tested which school-level findings, discussed above, would not hold if the missing data were entirely nonrandom (i.e., were entirely located in one category of a school type), an unlikely event and a very high standard. The results show that the above findings on increases in beginning teachers in large public schools, high-poverty public schools, small private schools, and nonsectarian private schools, while of course of a lower magnitude, all remained statistically significant. However, the finding on an increase in beginners in combined public schools did not remain statistically significant because these schools are small in size and number (large: $T = 23, p < .001$; high-poverty: $T = 137, p < .001$; nonsectarian: $T = 102, p < .001$; small: $T = 49, p < .001$).

Table 4. Total number and percentage of beginning teachers (5 or less years), by school characteristics: 1987–88 and 2011–12

School characteristics ¹	1987–88		2011–12		Change from 1987–88 to 2011–12	
	Number of beginning teachers	Percent beginning teachers	Number beginning teachers	Percent beginning teachers	Change in the number of beginning teachers	Percent change in the number of beginning teachers
All schools	591,400	22.5	845,500	22.0	254,000	43.0
All public schools	475,000	20.4	718,600	21.2	243,600	51.3
School level						
Elementary	267,200	21.1	427,200	20.5	160,000	59.9
Secondary	146,400	18.6	215,900	21.6	69,500	47.4
Combined	26,200	25.1	75,600	25.2	49,400	188.6
Missing	35,200	21.2				
Student enrollment						
Less than 100	9,800	29.8	14,900	25.7	5,000	51.2
100–749	289,200	20.8	429,900	21.5	140,700	48.7
750 or more	140,800	19.2	273,900	20.7	133,000	94.5
Missing	35,200	21.2				
Percent poverty-level students						
Less than 33 percent	264,300	19.1	205,400	18.5	-58,900	-22.3
33–74 percent	134,600	22.6	323,900	21.3	189,400	140.7
75 percent or more	41,000	23.0	189,300	25.1	148,400	362.3
Missing	35,200	21.2				
All private schools	116,500	37.9	126,800	27.3	10,400	8.9
Religious affiliation						
Catholic	44,100	33.5	33,200	23.2	-10,900	-24.7
Nonsectarian	20,600	38.6	37,600	27.1	17,000	82.5
Other religious	38,900	45.2	56,000	30.6	17,100	43.9
Missing	12,800	35.6				
School level						
Elementary	58,200	40.1	52,800	26.3	-5,400	-9.3
Secondary	16,200	31.1	19,500	27.0	3,300	20.3
Combined	29,300	39.6	54,600	28.5	25,300	86.5
Missing	12,800	35.6				
Student enrollment						
Less than 100	20,800	55.2	32,100	34.7	11,300	54.3
100–749	73,500	36.5	80,500	26.1	7,000	9.5
750 or more	9,300	29.4	14,200	22.4	4,900	52.7
Missing	12,800	35.6				

¹ Because of missing school data, the values in the 1987–88 columns of the number of teachers, by school-level characteristics, are underestimates. Hence, caution must be exercised in the interpretation of estimates of the change in the number of teachers, by school characteristics, between 1987–88 and 2011–12.

NOTE: Due to rounding, frequencies may not sum to totals.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

Well above-average increases occurred in high-poverty public schools—also parallel to their very high levels of hiring and growth in teachers, as earlier illustrated in table 2. In 2011–12, there were over four times as many beginners in high-poverty schools as in 1987–88. In contrast, the number of beginning teachers employed in low-poverty public schools declined by one-fifth during this same period (see figure 6) ($T = 548, p < .001$). Again, while the numbers changed, the proportions of beginners in such schools did not greatly change over this time period because of the overall respective increase and decrease in the numbers of teachers in high- and low-poverty schools.

Overall, the teaching force in the private school sector has been “greener” than that in public schools, but the growth of beginners has been far slower than in public schools. Hence, the

private-public school teacher experience gap decreased between 1987–88 and 2011–12. ($T = 2.65$, $p < .025$) Beginners comprised 20 percent of public school teachers in 1987–88 and 38 percent of private school teachers that same year. In 2011–12, 21 percent of public school teachers were beginners compared to 27 percent of private school teachers. Moreover, across private schools there were differences in these changes. Beginners in nonsectarian private schools increased by over 80 percent between 1987–88 and 2011–12. In contrast, the number of beginners employed in Catholic schools dropped by 25 percent during this same period ($T = 267$, $p < .001$). Among the greenest of schools are small private schools, in which over half the staff were beginners in 1987–88 (table 4). However, while there was above-average growth in the number of beginning teachers in small private schools, the percentage of teachers in such schools that were beginners actually declined over this time period.

Changes in the Racial/Ethnic Composition of the Teaching Force

Teacher-level characteristics

Table 1 shows that the overall increase in minority teachers, of 104 percent, has not been even across the major minority subgroups.¹⁰ The numbers of Asian and Hispanic teachers increased at a far higher rate than have Black teachers, while American Indian teachers declined in numbers since the late 1980s. This section investigates to what extent the increase in minority teachers, overall, has varied across different types of teachers and across different kinds of schools.

The data reveal some interesting sex differences in these changes in the racial/ethnic composition of the teaching force. As shown earlier for table 1, the teaching force has become more female. Overall, female teachers increased by 56 percent and males by 22 percent. From the estimates on teacher race/ethnicity and sex in tables 1 and 5, it is possible to calculate how these teacher increases by sex differ by teacher race/ethnicity. The data reveal that during this period, from 1987–88 to 2011–12, the number of female teachers who were minority increased by 102 percent, while the number of male teachers who were minority increased by 110 percent. In contrast, the number of White female teachers increased by 49 percent, while the number of White male teachers increased by only 12 percent (table 5 and figure 7). In 2011–12, males represented about one quarter of both the White and the minority portions of the teaching force.

As also shown in table 5, teachers whose main fields of assignment were ESL, foreign language, English, math, natural science, and to a lesser extent, special education and social science, all showed above-average gains in minority members. ESL had a 647-percent increase in minority teachers and is one of the most racially/ethnically diverse fields. In 2012, 42 percent of ESL teachers were minority. But, it is interesting to note that, while ESL had a high growth rate in terms of employing minorities, because it is a small field that has grown greatly in numbers, the percentage of ESL teachers who were minorities actually declined from 1987–88 to 2011–12.

Likewise, foreign language, also a small field that has seen a large rise in numbers, had a 44-percent increase in minority teachers, and is one of the most racially/ethnically diverse fields. In 2012, about a third of foreign language teachers were minority. In addition, all four core

¹⁰ Minority refers to all those who are not White, non-Hispanic. It includes: Hispanics or Latinos, regardless of race; Blacks or African Americans, non-Hispanic; Asians or Native Hawaiian/Pacific Islanders, non-Hispanic; American Indians/Alaska Natives, non-Hispanic; and those of Two or more races, non-Hispanic.

academic fields—English/language arts, mathematics, social science, and science—each also gained substantial numbers of minority members (math: $T = 178, p < .001$; ELA: $T = 233, p < .001$; social science: $T = 128, p < .001$; science: $T = 107, p < .001$). In contrast, the main fields of general elementary ($T = 233, p < .001$), vocational-technical ($T = 357, p < .001$), and art/music ($T = 775, p < .001$) each had below-average growth.

Table 5. Total number and percentage of minority teachers, by teacher characteristics: 1987–88 and 2011–12

Teacher characteristics	1987–88		2011–12		Change from 1987–88 to 2011–12	
	Number of minority teachers	Percent minority teachers	Number of minority teachers	Percent minority teachers	Change in the number of minority teachers	Percent change in the number of minority teachers
All minority teachers	327,200	12.4	666,200	17.3	339,000	103.6
Sex						
Female	247,700	13.2	499,600	17.0	251,900	101.7
Male	79,500	10.6	166,600	18.1	87,100	109.5
Age						
Less than 30	37,300	9.8	112,500	15.7	75,200	201.5
30–49	217,200	12.6	376,700	19.5	159,500	73.4
50 or more	72,800	13.8	177,100	14.7	104,300	143.4
Teaching experience						
0 to 5 years	68,400	11.6	168,900	20.0	100,500	147.0
6 to 10 years	59,800	11.7	179,500	20.3	119,600	200.0
11 or more years	199,100	13.0	317,900	15.0	118,800	59.7
Field						
General elementary	122,100	12.5	206,900	16.8	84,800	69.4
Math	15,600	11.1	58,300	17.9	42,700	273.7
Natural science	12,600	10.1	42,600	16.4	29,900	237.7
Social science	13,600	10.7	34,400	14.4	20,800	153.7
English/language arts	16,300	9.6	68,700	15.8	52,400	322.0
Foreign language	10,000	17.5	45,000	34.4	35,100	352.3
Vocational-technical	13,700	10.8	24,400	15.3	10,800	78.8
Art and music	14,200	8.6	20,100	8.9	5,900	41.2
Drama or dance ¹	—	—	‡	‡	—	—
Health and P.E.	14,400	11.3	35,000	17.3	20,600	142.4
English as a second language (ESL)	4,000	66.7	30,100	42.0	26,000	647.1
Special education	30,400	12.9	78,900	17.5	48,500	159.5
Other	60,400	16.0	20,100	20.7	-40,300	-66.7

— Not available.

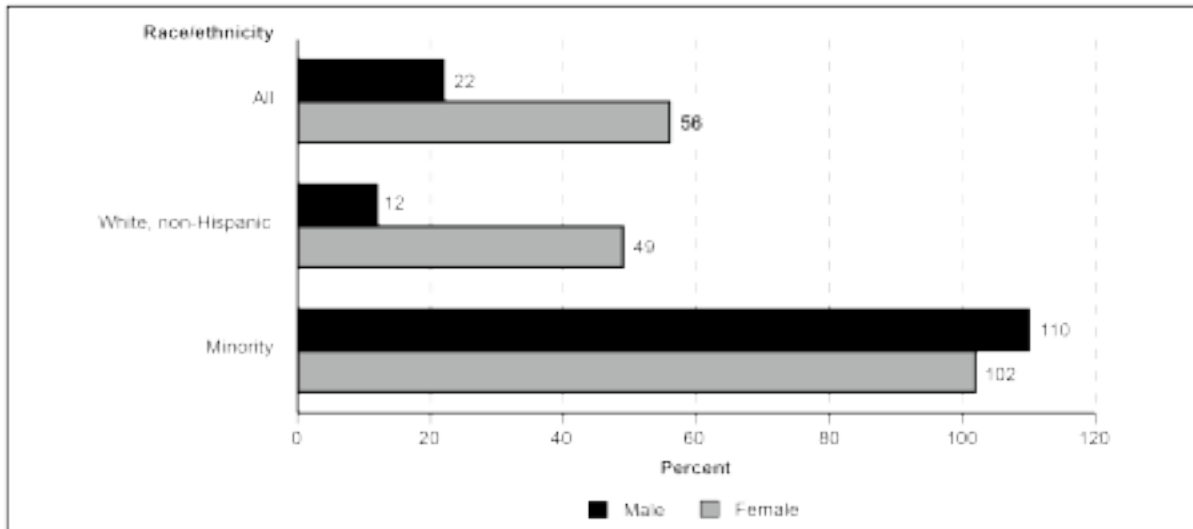
‡ Reporting standards not met. Either there are too few cases for a reliable estimate or the coefficient of variation (CV) is 50 percent or greater.

¹ The 1987–88 SASS did not include measures of the teaching fields of drama and dance; hence, this category is left blank in the 1987–88 columns.

