



A descriptive analysis of the principal workforce in Wisconsin





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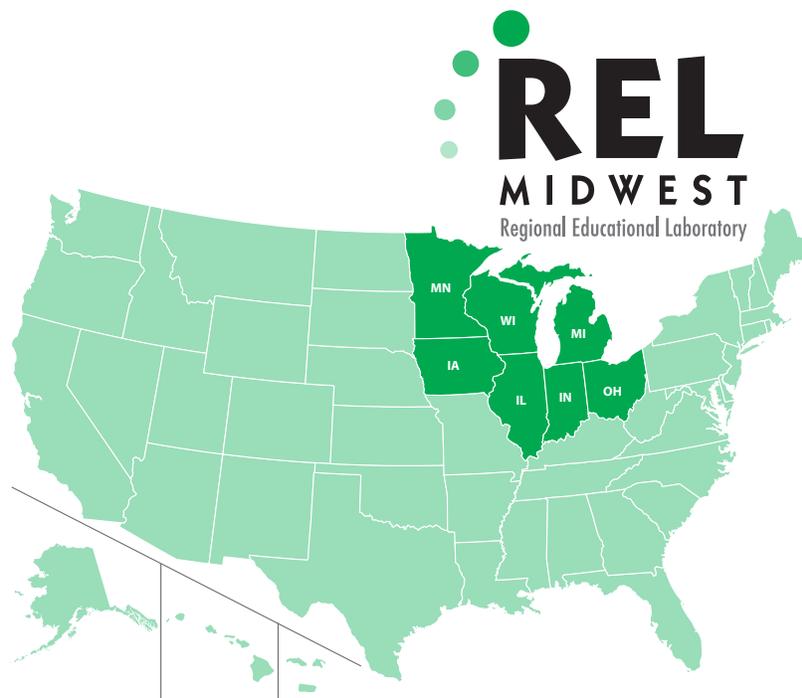
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A descriptive analysis of the principal workforce in Wisconsin

This study describes trends in demographic characteristics and retention rates in the Wisconsin principal workforce between 1999 and 2009. Over the period, the principal workforce remained predominantly White and male, but the share of female and racial/ethnic minority principals rose. Less than half of new principals remained as principals in Wisconsin after eight years.

Researchers and policymakers have devoted more attention to the impact of principals on student achievement and school improvement (Leithwood et al. 2004). National and state policymakers are concerned that the principal workforce is aging, that fewer new principals are joining the workforce, and that fewer female and racial/ethnic minority educators are entering and remaining in the principal workforce (Gates et al. 2006; Jackson and Kelley 2002).

This study responds to a request from the Wisconsin Department of Public Instruction for information on Wisconsin's school principal workforce population.¹ Descriptive analyses addressed two research questions:

- How do the demographic characteristics of Wisconsin school principals compare with those of Wisconsin teachers, and

how did these characteristics change over 1999–2009?

- How does the eight-year retention rate for a cohort of new Wisconsin principals from 2000 to 2002 compare with the retention rate of returning Wisconsin principals?

Data were gathered for the 11 academic years from 1999 to 2009² from the Wisconsin public school personnel and certification databases. The sample consisted of 1,703 principals and 59,803 teachers in 1999.³ A cross-sectional analysis was used to describe principal and teacher demographic characteristics.

A longitudinal cohort design was used to study the retention of Wisconsin principals for two cohorts: one of new principals who began between 2000 and 2