NOTE: Due to rounding, frequencies may not sum to totals. Minority refers to all those who are not White, non-Hispanic. It includes: Hispanics or Latinos, regardless of race; Blacks or African Americans, non-Hispanic; Asians or Native Hawaiian/Pacific Islanders, non-Hispanic; American Indians/Alaska Natives, non-Hispanic; and those of Two or more races, non-Hispanic.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

Figure 7. Percentage increase in teachers, by race/ethnicity and sex: 1987–88 to 2011–12



NOTE: Minority refers to all those who are not White, non-Hispanic. It includes: Hispanics or Latinos, regardless of race; Blacks or African Americans, non-Hispanic; Asians or Native Hawaiian/Pacific Islanders, non-Hispanic; American Indians/Alaskan Natives, non-Hispanic; and those of Two or more races, non-Hispanic.
 SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

School-level characteristics

As shown in table 6, increases in minorities in teaching also differed across different types of schools. In particular, combined public schools and high-poverty public schools showed large gains in minority teaching staff.¹¹ The data show that of the types of schools examined here, by far the most racially/ethnically diverse are public schools serving high-poverty communities (high-poverty vs. large public: $T = 10, p < .001$). As shown in table 2, the number of teachers, as a whole, employed in high-poverty public schools has grown dramatically (324 percent). As shown in table 6, this increase has included a large surge in the number of minority teachers in such schools (288 percent). Because of the very large increase in the number of overall teachers employed in high-poverty schools, however, the percentage of minority teachers in such schools actually fell slightly between 1987–88 and 2011–12. In contrast, the number and proportion of minority teachers employed in low-poverty schools is lower and has shown little change ($T = 4, p < .001$) (see figure 8).

¹¹ Table 6 indicates that in the 1987–88 SASS, of all the public school teachers missing school-level data, about 15 percent were minority and of all the private teachers missing school-level data, about 10 percent were minority. To assess the implications of teachers missing school-level data, the analysis tested which school-level findings, discussed above, would not hold if the missing data were entirely nonrandom (i.e., were entirely located in one category of a school type), an unlikely event and a very high standard. The results showed that only one of the above findings on increases in minority teachers—that in high-poverty public schools, while of course of a lower magnitude, remained statistically significant. The findings on increases in minority teachers in combined public schools, small private schools, combined private schools, other religious private schools and nonsectarian private schools did not remain statistically significant. Because the numbers of minority teachers in these schools was low in 1987–88, adding the missing to them considerably increased their numbers of minority teachers, and hence, effectively undercut any gains by 2011–12. (high-poverty: $T = 870, p < .001$).

Table 6. Total number and percentage of minority teachers, by school characteristics: 1987–88 and 2011–12

School characteristics ¹	1987–88		2011–12		Change from 1987–88 to 2011–12	
	Number of minority teachers	Percent minority teachers	Number of minority teachers	Percent minority teachers	Change in the number of minority teachers	Percent change in the number of minority teachers
All schools	327,200	12.4	666,200	17.3	339,000	103.6
All public schools	305,200	13.1	612,000	18.1	306,800	100.5
School level						
Elementary	177,900	14.1	391,900	18.8	213,900	120.3
Secondary	89,100	11.3	159,200	16.0	70,100	78.7
Combined	12,800	12.3	60,900	20.3	48,000	374.2
Missing	25,300	15.2				
Student enrollment						
Less than 100	2,600	7.7	9,000!	15.5!	6,400	250.5
100–749	160,800	11.5	322,900	16.1	162,000	100.8
750 or more	116,500	16.0	280,100	21.1	163,600	140.5
Missing	25,300	15.2				
Percent poverty-level students						
Less than 33 percent	101,000	7.3	101,900	9.2	900	0.9
33–74 percent	106,700	17.9	230,400	15.1	123,700	115.9
75 percent or more	72,100	40.5	279,600	37.1	207,500	287.6
Missing	25,300	15.2				
All private schools	22,000	7.2	54,200	11.7	32,200	146.3
School classification						
Catholic	10,800	8.2	17,700	12.4	6,900	63.4
Nonsectarian	2,900	5.4	16,000	11.5	13,100	456.5
Other religious	4,600	5.4	20,600	11.2	15,900	343.6
Missing	3,700	10.2				
School level						
Elementary	10,700	7.4	28,900	14.4	18,200	170.4
Secondary	4,400	8.4	8,100	11.2	3,700	85.8
Combined	3,300	4.5	17,300	9.0	14,000	421.2
Missing	3,700	10.2				
School enrollment						
Less than 100	3,400	9.0	13,900	15.0	10,500	310.7
100–749	12,800	6.3	35,400	11.5	22,600	177.3
750 or more (!)	2,200!	6.9!	4,900!	7.8!	2,700	125.3
Missing	3,700	10.2				

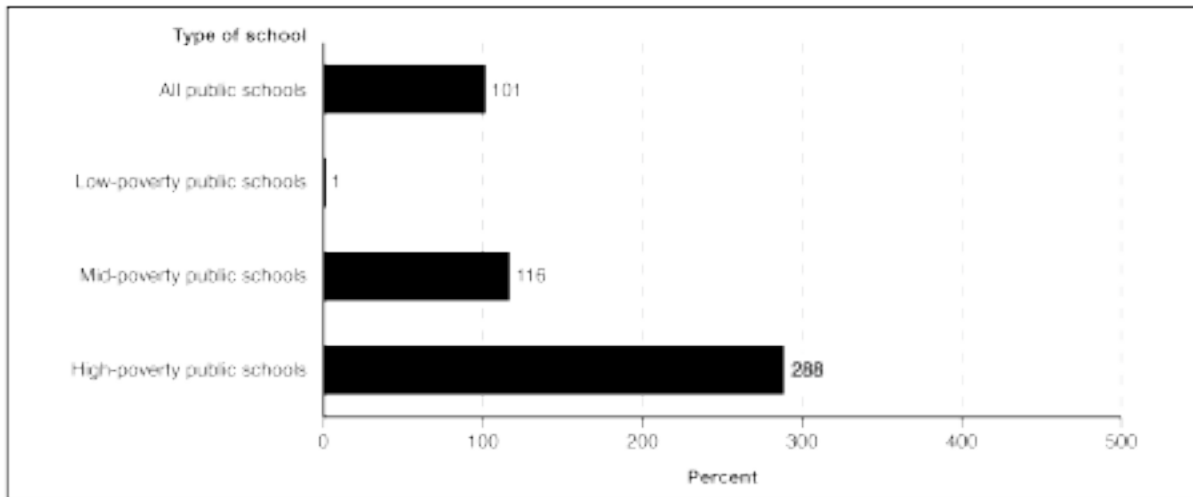
! Interpret data with caution. The coefficient of variation (CV) for this estimate is between 30 and 50 percent.

¹ Because of missing school data, the values in the 1987–88 columns of the number of teachers, by school-level characteristics, are underestimates. Hence, caution must be exercised in the interpretation of estimates of the change in the number of teachers, by school characteristics, between 1987–88 and 2011–12.

NOTE: Due to rounding, frequencies may not sum to totals. Minority refers to all those who are not White, non-Hispanic. It includes: Hispanics or Latinos, regardless of race; Blacks or African Americans, non-Hispanic; Asians or Native Hawaiian/Pacific Islanders, non-Hispanic; American Indians/Alaska Natives, non-Hispanic; and those of Two or more races, non-Hispanic.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

Figure 8. Percentage increase in minority teachers, by public school poverty level: 1987–88 to 2011–12



NOTE: Low-poverty schools refers to those with less than 33 percent of students approved for free or reduced-price lunches; mid-poverty schools refers to those with 33 to 74 percent of students approved for free or reduced-price lunches; high-poverty schools refers to those with 75 percent or more of students approved for free or reduced-price lunches. Minority refers to all those who are not White, non-Hispanic. It includes: Hispanics or Latinos, regardless of race; Blacks or African Americans, non-Hispanic; Asians or Native Hawaiian/Pacific Islanders, non-Hispanic; American Indians/Alaskan Natives, non-Hispanic; and those of Two or more races, non-Hispanic.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

As a result of these different changes, there is a large uneven distribution of minority teachers across schools by poverty level. By re-examining and comparing the estimates in tables 2 and 6, it is possible to estimate this distribution. The data show that, in 2011–12, while high-poverty public schools employed about one-fifth of the entire teaching force, they employed 42 percent of all minority teachers. In contrast, in 2011–12, while low-poverty public schools employed about one-third of the entire teaching force, they employed only 15 percent of all minority teachers.

In general, private schools have proportionately fewer minority teachers than do public schools (in 2011–12, 18 vs. 12 percent), ($T = 7.4, p < .001$). However, as shown in table 6, the number of minority teachers in private schools has increased at a higher rate than in the public school system. Within the private sector, this was especially true for non-Catholic schools, small schools, and combined schools (non-Catholic: $T = 121, p < .001$; small: $T = 53, p < .001$; combined: ($T = 110, p < .001$).

Summary

The elementary and secondary teaching force in the United States underwent large-scale demographic changes in the past quarter century, from 1987–88 to 2011–12. This report focuses on three major changes. The teaching force increased substantially in size, making it the largest occupation in the United States. The number of beginning teachers also grew at a higher rate than that of veteran teachers—making the teaching force less experienced than in the past. Finally, the number of minority teachers grew more than the number of White teachers—making the teaching force more racially/ethnically diverse.

For each of these changes, important questions immediately arise. Among them is the question of how widespread and uniform were these demographic changes in the teaching force across the nation? This report addresses this question by disaggregating the data to investigate how changes in the above three demographic characteristics—the numbers of teachers, levels of teaching experience, and the racial/ethnic diversity of the teaching force—varied across different types of teachers and across different types of schools between 1987–88 and 2011–12. The data show that these changes have not been spread evenly. The major findings are summarized below.

Changes in the Size of the Teaching Force

While the teaching force has grown overall, there have been large differences in growth across different teaching fields. ESL, ELA, mathematics, foreign language, science, and special education were all high-growth fields. In contrast, the fields of general elementary, vocational-technical education, and art/music each had below-average growth.

Additionally, the growth in the teaching force has not been equal across schools. High-poverty schools employ a smaller portion of the teaching force than do lower-poverty schools (22 percent vs. 33 percent in 2011–12). But, this has been changing. During the period from 1987 to 2012, the teaching force in high-poverty public schools grew by nearly 325 percent. In contrast, the number of teachers employed in low-poverty public schools declined by one-fifth.

There were also differences in growth between public and private schools. Between 1987–88 and 2011–12, the number of teachers employed in private schools increased at a higher rate than in public schools. However, as documented in the Ingersoll, Merrill, and Stuckey (2014) study, private schools in the United States account for a small portion of the elementary and secondary student population (about 8.3 percent in 2011–12) and of the teaching force (about 12 percent in 2011–12). Moreover, as also shown in the prior study, unlike the public sector, the number of students in private schools decreased during this same period. The result has been a decrease in the average pupil-teacher ratio in private schools, which was already lower than in public schools.

These changes also varied across different types of private schools. The period from 1987–2012 saw a relatively low (about 9 percent) increase in the number of teachers employed in Catholic schools. On the other hand, there were large increases in the number of teachers in non-Catholic religious private schools and in nonsectarian/nonreligious private schools.

Changes in the Experience Levels of the Teaching Force

Between 1987–88 and 2011–12, the total number of beginners (those with 5 or less years of experience) in the teaching force increased by over 250,000. As might be expected, those types of schools with the greatest hiring and growth also often had the largest gains in numbers of beginners. For example, the number of beginners in high-poverty schools increased by over 300 percent between 1987–88 and 2011–12. In 2011–12, there were over four times as many beginners in high-poverty schools as in 1987–88. In contrast, the number of beginning teachers employed in low-poverty schools declined by one-fifth during the same period.

The teaching force in the private school sector has been less experienced than that in public schools, but this private-public gap decreased between 1987-88 and 2011–12. Beginners comprised 20 percent of public school teachers in 1987-88 and 38 percent of private school teachers that same year. In 2011–12 some 21 percent of public school teachers were beginners compared to 27 percent of private school teachers. These changes also varied across different types of private schools. The number of beginners in nonsectarian/nonreligious private schools increased by over 83 percent between 1987–88 and 2011–12. In contrast, the number of beginners employed in Catholic schools dropped by 25 percent during this same period.

Changes in the Racial/Ethnic Composition of the Teaching Force

The elementary and secondary teaching force in the United States has long been predominantly White and the proportion of minority students in schools has long been far greater than the proportion of minority teachers (Ingersoll, Merrill, and Stuckey 2014). However, while minority teachers remain underrepresented in the teaching force, the proportion of teachers who are minorities increased over the last 25 years. Between 1987–88 and 2011–12, there was a 104-percent increase in the number of minority teachers, compared to 38 percent for White teachers. The percentage of teachers who belonged to minority groups increased from 12.4 percent in 1987–88 to 17.3 percent in 2011–12. In 1987–88, there were about 327,000 minority teachers; by 2011–12, there were over 666,000.

These changes in overall representation also have not been even across minority subgroups. The number of Asian and Hispanic teachers increased at a higher rate than the number of Black teachers, while the number of American Indian teachers sharply declined during this period.

Teachers whose main fields were ESL, foreign language, ELA, math, science, social science, and special education showed large gains in racial/ethnic diversity. In contrast, teachers whose main fields were general elementary, vocational-technical, and art/music each had below-average growth of minority teachers. As of 2011–12, ESL and foreign language were the most racially/ethnically diverse of the fields examined in this report; art/music was the least diverse.

Additionally, there have been some interesting sex differences in these changes in the racial/ethnic composition of the teaching force. During the period from 1987–88 to 2011–12, the number of White female teachers increased by 49 percent, while the number of White male teachers increased by only 12 percent. In contrast, during this same period, the number of minority female teachers increased by 102 percent, while the number of minority male teachers increased by 110 percent.

In both 1987–88 and 2011–12, high-poverty public schools had the highest percentage of minority teachers in the types of schools examined in this report. Moreover, the number of minority teachers employed in mid- and high-poverty public schools grew during this period, while there was almost no growth in the number of minority teachers in low-poverty schools. The result is a large unequal distribution of minority teachers across schools by poverty level. For instance, in 2011–12, while high-poverty public schools employed about one-fifth of the teaching force, they employed 42 percent of all minority teachers. In contrast, in 2011–12, while low-poverty public schools employed almost one-third of the teaching force, they employed only 15 percent of minority teachers.

This report presents the results of a descriptive study. The objective is to examine and describe variations in three sets of demographic characteristics, and their changes, across subgroups. The objective is not to either explain the reasons behind the trends, nor to evaluate the implications of these trends. However, such questions naturally arise.

For instance, the data showing a large increase in the size of the teaching force raises an important set of questions: What are the sources of, and reasons for, the growth in the teaching force? Why have some fields grown so much faster than others? For instance, was the rapid growth in the number of special education teachers tied to changes in the federal Individuals with Disabilities Education Act (IDEA) or to changes in the level of learning disabilities diagnosed in children? What is behind the rapid increase in the proportion of the teaching force employed in high-poverty schools and the decrease in low-poverty schools? Has it been the size of such schools, or the number of schools in low and high-poverty communities that has changed? Moreover, what are the implications and consequences of the large increase in the size of the teaching force as a whole? How has the school system sustained the financial costs of a teaching force that has grown faster than the student population? In addition, what are the reasons behind, and the implications of, the larger increase of teachers in private schools than in public schools (while there was a decrease in the number of students in private schools)? These questions warrant further investigation.

Likewise, similar questions arise in regard to the second trend investigated in this report—the increase in beginning teachers. What are the implications of this growth and of the uneven distribution of beginners across schools? For instance, has the fourfold increase in beginners in high-poverty schools had an impact on those schools? Has the 20-percent decrease in beginners in low-poverty schools had an impact on such schools? Moreover, what are the financial implications of the increase in beginners for schools? A teaching force with an increasingly larger portion of beginners, at the low end of the salary scale, could ameliorate some of the increased payroll costs of the large increase in the size of the teaching force, mentioned above.

Finally, the data documenting the third trend—the increase in the number of minority teachers—also raise important questions. What are both the reasons for, and the implications of, the unequal distribution of minority teachers across different types of schools revealed in this report? For instance, why has the increase in minority teachers been far larger in high-poverty schools than in low-poverty schools and what are the implications of this for student achievement? To what extent does this uneven distribution vary across different minority subgroups? What are the relative likelihoods of students being taught by minority teachers in different schools and is this changing over time? These questions warrant further research.

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Appendix A: Standard Error Tables

Table A-1. Standard errors for table 1: Total number and percentage of elementary and secondary teachers, by teacher characteristics: 1987–88 and 2011–12

Teacher characteristics	1987–88		2011–12		Change from 1987–88 to 2011–12	
	Number of teachers	Percent of teachers	Number of teachers	Percent of teachers	Change in the number of teachers	Percent change in the number of teachers
All teachers	299.2	†	22.8	†	300.1	0.02
Sex						
Female	280.7	1.79	19.4	0.42	281.3	0.02
Male	116.3	1.79	22.9	0.42	118.5	0.02
Race/ethnicity						
Hispanic, regardless of race	46.5	0.13	25.2	0.32	52.9	0.22
White, non-Hispanic	280.2	0.20	18.9	0.48	280.8	0.02
Black, non-Hispanic	87.2	0.19	22.5	0.25	90.0	0.06
Asian, Native Hawaiian/Pacific Islander, non-Hispanic	29.8	0.06	26.6	0.18	40.0	0.39
American Indian/Alaska Native, non-Hispanic	26.6	0.07	22.6	0.07	34.9	0.10
Two or more races, non-Hispanic	—	—	19.6	0.10	—	—
Age						
Less than 30	196.2	2.38	21.3	0.49	197.4	0.10
30–49	217.3	1.55	20.5	0.53	218.2	0.01
50 or more	109.4	0.87	27.0	0.54	112.7	0.05
Teaching experience						
0–5 years	243.6	3.65	19.2	0.49	244.3	0.06
6 to 10 years	114.1	0.65	20.4	0.44	115.9	0.04
11 or more years	175.3	3.05	27.1	0.59	177.4	0.02
Field						
General elementary	231.8	2.30	20.7	0.63	232.8	0.03
Math	54.9	0.27	20.6	0.25	58.7	0.09
Natural science	50.5	0.26	13.7	0.17	52.4	0.09
Social science	43.7	0.38	15.7	0.17	46.4	0.07
English/language arts	63.9	0.26	20.3	0.30	67.1	0.10
Foreign language	34.3	0.13	16.9	0.16	38.2	0.14
Vocational-technical	47.0	0.32	13.9	0.13	49.1	0.05
Art and music	62.1	0.28	16.6	0.21	64.3	0.05
Drama and dance	—	—	20.6	0.07	—	—
Health and P.E.	48.5	0.33	20.7	0.23	52.7	0.06
English as a second language (ESL)	9.7	0.03	29.9	0.20	31.4	1.97
Special education	82.0	0.22	23.6	0.37	85.3	0.07
Other	113.7	0.23	20.8	0.16	115.6	0.01

— Not available.

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

Table A-2. Standard errors for table 2: Total number and percentage of elementary and secondary teachers, by school characteristics: 1987–88 and 2011–12

School characteristics	1987–88		2011–12		Change from 1987–88 to 2011–12	
	Number of teachers	Percent of teachers	Number of teachers	Percent of teachers	Change in the number of teachers	Percent change in the number of teachers
All schools	299.2	†	22.8	†	300.1	0.02
All public schools	277.4	0.37	22.5	0.26	278.3	0.02
School level						
Elementary	261.0	2.68	14.8	0.74	261.5	0.03
Secondary	125.9	2.54	23.3	0.51	128.1	0.02
Combined	57.2	0.24	44.0	0.64	72.2	0.16
Missing	20.8	1.65				
Student enrollment						
Less than 100	43.9	0.13	35.8	0.24	56.6	0.26
100–749	259.8	2.03	17.9	0.86	260.5	0.03
750 or more	128.0	2.11	33.2	0.82	132.3	0.03
Missing	20.8	1.65				
Percent low-income						
Less than 33 percent	218.1	1.07	22.3	0.60	219.3	0.01
33–74 percent	166.0	0.85	22.9	0.62	167.6	0.07
75 percent or more	93.2	0.39	29.7	0.69	97.8	0.22
Missing	20.8	1.65				
All private schools	113.2	0.37	16.3	0.26	114.3	0.06
Religious affiliation						
Catholic	77.5	1.88	10.7	1.02	78.2	0.06
Nonsectarian	60.4	1.31	23.0	1.50	64.6	0.30
Other religious	75.8	1.39	20.2	1.49	78.5	0.19
Missing	19.4	3.71				
School level						
Elementary	81.4	2.08	17.8	1.65	83.4	0.08
Secondary	49.8	1.32	24.3	1.36	55.4	0.14
Combined	80.9	2.41	24.4	1.82	84.5	0.29
Missing	19.4	3.71				
Student enrollment						
Less than 100	60.2	1.48	22.1	1.46	64.1	0.39
100–749	101.8	1.54	19.9	1.87	103.8	0.08
750 or more	40.1	1.38	31.6	1.59	51.0	0.27
Missing	19.4	3.71				

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

Table A-3. Standard errors for table 3: Total number and percentage of beginning teachers (5 or less years), by teacher characteristics: 1987–88 and 2011–12

Teacher characteristics	1987–88		2011–12		Change from 1987–88 to 2011–12	
	Number of beginning teachers	Percent beginning teachers	Number of beginning teachers	Percent beginning teachers	Change in the number of beginning teachers	Percent change in the number of beginning teachers
All beginning teachers	243.6	3.65	19.2	0.49	244.3	0.06
Sex						
Female	223.5	3.84	18.9	0.52	224.3	0.07
Male	98.5	2.78	18.7	0.87	100.2	0.13
Race/ethnicity						
Hispanic, regardless of race	38.6	3.33	27.3	2.33	47.2	0.52
White, non-Hispanic	232.2	3.80	18.2	0.50	232.9	0.06
Black, non-Hispanic	60.0	2.88	19.5	1.83	63.1	0.32
Asian, Native Hawaiian/Pacific Islander, non-Hispanic	14.5	2.85	22.1	3.95	26.5	0.96
American Indian/Alaska Native, non-Hispanic	25.9	4.83	20!	5.4!	32.7	0.45
Two or more races, non-Hispanic	—	—	18.4	5.19	—	—
Age						
Less than 30	200.2	4.66	21.9	1.17	201.4	0.11
30–49	139.2	1.97	18.8	0.45	140.4	0.06
50 or more	33.5	0.43	18.8	0.34	38.4	0.37
Field						
General elementary	166.5	3.61	22.8	0.85	168.1	0.09
Math	48.1	3.33	18.0	1.93	51.4	0.49
Natural science	56.4	5.13	16.5	1.49	58.8	0.46
Social science	40.5	2.94	15.2	1.25	43.2	0.69
English/language arts	60.1	4.06	19.6	1.14	63.2	0.56
Foreign language	25.0	2.31	16.6	1.99	30.0	0.44
Vocational-technical	44.9	3.50	12.5	1.31	46.6	0.33
Art and music	56.3	3.74	15.2	1.44	58.4	0.15
Drama and dance	—	—	12.4	3.73	—	—
Health and P.E.	41.0	2.91	18.8	1.90	45.1	0.22
English as a second language (ESL)	10.0	4.93	30.7	4.37	32.3	3.09
Special education	74.1	4.13	18.4	1.27	76.4	0.21
Other	96.1	3.91	16.4	2.12	97.5	0.03

— Not available.

! Interpret data with caution. The coefficient of variation (CV) for this estimate is between 30 and 50 percent.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

Table A-4. Standard errors for table 4: Total number and percentage of beginning teachers (5 or less years), by school characteristics: 1987–88 and 2011–12

School characteristics	1987–88		2011–12		Change from 1987–88 to 2011–12	
	Number of beginning teachers	Percent beginning teachers	Number of beginning teachers	Percent beginning teachers	Change in the number of beginning teachers	Percent change in the number of beginning teachers
All teachers	243.6	3.65	19.2	0.49	244.3	0.06
All public schools	225.6	3.64	20.5	0.47	226.5	0.07
School level						
Elementary	198.3	4.18	22.3	0.66	199.6	0.12
Secondary	116.8	3.54	18.6	0.72	118.2	0.12
Combined	52.3	4.54	28.5	1.39	59.6	0.59
Missing	13.4	0.98				
Student enrollment						
Less than 100	31.2	3.65	18.3	2.00	36.2	0.52
100–749	202.5	4.17	20.1	0.61	203.5	0.10
750 or more	116.5	3.67	25.6	0.84	119.3	0.16
Missing	13.4	0.98				
Percent low-income						
Less than 33 percent	181.5	3.94	15.3	0.58	182.2	0.05
33–74 percent	135.2	4.44	18.8	0.66	136.5	0.24
75 percent or more	63.1	2.79	24.4	1.31	67.7	0.71
Missing	13.4	0.98				
All private schools	93.6	3.43	28.7	2.16	97.8	0.09
Religious affiliation						
Catholic	64.3	4.16	23.3	3.01	68.4	0.12
Nonsectarian	49.1	4.64	17.8	2.15	52.2	0.44
Other religious	61.2	3.60	23.1	2.44	65.4	0.23
Missing	12.0	2.31				
School level						
Elementary	70.0	4.03	19.2	1.98	72.6	0.11
Secondary	41.8	4.95	25.4	3.89	48.9	0.35
Combined	60.9	3.78	26.9	2.77	66.6	0.40
Missing	12.0	2.31				
Student enrollment						
Less than 100	50.2	3.73	17.9	2.13	53.3	0.38
100–749	81.9 !	3.70!	31.2	2.61	87.7	0.13
750 or more	33.7	5.67	37.7	5.65	50.5	0.69
Missing	12.0	2.31				

! Interpret data with caution. The coefficient of variation (CV) for this estimate is between 30 and 50 percent.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

Table A-5. Standard errors for table 5: Total number and percentage of minority teachers, by teacher characteristics: 1987–88 and 2011–12

Teacher characteristics	1987–88		2011–12		Change from 1987–88 to 2011–12	
	Number of minority teachers	Percent minority teachers	Number of minority teachers	Percent minority teachers	Change in the number of minority teachers	Percent change in the number of minority teachers
All minority teachers	105.3	0.20	27.9	0.48	109.0	0.07
Sex						
Female	99.5	0.27	25.2	0.52	102.7	0.08
Male	38.7	0.31	27.6	0.99	47.5	0.11
Age						
Less than 30	57.2	0.66	26.1	1.07	62.9	0.47
30–49	76.7	0.23	27.6	0.71	81.5	0.06
50 or more	51.0	0.76	26.6	0.83	57.6	0.17
Teaching experience						
0–5 years	74.6	0.73	25.3	1.06	78.7	0.27
6–10 years	36.5	0.57	28.3	1.12	46.2	0.19
11 or more years	72.3	0.39	25.8	0.55	76.8	0.06
Field						
General elementary	77.6	0.39	27.6	0.91	82.4	0.11
Math	17.0	0.65	26.0	1.48	31.1	0.44
Natural science	18.5	0.94	17.8	1.20	25.6	0.52
Social science	19.2	1.03	15.5	1.14	24.7	0.38
English/language arts	21.9	0.58	24.1	1.20	32.6	0.59
Foreign language	15.0	1.41	16.6	2.24	22.4	0.70
Vocational-technical	18.3	0.81	19.7	1.58	26.9	0.28
Art and music	22.8	0.66	17.3	1.02	28.6	0.26
Drama and dance	—	—	‡	‡	—	—
Health and P.E.	17.9	0.95	26.1	2.02	31.6	0.35
English as a second language (ESL)	7.7	3.79	31.1	4.77	32.1	1.63
Special education	30.4	0.67	30.2	1.50	42.9	0.28
Other	47.9	0.56	24.2	2.70	53.6	0.05

— Not available.

‡ Reporting standards not met. Either there are too few cases for a reliable estimate or the coefficient of variation (CV) is 50 percent or greater.

NOTE: Minority refers to all those who are not White, non-Hispanic. It includes: Hispanics or Latinos, regardless of race; Blacks or African Americans, non-Hispanic; Asians or Native Hawaiian/Pacific Islanders, non-Hispanic; American Indians/Alaska Natives, non-Hispanic; and those of Two or more races, non-Hispanic.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

Table A-6. Standard errors for table 6: Total number and percentage of minority teachers, by school characteristics: 1987–88 and 2011–12

School characteristics	1987–88		2011–12		Change from 1987–88 to 2011–12	
	Number of minority teachers	Percent minority teachers	Number of minority teachers	Percent minority teachers	Change in the number of minority teachers	Percent change in the number of minority teachers
All schools	105.3	0.20	27.9	0.50	109.0	0.07
All public schools	101.2	0.22	28.9	0.53	105.3	0.07
School level						
Elementary	96.9	0.36	27.1	0.75	100.6	0.12
Secondary	43.7	0.37	21.8	0.66	48.8	0.09
Combined	21.6	0.92	40.9	1.92	46.3	0.86
Missing	12.7	0.92				
Student enrollment						
Less than 100	12.0	1.40!	34.5	3.33	36.5	2.13
100–749	91.7	0.29	21.8	0.58	94.2	0.12
750 or more	55.5	0.60	30.4	0.82	63.3	0.12
Missing	12.7	0.92				
Percent low-income						
Less than 33 percent	60.0	0.24	21.8	0.54	63.8	0.06
33–74 percent	67.6	0.64	24.0	0.67	71.7	0.14
75 percent or more	56.7	1.45	30.9	1.39	64.5	0.31
Missing	12.7	0.92				
All private schools	30.3	0.48	13.6	0.69	33.2	0.34
Religious affiliation						
Catholic	24.4	1.02	12.0	1.11	27.2	0.38
Nonsectarian	20.4	1.09	16.1	1.42	26.0	4.00
Other religious	16.6	1.01	16.2	1.20	23.2	1.63
Missing	11.1	1.79				
School level						
Elementary	27.6	0.84	12.7	0.99	30.4	0.71
Secondary	18.1	1.79	16.8	1.73	24.7	0.86
Combined	15.3	1.04	15.5	1.06	21.8	2.45
Missing	11.1	1.79				
Student enrollment						
Less than 100	22.4	1.57	16.0	1.74	27.5	2.76
100–749	24.8	0.68	14.1	0.80	28.6	0.55
750 or more	15.5!	2.01!	26.0 !	2.9!	29.9	1.97
Missing	11.1	1.79				

! Interpret data with caution. The coefficient of variation (CV) for this estimate is between 30 and 50 percent.

NOTE: Minority refers to all those who are not White, non-Hispanic. It includes: Hispanics or Latinos, regardless of race; Blacks or African Americans, non-Hispanic; Asians or Native Hawaiian/Pacific Islanders, non-Hispanic; American Indians/Alaska Natives, non-Hispanic; and those of Two or more races, non-Hispanic.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

Table A-7. Standard errors for figure 1: Percentage increase in teachers, by main teaching field: 1987–88 to 2011–12

Main teaching field	Estimate	Standard error
All teachers	46	2
English as a second language (ESL)	1,088	197
English/language arts (ELA)	157	10
Math	131	9
Foreign language	130	14
Natural science	108	9
Special education	92	7
Social science	90	7
Art/music	37	5
Vocational-technical	27	5
General elementary	26	3

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

Table A-8. Standard errors for figure 2: Percentage change in teachers, by public school poverty level: 1987–88 to 2011–12

Public school poverty level	Estimate	Standard error
All schools	46	2
Low-poverty schools	-20	1
Mid-poverty schools	156	7
High-poverty schools	324	22

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

Table A-9. Standard errors for figure 3: Percentage change in beginning teachers, by public school poverty level: 1987–88 to 2011–12

Public school poverty level	Estimate	Standard error
All schools	43	6
Low-poverty schools	-22	5
Mid-poverty schools	141	24
High-poverty schools	362	71

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

Table A-10. Standard errors for figure 4: Percentage increase in teachers, by race/ethnicity and by sex: 1987–88 to 2011–12

Race/ethnicity	Estimate	Standard error
All		
Male	22	2
Female	56	2
White (non-Hispanic)		
Male	12	2
Female	49	2
Minority		
Male	110	11
Female	102	8

NOTE: Minority refers to all those who are not White, non-Hispanic. It includes: Hispanics or Latinos, regardless of race; Blacks or African Americans, non-Hispanic; Asians or Native Hawaiian/Pacific Islanders, non-Hispanic; American Indians/Alaska Natives, non-Hispanic; and those of Two or more races, non-Hispanic.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

Table A-11. Standard errors for figure 5: Percentage increase in minority teachers, by public school poverty level: 1987–88 to 2011–12

Type of School	Estimates	Standard errors
All Schools	104	7
Low-poverty public schools	1	6
Mid-poverty public schools	116	14
High-poverty public schools	324	31

NOTE: Minority refers to all those who are not White, non-Hispanic. It includes: Hispanics or Latinos, regardless of race; Blacks or African Americans, non-Hispanic; Asians or Native Hawaiian/Pacific Islanders, non-Hispanic; American Indians/Alaska Natives, non-Hispanic; and those of Two or more races, non-Hispanic.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

Appendix B: Methodology and Technical Notes

Overview of the 2011–12 Schools and Staffing Survey

The Schools and Staffing Survey (SASS) is sponsored by the National Center for Education Statistics (NCES) of the Institute of Education Sciences within the U.S. Department of Education and is conducted by the U.S. Census Bureau. SASS is a nationally representative sample survey of public and private K–12 schools, principals, and teachers in the 50 states and the District of Columbia. School districts associated with public schools and library media centers in public schools are also part of SASS. SASS was conducted seven times—in school years 1987–88, 1990–91, 1993–94, 1999–2000, 2003–04, 2007–08, and 2011–12.

The 2011–12 SASS consisted of questionnaires for five types of respondents: school districts (public), schools (public and private), principals (public and private), teachers (public and private), and school library media centers (public). Modified versions of the public school principal, public school, and public school teacher questionnaires that incorporated wording and questions appropriate for private school settings were sent to private schools. Charter schools and schools in single-school districts received a modified public school questionnaire that included both district and school items.

For public schools, information can be linked across teachers and their principals, schools, library media centers, and districts. For private schools, information can be linked across teachers and their principals and schools. For the content of the questionnaires, see <http://nces.ed.gov/surveys/sass/questionnaire.asp>.

SASS was designed to produce national, regional, and state estimates for public elementary and secondary schools, school districts, principals, teachers, and school library media centers; and national and regional estimates for public charter schools, as well as principals, teachers, and school library media centers within these schools. For private schools, the sample supports national, regional, and affiliation strata estimates for schools, principals, and teachers. Comparisons between public and private schools and their principals and teachers are possible only at the regional and national levels, because private schools were selected for sampling by affiliation strata and region rather than by state.

The teacher survey was designed to support comparisons between new and experienced teachers (3 years or less of experience vs. more than 3 years of experience) at the state level for public school teachers and at the regional or affiliation strata level for private school teachers.

This appendix includes information on all components of SASS. For additional information on the specific SASS-related topics discussed in this appendix, consult the *Survey Documentation for the 2011–12 Schools and Staffing Survey* (Chambers et al. forthcoming) or the *User's Manual for the 2011–12 Schools and Staffing Survey Volumes 1–6* (Goldring et al. 2013) or *Characteristics of Public and Private Elementary and Secondary School Teachers in the United States: Results From the 2011–12 Schools and Staffing Survey* (Goldring et al. 2013). To access additional general information on SASS or for electronic copies of the questionnaires, go to the SASS home page (<http://nces.ed.gov/surveys/sass>).

Sampling Frames and Sample Selection

Public schools. The starting point for the 2011–12 SASS public school sampling frame was the preliminary 2009–10 Common Core of Data (CCD) Nonfiscal School Universe data file.¹ The sampling frame was adjusted from the CCD in order to fit the definition of a school eligible for SASS. To be eligible for SASS, a school was defined as an institution or part of an institution that provides classroom instruction to students, has one or more teachers to provide instruction, serves students in one or more of grades 1–12 or the ungraded equivalent, and is located in one or more buildings apart from a private home. It was possible for two or more schools to share the same building; in that case, they were treated as different schools if they had different administrators (i.e., principal or school head).

The SASS 2011–12 universe of schools is confined to the 50 states plus the District of Columbia and excludes the other jurisdictions, Department of Defense overseas schools, Bureau of Indian Education schools, and CCD schools that do not offer teacher-provided classroom instruction in grades 1–12 or the ungraded equivalent. This last group includes schools that are essentially administrative units that may oversee entities that provide classroom instruction or may only provide funding and oversight.

The SASS definition of a school is generally similar to the CCD definition, with some exceptions. Because SASS allows schools to define themselves, Census Bureau staff observed that schools generally report as one entity in situations where the administration of two or more schools reported separately on CCD is the same. Thus, CCD schools with the same location, address, and phone number were collapsed during the SASS frame, building on the assumption that the respondent would consider them to be one school. A set of rules was applied in certain states to determine in which instances school records should be collapsed together. When school records were collapsed together, the student and teacher counts, grade ranges, and names as reported to CCD were all modified to reflect the change.

Finally, additional school records were added to the sampling frame. Most of these records were for alternative, special education, or juvenile justice facilities in California, Pennsylvania, and New York.² For a detailed list of frame modifications, see the *Survey Documentation for the 2011–12 Schools and Staffing Survey* (Chambers et al. forthcoming). After deleting, collapsing, and adding school records, the SASS public school sampling frame consisted of about 90,530 traditional public schools and 5,080 public charter schools.

SASS uses a stratified, probability proportionate to size (PPS) sample (for an explanation of PPS sampling, see Cochran 1977). The first level of stratification was school type: (1) schools in a subset of the states where counties are the school districts (Florida, Maryland, Nevada, and West Virginia) so that each of these districts had school(s) selected; (2) public charter schools; and (3) all other traditional public schools. The second-level stratification was state and school district for type 1 schools, and states or groups of states for type 2 and 3 schools. Each of the school types was then stratified by grade level (elementary, secondary, and combined for public charter

¹ For more information about the CCD, see <http://nces.ed.gov/ccd/>.

² In the 2007–08 SASS, records for Career Technical Centers (CTCs) were added to the frame because they were believed to be underrepresented in CCD. In 2011–12 SASS, special handling of CTCs was not deemed necessary. However, CTCs listed in CCD that met the SASS eligibility criteria were included on the SASS sampling frame.

schools; primary, middle, high, and combined for traditional public schools). Within each stratum, schools were sorted prior to sampling by state, community type (12 categories), collapsed ZIP code, percent free or reduced-price lunch (2 categories), highest grade in the school, percent minority enrollment (4 categories), and enrollment. The measure of size used for the schools was the square root of the number of full-time-equivalent teachers reported or imputed for each school during sampling frame development. If a school's measure of size was greater than the sampling interval, the school was included in the sample with certainty. Each stratum was assigned a sample size to meet the defined precision goals of the survey. For example, for public primary schools, the goal was 15 percent or lower for coefficient of variation for national, regional, and state estimates for key characteristics. These sampling procedures resulted in a total public school sample of about 10,250 traditional public schools and 750 public charter schools.

Private schools. The 2011–12 SASS private school frame was based on the 2009–10 Private School Universe Survey (PSS) as updated for the 2011–12 PSS. That update is conducted prior to each administration of PSS by collecting membership lists from private school associations and religious denominations, as well as private school lists from state education departments. The 2011–12 SASS private school frame was further augmented by the inclusion of additional schools that were identified through the 2009–10 PSS area frame data collection; these area frame schools were included in the SASS sample survey with certainty. Schools with kindergarten as the highest grade level were deleted from the frame to fit the SASS definition. After these changes, the private school sampling frame consisted of about 28,490 private schools.³

Private schools were stratified by affiliation strata, grade level (elementary, secondary, and combined), and Census region (Northeast, Midwest, South, and West). The 11 affiliation strata included three strata for Catholic (parochial, diocesan, and private); Baptist; Jewish; Lutheran; Seventh-day Adventist; other religious; and three strata for nonsectarian (regular, special emphasis, and special education). Within each stratum, private schools in the list frame were sorted prior to sampling by state, highest grade in the school, community type (12 categories), ZIP code, and enrollment. The measure of size and PPS procedures described for public schools were used for private schools as well. Of the 3,000 private schools sampled for the 2011–12 SASS, about 2,750 were from the list frame and about 250 were from the 2009–10 PSS area frame.

Public school districts. Since the SASS sample design calls for schools to be selected first, the public school district sample consists of the districts that were associated with the schools in the public school sample. This provides the linkage between the district and the school. In Florida, Maryland, Nevada, and West Virginia, school sampling was done in such a way that all districts were taken with certainty. About 5,800 public school districts were pulled into the sample by being associated with sampled public schools.

Teachers. Teachers are defined as staff members who teach regularly scheduled classes to students in any of grades K–12. Teacher Listing Forms (i.e., teacher rosters) were collected from sampled schools and districts, primarily by mail, and compiled at the Census Bureau. This

³ For more information about the PSS, see <http://nces.ed.gov/surveys/pss>.

compilation was done on an ongoing basis throughout the roster collection period. Along with the names of teachers, sampled schools were asked to provide information about each teacher's teaching experience (first year, 2–3 years, 4–19 years, and 20 or more years), teaching status (full or part time), and subject matter taught (special education, general elementary, math, science, English/language arts, social studies, vocational-technical, or other).

Sampling was also done on an ongoing basis throughout the roster collection period. The Census Bureau first stratified teachers into four teacher strata: 1) beginning teachers (in their first year of teaching), 2) early-career teachers (in their second or third years of teaching), 3) mid-career teachers (in their 4th through 19th years of teaching), and 4) experienced teachers (in their 20th or later years of teaching). Beginning and early-career teachers were oversampled to improve the survey estimates for this subpopulation. Teachers within a school were sorted by the teacher stratum code, the subject matter taught, and the teacher line number code. The teacher line number is a unique number assigned to identify the individual within the teacher list. Within each teacher stratum in each school, teachers were selected systematically with equal probability.

So that a school would not be overburdened by sampling too large of a proportion of its teachers, the maximum number of teachers per school was set at 20. About 20 percent of the eligible public schools and 28 percent of the eligible private schools did not provide teacher lists that could be used for sampling teachers. For these schools, no teachers were selected. About 51,100 public school teachers and 7,100 private school teachers were sampled.

Principals. The principal of each sampled school was selected. About 14,000 school principals were sampled (10,250 traditional public school principals, 750 public charter school principals, and 3,000 private school principals).

For details on sampling at all levels, see the *Survey Documentation for the 2011–12 Schools and Staffing Survey* (Chambers et al. forthcoming).

Data Collection Procedures

In 2011–12, SASS employed a mail-based survey approach with subsequent telephone and in-person field follow-up. Prior to the beginning of data collection, research applications were submitted to public school districts that required applications to conduct research in their schools. Starting in June 2011, all districts were contacted by telephone to verify or collect the information about the district and sampled school(s) needed for data collection, identify the best person to receive the district questionnaire, and determine if the district would provide an electronic teacher list for sampled school(s). Survey packages were mailed to districts in October 2011.⁴ Follow-up was conducted sequentially by mail, telephone, and in person to districts that did not provide the requested questionnaire and/or teacher list.

⁴ The SASS district package contained a cover letter, the School District Questionnaire, and postage-paid return envelope. Districts that indicated they would provide electronic list(s) of teachers for their selected school(s) received a letter that explained the purpose of the teacher list and provided instructions for uploading the file. In districts with only one school, the school received the Public School Questionnaire (with District Items) in lieu of the School District Questionnaire and School Questionnaire.

In preparation for school-level data collection, advance letters were mailed to the sampled schools in June 2011 to verify their addresses. School packages were mailed in October 2011.⁵ Next, schools were telephoned using a computer-assisted telephone-interviewing instrument to verify school information, establish a survey coordinator (who became the main contact person at the school for subsequent communication), and follow up on the Teacher Listing Form if the school district had not already provided an electronic teacher list. Teacher questionnaires were mailed to schools on a flow basis as teachers were sampled on an ongoing basis from the data provided on the Teacher Listing Form or electronic teacher list. The field follow-up period was preceded by phone calls from the telephone centers to remind the survey coordinators to have staff complete and return all forms. Individual survey respondents (principal, librarian, and teachers) were also called from the telephone centers and asked to complete the questionnaire by phone. Data collection ended in June 2012.

Data Processing and Imputation

The Census Bureau used both central processing and headquarters staff to check returned questionnaires, key the data, and implement quality control procedures. Questionnaires that had a preliminary classification of a complete interview were submitted to a series of computer edits consisting of a range check, a consistency edit, a blanking edit, and a logic edit.⁶ After these edits were run and reviewed by analysts, the records were put through another edit to make a final determination as to whether the case was eligible for the survey and whether sufficient data had been collected for the case to be classified as a complete interview.

After the final edits were run, cases with “not-answered” values for items remained. Values were imputed using two main approaches. Donor respondent methods, such as hot-deck imputation, were used. If no suitable donor case could be matched, the few remaining items were imputed using mean or mode from groups of similar cases to impute a value to the item with missing data. After each stage of imputation, computer edits were run again to verify that the imputed data were consistent with the existing questionnaire data. If that was not the case, an imputed value was blanked out by one of these computer edits due to inconsistency with other data within the same questionnaire or because it was out of the range of acceptable values. In these situations, Census Bureau analysts looked at the items and tried to determine an appropriate value. Edit and imputation flags, indicating which edit or imputation method was used, were assigned to each relevant survey variable. For further information, see the sections on data processing and imputation in the *Survey Documentation for the 2011–12 Schools and Staffing Survey* (Chambers et al. forthcoming).

⁵ The SASS school package contained a cover letter to the principal, a cover letter to the survey coordinator, the Teacher Listing Form if the district could not provide it, the Public School Principal Questionnaire or Private School Principal Questionnaire, the Public School Questionnaire or Public School Questionnaire (with District Items) or Private School Questionnaire, the School Library Media Center Questionnaire (for public schools only), postage-paid return envelopes, and the *Statistical Abstract of the United States: 2011 CD*.

⁶ Blanking edits delete answers to questions that should not have been filled in (e.g., if a respondent followed a wrong skip pattern).

Response Rates

Unit response rates. The unit response rate indicates the percentage of sampled cases that met the definition of a complete interview. The weighted SASS unit response rate was produced by dividing the weighted number of respondents who completed questionnaires by the weighted number of eligible sampled cases, using the initial base weight (the inverse of the probability of selection).⁷ Table B-1 summarizes the weighted unit response rates for each survey type. Because response rates vary between surveys, it is possible to not have information for all the components related to a particular school. For example, a district may not have a corresponding school record, or there may not be a principal record for every school.

Table B-1. Weighted unit and overall response rates using initial base weight, by survey: 2011–12

Survey	Unit response rate (percent)	Overall response rate (percent)
Public school teacher listing form	79.6	†
Private school teacher listing form	71.6	†
Public school district	80.6	†
Public school	72.5	†
Private school	65.7	†
Public school principal	72.7	†
Private school principal	64.7	†
Public school teacher	77.7	61.8
Private school teacher	69.9	50.1
Public school library media center	72.9	†

† Not applicable.

NOTE: The data that are summed to produce the numerator and denominator of the response weight are weighted, not the actual response rate. That is, the response rates were calculated using data that were weighted with the base weights (i.e., the inverse of the probability of selection).

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School and Private School Teacher Listing Forms; Public School District, Public School, Private School, Public School Principal, Private School Principal, Public School Teacher, Private School Teacher, and Public School Library Media Center Documentation Data Files," 2011–12.

Overall response rates. The overall response rate represents the response rate to the survey, taking into consideration each stage of the survey. For teachers, the overall response rate is calculated as the product of the response rate to two stages: the Teacher Listing Form and the Teacher Questionnaire.⁸ The weighted overall response rate using the initial base weight for public school teachers was 61.8 percent; and for private school teachers, 50.1 percent. For the other surveys, the overall and unit response rates are the same since these surveys have only one sampling stage.

Unit nonresponse bias analysis. Because the *NCES Statistical Standards* (U.S. Department of Education 2012) require analysis of nonresponse bias for any survey stage with a base-weighted response rate less than 85 percent, all SASS files were evaluated for potential bias. As shown in table B-1, the weighted response rate using the initial base weight was 80.6 percent for public school districts. The weighted response rate using the initial base weight was 72.5 percent for public schools and 65.7 percent for private schools. The weighted response rate using the initial

⁷ For the formula used to calculate the unit response rate, see *NCES Statistical Standards* (U.S. Department of Education 2012).

⁸ For the formula used to calculate the overall response rate, see *NCES Statistical Standards* (U.S. Department of Education 2012).

base weight was 72.7 percent for public school principals and 64.7 percent for private school principals. The weighted response rate using the initial base weight for the teacher listing form was 79.6 for public schools and 71.6 for private schools. The weighted questionnaire response rate using the initial base weight for the teacher survey was 77.7 percent for public school teachers and 69.9 percent for private school teachers. The weighted response rate using the initial base weight was 72.9 percent for public school library media centers.

Given the low overall response rates for both public and private school teachers, a decision was reached to consider all significant differences observed in the comparisons conducted for the nonresponse bias analysis.

A comparison between the frame and the base-weighted estimates for the public school Teacher Listing Form showed evidence of bias in 8 percent of the characteristics compared at the national level and in 16 percent of the characteristics compared at the state level. A comparison between the frame and the base-weighted estimates for the public school teacher estimates showed evidence of bias in 6 percent of the characteristics compared at the national level and in 11 percent of the characteristics compared at the state level. For the private school Teacher Listing Form, a comparison between the frame and the base-weighted estimates showed evidence of bias in 7 percent of the characteristics compared at the national level and in 10 percent of the characteristics compared at the affiliation level; and a comparison between the frame and the base-weighted estimates for the private school teacher estimates showed evidence of bias in 8 percent of the characteristics compared at the national level and in 9 percent of the characteristics compared at the affiliation level.

Nonresponse adjustments were designed to reduce or eliminate bias. When the estimates computed using the nonresponse-adjusted weights were compared to the frame estimates for the public school Teacher Listing Form, the estimates show that in the set of national estimates, bias remained in 4 percent of the characteristics compared, but in the state-level estimates, 15 percent were significantly biased after nonresponse adjustments were applied to the weights. The same comparison for the public school teacher data showed that after nonresponse adjustments were applied to the weights, the percentage of estimates with measurable bias decreased to 2 percent at the national level but remained at 9 percent at the state level. For the private school Teacher Listing Form, when the estimates computed using the nonresponse-adjusted weights were compared to the frame estimates, the estimates showed that in the set of national estimates, bias remained in 2 percent of the characteristics compared, but in the affiliation-level estimates, 9 percent were significantly biased after nonresponse adjustments were applied to the weights. The same comparison for the private school teacher data showed that after nonresponse adjustments were applied to the weights, the percentage of estimates with measurable bias decreased to 3 percent at the national level but remained at 9 percent at the affiliation level. For further information on unit response rates and nonresponse bias analysis, see the *Survey Documentation for the 2011–12 Schools and Staffing Survey* (Chambers et al. forthcoming).

Item response rates. The item response rate indicates the percentage of respondents who answered a given survey question or item. The weighted SASS item response rate is calculated by dividing the weighted number of respondents who provided an answer to an item by the

weighted number of respondents who were eligible to answer that item.⁹ Table B-2 provides a brief summary of the weighted item response rates for each questionnaire.

For the public school teacher data, four of the survey items used in this report have item response rates of less than 85 percent. This includes three of the items used to calculate average class size for teachers in departmentalized instruction (T0137, T0138, and T0139) with item response rates of 83, 81, and 78 percent, respectively. In addition, the amount of salary supplement from additional compensation based on students' performance (T0512) has an item response rate of 83 percent.

Table B-2. Summary of weighted item response rates, by survey: 2011–12

Survey	Percent of items with a response rate of 85 percent or more	Percent of items with a response rate of less than 85 percent
Public school district	100.0	0.0
Public school	96.2	3.8
Private school ¹	93.5	6.1
Public school principal	98.9	1.1
Private school principal	98.3	1.7
Public school teacher	94.2	5.8
Private school teacher	92.5	7.5
Public school library media center	100.0	0.0

¹ There was one item on the Private School Questionnaire that had 0 eligible respondents; thus, the response rate could not be calculated. For this reason, the percentages on this row do not sum to 100.

NOTE: Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School and Private School Teacher Listing Forms; Public School District, Public School, Private School, Public School Principal, Private School Principal, Public School Teacher, Private School Teacher, and Public School Library Media Center Documentation Data Files," 2011–12.

For the private school teacher data, five of the survey items used in this report have item response rates of less than 85 percent. This includes two of the items used to calculate average class size for teachers in departmentalized instruction (T0138 and T0139) with item response rates of 85 (rounded) and 80 percent, respectively. In addition, the average hours per week paid to deliver instruction to a class of students (T0390), average hours required to receive base pay during a typical full week (T0391), and average amount of the salary supplement from additional compensation based on students' performance (T0512) have item response rates of 82, 82, and 70 percent, respectively. For further information on item response rates and bias analysis, see the *Survey Documentation for the 2011–12 Schools and Staffing Survey* (Chambers et al. forthcoming).

Weighting

The general purpose of weighting is to scale up the sample estimates to represent the target survey population. For SASS, a base weight is used as the starting point. In some cases, this base weight is the simple reciprocal of the unit's probability of selection on the frame (the initial base weight), and in other cases, adjustments are made to this frame base weight to reflect multiple chances of selection from the frame or other situations such as subsampling.

⁹ For the formula to calculate the item response rate, see *NCES Statistical Standards* (U.S. Department of Education 2012).

Next, a series of nonresponse adjustment factors are calculated and applied based on a weighting cell adjustment. Weighting cells are developed using tree search algorithms. These cells are selected to be homogeneous in response propensity within cells and heterogeneous in response propensity across cells (response propensity is the underlying “chance” that a particular sample unit will respond by completing the questionnaire: its individual response rate). The adjustment is the inverse of the weighted response rate within each cell, and each respondent in the cell receives this adjustment. Nonrespondents are given weights of zero: the respondents are reweighted to represent the nonrespondents.

Finally, for some files, a ratio-adjustment factor is calculated and applied to the sample to adjust the sample totals to the frame totals. This improves the precision of survey estimates.

The product of these factors is the final weight for each SASS respondent, which appears as DFNLWGT on the SASS Public School District Data File, AFNLWGT on all SASS Principal Data Files, SFNLWGT on all SASS School Data Files, TFNLWGT on all SASS Teacher Data Files, and MFNLWGT on the SASS Library Media Center Data File. The counts in table 1 (in the Estimate Tables section) do not necessarily match the frame counts because some cases in the frame were found to be ineligible (i.e., out of scope) and because not all data files (e.g., principal or library media center) are poststratified to match the frame counts.

Variance Estimation

In surveys with complex sample designs, such as SASS, direct estimates of sampling errors that assume a simple random sample typically underestimate the variability in the estimates. The SASS sample design and estimation include procedures that deviate from the assumption of simple random sampling, such as stratifying the school sample, oversampling new teachers, and sampling with differential probabilities.

One method of calculating sampling errors of complex sample designs is replication. Replication methods involve constructing a number of subsamples (i.e., replicates) from the full sample and computing the statistic of interest for each replicate. The mean square error of the replicate estimates around the full sample estimate provide an estimate of the variance of the statistic. Each SASS data file includes a set of 88 replicate weights designed to produce variance estimates. The set of replicate weights for each file should be applied to the respondents in that file. The replicate weights for SASS respondents are DREPWT1–DREPWT88 for districts, AREPWT1–AREPWT88 for principals, SREPWT1–SREPWT88 for schools, TREPWT1–TREPWT88 for teachers, and MREPWT1–MREPWT88 for library media centers. In this report, the standard errors were calculated using PROC SURVEY FREQ in SAS with the SASS providing replicate weights to account for the complex sampling design.

Reliability of Data

SASS estimates are based on samples. The sample estimates may differ somewhat from the values that would be obtained from the universe of respondents using the same questionnaire, instructions, and field representatives. The difference occurs because a sample survey estimate is subject to two types of errors: nonsampling and sampling. Estimates of the magnitude of sampling error for SASS data can be derived or calculated. Nonsampling errors are attributed to

many sources, including definitional difficulties, the inability or unwillingness of respondents to provide correct information, differences in the interpretation of questions, an inability to recall information, errors made in collection (e.g., in recording or coding the data), errors made in processing data, and errors made in estimating values for missing data. Quality control and edit procedures were used to reduce errors made by respondents, coders, and interviewers.

Caution Concerning Changes in Estimates

Care must be taken in estimating change over time in a SASS data element, because some of the measured change may not be attributable to a change in the education system.

Some of the change may be due to changes in the sampling frame, changes in questionnaire item wording, or other changes. For example, the definition of locale codes has undergone major changes since the 2000 Decennial Census. The first major change was an improvement in geocoding technology, which enhanced the assignment of specific addresses to physical locations. In 2005, a new locale code for CCD was implemented based on the new urban-centric method of classifying locale. Changes in how areas and, thus, schools are categorized may account for at least some changes that are noted from previous administrations.

Overview of the 1987–88 Schools and Staffing Survey

For detailed information on the 1987–88 SASS, see Choy, Medrich, Henke, and Bobbit 1992.

Sampling Frames and Sample Selection

Public schools. The public school sample of 9,317 schools was selected from the Quality of Education Data (QED) file of public schools. All public schools in the file were stratified first by state (50 states and the District of Columbia) and then by three grade levels (elementary, secondary, and combined elementary and secondary). Within each stratum, the schools were sorted by urbanicity, percentage minority (four categories), ZIP code (first three digits), highest grade in the school, enrollment, and PIN number (assigned by QED). For each stratum within each state, sample schools were selected by systematic (interval) sampling with probability proportional to the square root of the number of teachers within a school.

Private schools. The private school sample of 3,513 schools was selected primarily from the QED file of private schools. Because this list of private schools did not fully cover all private schools in the country, two additional steps were taken to improve coverage. The first step was to update the QED file with current lists of schools from 17 private school associations. All private schools obtained in this way and the private schools on the QED list were stratified by state and within state by grade level and affiliation group. Sampling within each stratum was done as it was for public schools.

The second step taken to improve private school coverage was to select an area frame of schools contained in 75 Primary Sampling Units (PSUs) selected from the universe of 2,497 PSUs with probability proportional to the square root of the PSU population. The PSUs, each of which consisted of a county or group of counties, were stratified by Census geographic region (Northeast, Midwest, South, and West), Metropolitan Statistical Area (MSA) status (MSA or

non-MSA), and private school enrollment (two groups). Within each of the 75 PSUs, a telephone search was conducted to find all in-scope private schools. Sources included yellow pages, religious institutions (except for Roman Catholic religious institutions, because each Catholic diocese is contacted annually when the QED list is updated), local education agencies (LEAs), chambers of commerce, local government offices, commercial milk companies, and commercial real estate offices. All schools not on the QED file or the lists from private school associations were eligible to be selected for the area sample. Most of these schools were selected with certainty, but when sampling was done, schools were sampled with probability proportional to the square root of the number of teachers (for schools that could be contacted) or a systematic equal probability procedure (for schools that could not be contacted).

The private school sample was designed to allow detailed comparisons among the following affiliations: Catholic, Friends, Episcopal, Jewish, Lutheran, Seventh Day Adventist, Christian Schools International, American Association of Christian Schools, Exceptional Children, Military Schools, Montessori, and Independent Schools. At least 100 schools were selected from each affiliation or all schools in the affiliation if there were fewer than 100 schools.

Public school districts. All LEAs that had at least one school selected for the school sample were included in the LEA sample for the Teacher Demand and Shortage Survey. In addition, a sample of 70 LEAs that did not contain eligible schools was selected directly. Only eight of these 70 were actually in scope (that is, reported hiring teachers). The total LEA sample was 5,592.

Teachers. All 56,242 public and 11,529 private school teachers in the teacher samples were selected from the public and private school samples. The specified average teacher sample size was four, eight, and six teachers for public elementary, secondary, and combined schools, respectively and four, five, and three teachers for private elementary, secondary, and combined schools, respectively. A list that included all full- and part-time teachers, itinerant teachers, and long-term substitutes was obtained from each sample school. Within each school, teachers were stratified by experience into two groups: new teachers and all others. New teachers were those who, counting 1987–88, were in their first, second, or third year of teaching. New teachers in private schools were oversampled by 60 percent; oversampling in public schools was not necessary. Within each new and experienced teacher stratum, elementary teachers were sorted into general elementary, special education, and “other” categories; and secondary teachers were sorted into mathematics, science, English, social science, vocational education, and “other” categories. Within each school and teacher stratum, teachers were selected systematically with equal probability. In order to obtain more reliable estimates of bilingual-ESL teachers, both the public and private school teacher samples included a bilingual-ESL supplement that included teachers who used a native language other than English to instruct students with limited English proficiency and teachers who provided intensive instruction in English to students with limited English proficiency. The bilingual-ESL supplement of 2,447 teachers was selected independently from the basic sample. It was designed to provide estimates for California, Texas, Florida, Illinois, New York, and for all other states combined. The sample size within each school was chosen to be proportional to the weighted number of bilingual-ESL teachers in the school. Within a school containing bilingual-ESL teachers, the teachers were selected systematically with equal probability.

Data Collection Procedures

The data were collected for NCES by the U.S. Census Bureau. Questionnaires were mailed to school districts, schools, administrators, and teachers in January and February 1988. Six weeks later, a second questionnaire was sent to each nonrespondent. A telephone follow-up of nonrespondents was conducted during April, May, and June. Because of the large number of nonresponding teachers and the need to complete the survey before the end of the school year, the telephone follow-up was conducted for only a subsample of teachers. The weights for this subsample were adjusted to reflect the subsampling.

Data Processing, Response Rates, and Imputation

Most item-level missing data on the district and school files were imputed using a sequential hot deck procedure that matched the nonrespondent district or school with the most similar respondent in the same stratum. “Most similar” was determined based on metropolitan status, percent minority, and enrollment. On the public school file, all missing items were imputed. On the private school file, items 7 and 35 were not imputed. On both the public and private school teacher demand and shortage file, items 3, 11, 12, 13, and 28 were not imputed. No imputation was done for either the teacher or administrator files. Item nonresponse was treated as missing data in the computation of estimates for tables that include data from either of these files. This is equivalent to assuming equal distributions for both respondents and nonrespondents. Not imputing for item nonresponse when averages are estimated results in bias, and the nature of this bias is unknown.

Table B-3. Summary of weighted item response rates, by survey: 1987–88

Survey	Public	Private
Teacher demand and shortage	90.8	66.0
Administrator	94.4	79.3
School	91.9	78.6
Teacher	86.4	79.1

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88.

Table B-4. Number and percentage of teachers with missing school data in the 1987–88 SASS

	Number of missing observations	Percent of observations missing	Weighted number of missing observations	Percent of missing weighted observations
Public schools				
School level	2,518	6.2	166,120	7.2
Student enrollment	2,518	6.2	166,120	7.2
Percent low-income	2,518	6.2	166,120	7.2
Private schools				
School level	660	9.8	36,066	11.7
Student enrollment	660	9.8	36,066	11.7
School classification	660	9.8	36,066	11.7

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88.

Table B-5. Total percentage of elementary and secondary teachers, by school characteristics: 1987–88 and 1990–91

School characteristics	1987–88	1990–91
	Percent of teachers	Percent of teachers
All schools	100.0	100.0
All public schools	88.3	88.5
School level		
Elementary	58.6	60.6
Secondary	36.6	35.4
Combined	4.8	4.0
Student enrollment		
Less than 100	1.5	1.6
100–749	64.6	63.8
750 or more	33.9	34.7
Percent poverty-level students		
Less than 33 percent	64.2	61.8
33–74 percent	27.6	29.2
75 percent or more	8.3	10.0
All private schools	11.7	11.5
School classification		
Catholic	48.5	42.6
Nonsectarian	19.7	21.1
Other religious	31.8	36.3
School level		
Elementary	53.5	48.1
Secondary	19.2	18.8
Combined	27.3	33.1
Student enrollment		
Less than 100	13.9	14.4
100–749	74.3	75.4
750 or more	11.8	10.2

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 199091.

Weighting

Weights of the sample units were developed to produce national and state estimates for public schools, teachers, administrators, and LEAs. The private sector data were weighted to produce national and affiliation group estimates. The affiliation groups for private schools were Catholic, other religious, and nonsectarian. The basic weights were the inverse of the probability of selection and were adjusted for nonresponse.

Variance estimation. The estimates in these tables are based on samples and are subject to sampling variability. Standard errors were estimated using a balanced repeated replications procedure that incorporates the design features of this complex sample survey. The standard errors were calculated using PROC SURVEY FREQ in SAS, with the SASS providing replicate weights to account for the complex sampling design. The standard errors indicate the accuracy of each estimate. If all possible samples of the same size were surveyed under the same conditions, an interval of 1.96 standard errors below to 1.96 standard errors above a particular statistic would include the universe value in approximately 95 percent of the cases. Note, however, that the standard errors do not take into account the effects of biases due to item nonresponse, measurement error, data processing error, or other possible systematic error.

Reliability of Data

The statistics in this report are population estimates derived from the samples described in the preceding section. Consequently, they are subject to sampling variability. In addition, they are subject to nonsampling errors, which can arise because of nonresponse, errors in reporting, or errors in data collection. These types of errors can bias the estimates and are not easy to measure. They can occur because respondents interpret questions differently, remember things incorrectly, or misreport their responses. Nonsampling errors can also be due to incorrect editing, coding, preparing, or entering of the data or to differences related to the time the survey was conducted. The precision with which one can use survey results to make inferences to a population depends upon the magnitude of both sampling and nonsampling errors. In large sample surveys, such as the SASS, sampling errors are generally minimal, except when estimates are made for relatively small subpopulations (Native Americans, for example).

SASS school and LEA estimates for some states were lower than the estimates produced by the NCES Public Elementary/Secondary School Universe Survey of CCD. This occurred because some small LEAs (with an average of 10.2 students) were not in the QED file and because the QED definition of school differs somewhat from the CCD definition. QED defines a school as a physical location, while CCD defines it as an administrative unit.

Because of these missing schools, the SASS counts of public schools and administrators are underestimated. The effect of these missing schools on the nature of the bias for averages is unknown. On a national basis, there were 6 percent more CCD schools than SASS schools. The differences were greatest for Nebraska, North Dakota, South Dakota, and Montana. For private schools, the SASS estimate of the number of schools was less than the sampling frame because of frame schools being out of scope, no longer in existence, or duplicated in the frame.

In some states, full-time-equivalent (FTE) teacher counts were not the same on the teacher and school files. In the average state, there were 5 percent fewer teachers on the teacher frame than the number of teachers reported by the schools, which would cause SASS estimates from the teacher file to be underestimates if all teachers were not included in the frame. In addition, schools appeared to have problems providing FTE counts, because in the average state, 19 percent of the schools reported the same number of teachers as FTEs when some part-time teachers were reported. Thus, the SASS FTE counts from the school file are likely to be overestimates.

Appendix C: Description of Variables Used in This Report

Table C-1. Teacher-level variables used in the report

Teacher-level characteristics	2011–12 code	1987–88 code
Sex	T5025: Are you male or female?	TSC319: Are you male or female?
Female	T5025 = 2	TSC319 = 2
Male	T5025 = 1	TSC319 = 1
Race/ethnicity	RACETH_T- Teacher's race/ethnicity, based off of two questions: What is your race? (T0528–0530) and Are you of Hispanic or Latino origin? (T0527)	RACE_ETH was created in 4 mutually exclusive categories (e.g., American Indian, Aleut, Eskimo, Asian or Pacific Islander, Black, or White).
White, non-Hispanic	IF RACETH_T = 47 THEN WHITE = 1; ELSE IF RACETH_T ^= . THEN WHITE = 0;	if RACE_ETH = 4 then race = 'RACE: White';
Minority	IF RACETH_T NOT IN (. , 47) THEN MINORITY = 1 ; ELSE IF RACETH_T = 47 THEN MINORITY = 0;	If Hispanic, Black, Asian or Pacific Islander, American Indian, Aleut, or Eskimo
Hispanic or Latino, regardless of race	IF RACETH_T IN (1,11,16,17,2,20,22,24,25,31,4,6,7,8,9) THEN HISPNC = 1; ELSE IF ^= . THEN HISPNC = 0;	if RACE_ETH = 5 then race = 'RACE: Hispanic';
Black or African American, non-Hispanic	IF RACETH_T = 39 THEN BLACK = 1; ELSE IF RACETH_T ^= . THEN BLACK = 0;	RACE_ETH = 3 then race = 'RACE: Black';
Asian or Native Hawaiian/Pacific Islander, non-Hispanic	IF RACETH_T IN (33,35,37) THEN ASIAN = 1; ELSE IF RACETH_T ^= . THEN ASIAN = 0;	if RACE_ETH = 2 then race = 'RACE: Asian or Pacific Islander.'
American Indian/Alaska Native, non-Hispanic	IF RACETH_T = 32 THEN NATAM = 1; ELSE IF RACETH_T ^= . THEN NATAM = 0;	if RACE_ETH = 1 then race = 'RACE: American Indian, Aleut, or Eskimo';
Two or more races, non-Hispanic	IF RACETH_T NOT IN (47,39,1,11,16,17,2,20,22,24,25,31,4,6,7,8,9,33,35,37, 32.) THEN MULTI =1; ELSE IF RACETH_T ^= . THEN MULTI=0;	
Age	T0534 (What is your year of birth) subtract 2011	TSC322(What is your year of birth) subtract 1987
Teaching experience	Teacher's adjusted years of teaching experience. Experience is calculated as the sum of years taught full or part-time in public and private schools. TOTYREXP cannot sum to more than the number of years that have elapsed between the year the teacher began teaching (T0040) and the survey year 2012. Teachers who began teaching in the 2011–12 school year are assigned 1 year of experience.	Teacher's adjusted years of teaching experience. Experience is calculated as the sum of years taught full or part-time in public and private schools. TOTYREXP cannot sum to more than the number of years that have elapsed between the year the teacher began teaching (TSC016) and the survey year 1988. Teachers who began teaching in the 1987–88 school year are assigned 1 year of experience.
Field	T0090 (This school year, what is your MAIN teaching assignment field at THIS school?) (Your main assignment is the field in which you teach the most classes.) ASSIGN03 is a created variable based on T0090.	TSC075 (What is your current primary teaching assignment field at THIS SCHOOL, that is, the field in which you teach the most classes) TSUBJ is a created variable based on TSC075.
General elementary Mathematics	If ASSIGN03 = 1	If tsubj = 0
Natural science	If ASSIGN03 = 8	If tsubj = 3
Social science	If ASSIGN03 = 9	If tsubj = 4
English/language arts (ELA)	If ASSIGN03 = 10	If tsubj = 6
Foreign language	If ASSIGN03 = 4	If tsubj = 5
Vocational-technical education	If ASSIGN03 = 6	If TSC075 = 11
Art and music	If ASSIGN03 = 11	If tsubj = 7
Drama and dance	If T0090 = 141 or T0090 = 145	If TSC075 = 17
Health and physical education	If T0090 = 143 or T0090 = 144	Cannot be disaggregated from Art/Music in this SASS cycle
English as a second language (ESL)	If ASSIGN03 = 7	If TSC075 = 13
Special education	If ASSIGN03 = 5	If TSC075 = 6
Other	If ASSIGN03 = 2	If tsubj = 0
	All other teachers, not in a category above such as gifted and talented, alternative education and leadership	All other teachers, not in a category above, such as gifted and talented, alternative education, and leadership

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

Table C-2. School-level variables used in the report

School-level characteristics	2011–12 code	1987–88 code
Sector	Determined by classification on sampling frames,	Determined by classification on sampling frames,
Public/charter	SECTOR = 1	SECTOR = 1
Private	SECTOR = 2	SECTOR = 2
School level	SCHLEVEL: a created variable derived from items S0024–S0038	SCHLEVEL: a created variable derived from items SSC024–SSC038
Elementary	SCHLEVEL = 1	SCHLEVEL = 1
Secondary	SCHLEVEL = 2	SCHLEVEL = 2
Combined elementary and secondary	SCHLEVEL = 3	SCHLEVEL = 3
Student enrollment	ENRK12UG: Total K–12 and ungraded enrollment in school	ENRK12UG: Total K–12 and ungraded enrollment in school
Less than 100 students	If ENRK12UG lt 100	If ENRK12UG lt 100
Between 100 and 749 students	If ENRK12UG ge 100 and lt 750	If ENRK12UG ge 100 and lt 750
750 or more students	If ENRK12UG ge 750	If ENRK12UG ge 750
Percent poverty-level students	NSLAPP_S: created variable measuring the percentage of student approved for NSLP at school	SSC085, how many students are eligible for free or reduced price lunch? Divided by ENRK12UG
0 to 33 percent	If percentage lt 33	If percentage lt 33
Between 33 and 75 percent	If percentage ge 33 and le 75	If percentage ge 33 and le 75
75 percent or more	If percentage gt 75	If percentage gt 75
Private school classification	Created variable, based on nine-level private school typology, RELIG	Created variable, based on nine-level private school typology, AFFIL
Catholic	If RELIG = 1	If AFFIL = 1
Nonsectarian	If RELIG = 2	If AFFIL = 2
Other religious	If RELIG = 3	If AFFIL = 3

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1987–88 and 2011–12.

Teaching Experience

In SASS there are two methods of measuring teaching experience—the first entails summing the total years taught, using the item that asks teachers what year they began teaching. The second method entails using the item that asks teachers to report their total years of teaching experience. In each method, the SASS questionnaire items contributing to these measures changed slightly between the 1987–88 and 2011–12 SASS cycles.

The Ingersoll, Merrill, and Stuckey study (2014) used the first method. In 1987–88, SASS asked teachers the year they began teaching full time (TSC016). In 2011–12, SASS asked teachers the year they began teaching full time or part time. These questions could yield more beginning teachers in 2011–12, given that part-time teachers were also counted in this cycle.

This NCES report uses the second method—the variable that sums up the total amount of years of experience as reported by the teacher. These questionnaire items also differed across the two cycles of SASS. In the 1987–88 cycle, the TOTEXPER variable summed up the amount of teacher experience, but did not account for the year a teacher began teaching. In the 2011–12 SASS, teacher experience was measured through the TOTYREXP variable that accounts for the first year teaching. The 1987–88 dataset does not have an identical TOTRYEXP variable.

To ensure a consistent definition across SASS cycles, this analysis used the TOTRYEXP variable to create a teaching experience measure that is identical across the two cycles of SASS.

Creation of a consistent measure entailed three steps:

- The first step was an analysis of the TOTYREXP definition from the 2011–12 SASS (B-563 from the 2011–12 User’s Manual).
- The second step sought to recreate that definition as closely as possible with the 1987–88 data to make a new variable TOTYREXPb.
- The third step was to create a 2011–12 TOTYREXPb variable to match the 1987–88 version and correlated the new (TOTYREXPb) and old variable (TOTYREXP) to check for sensitivity.

These three steps are described in detail below:

Step 1:

TOTYREXP—Teacher’s years of experience, accounting for year began teaching

Type: Numeric

Start Position: 3453

End Position: 3454

Width: 2

Variable Source: Created Variable

Variable Description: Teacher’s adjusted years of teaching experience. Experience is calculated as the sum of years taught full or part-time in public and private schools. Teaching experience may overlap by sector (public and private) or status (full- or part-time). To adjust for this, TOTYREXP cannot sum to more than the number of years that have elapsed between the year the teacher began teaching (T0040) and the survey year 2012. Teachers who began teaching in the 2011–12 school year are assigned one year of experience. Calculated as follows:

TOTYREXP = T0042; TYRPOSS = sum (2012, -t0040); TYRSECT = sum (T0043, T0044, T0047) if TYRPOSS = 0 then TYRPOSS = 1; if TOTYREXP gt TYRPOSS then TOTYREXP = TYRPOSS; if TYRPOSS gt TYRSECT then TOTYREXP=TYRSECT; drop TYRPOSS TYRSECT;

Step 2:

Because the 1987–88 cycle does not include an analogous item to T0043, this analysis dropped it from the 2011–12 definition of TOTYREXP and relabeled it TOTYREXPb.

*/*t0043 is question 12a. Of the school years you have worked as an elementary- or secondary-level teacher in public, public charter, or private schools, how many were—In public and private schools during the SAME school year?*/*

1987–88

TOTYREXPb = SUM(TSC023, TSC024, TSC025, TSC026); */*sum part time and full time teaching in public and private schools*/*

if TSC016 = . then TYPOSS = .;
else TYRPOSS = 87 -TSC016 */*year began teaching*/*;

```
TYRSECT = sum (TSC023, TSC025);  
  if TYRPOSS ge 0 or TYRPOSS lt 1 then TYRPOSS = 1;  
  if TOTYREXPb gt TYRPOSS then TOTYREXPb = TYRPOSS;  
  if TYRPOSS gt TYRSECT then TOTYREXPb=TYRSECT;
```

Step 3:

2011-12

```
t0040yr = substrn(t0040, 1, 4); /*get the year in the correct form*/  
  
TOTYREXPb = T0042; TYRPOSS = sum (2012, -t0040yr/*year began teaching*/);  
TYRSECT = sum ( T0044, T0047) ; if TYRSECT = 0 then TYRSECT = T0042;  
if TYRPOSS = 0 then TYRPOSS = 1; if TOTYREXPb gt TYRPOSS then TOTYREXPb  
= TYRPOSS; if TYRPOSS gt TYRSECT then TOTYREXPb=TYRSECT;
```

The estimated correlations between TOTYREXP and TOTYREXPb, showed that the two variables are highly related, ~.95.

Appendix D: Glossary of Terms

Percent poverty-level students: Of the total number of K–12 and ungraded students enrolled in a school, the percentage approved for the National School Lunch Program. This is often considered a proxy measure equivalent to the percentage of families below the federal poverty line.

Private school: A school not in the public system that provides instruction for any of grades 1–12 (or comparable ungraded levels). The instruction must be given in a building that is not used primarily as a private home.

Private school classification: A three-category variable based on the variables that identify the religious or nonreligious orientation of a private school: Catholic, other religious, or nonsectarian.

Public school: A public school is an institution or part of an institution that provides classroom instruction to students, has one or more teachers to provide instruction, serves students in one or more of grades 1–12 or the ungraded equivalent, and is located in one or more buildings. It is possible for two or more schools to share the same building; in this case, they are treated as different schools if they have different administrators (i.e., principals). Public schools include regular, special education, vocational/technical, alternative, and public charter schools. Schools in juvenile detention centers and schools located on domestic military bases and operated by the Department of Defense are included.

School level: A three-category variable based on grades reported by the school: elementary, secondary, and combined. Elementary schools are those with any of grades K–6 and none of grades 9–12. Secondary schools have any of grades 7–12 and none of grades K–6. Combined schools are those schools with grade levels in both elementary and secondary grade levels, or with all students in ungraded classrooms.

Student enrollment: The number of students officially enrolled in the school as of October 1 of the survey year.

Teacher: A teacher is defined as a full-time or part-time teacher who teaches any regularly scheduled classes in any of grades K–12. This definition includes administrators, librarians, and other professional or support staff members who teach regularly scheduled classes on a part-time basis. Itinerant teachers are included, as well as long-term substitutes who are filling the role of a regular teacher on a long-term basis. An itinerant teacher is defined as a teacher whose assignment requires teaching at more than one school (e.g., a music teacher who teaches 3 days per week at one school and two days per week at another). Itinerant teachers who teach full time in any district, but teach part time in a particular school, are considered part-time teachers at that particular school. The definition of a regular full-time teacher does not include any teacher whose primary position in a school is an itinerant teacher, a long-term substitute, a short-term substitute, a student teacher, a teacher aide, an administrator, a library media specialist or librarian, another type of professional staff (e.g., counselor, curriculum coordinator, social worker), support staff (e.g., secretary), or a part-time teacher.

Teacher field: The field in which a teacher teaches the most classes at their school.

Teacher race/ethnicity: Minority refers to all those who are not White, non-Hispanic. It includes: Hispanics or Latinos, regardless of race; Blacks or African Americans, non-Hispanic; Asians or Native Hawaiian/Pacific Islanders, non-Hispanic; American Indians/Alaska Natives, non-Hispanic; and those of Two or more races, non-Hispanic.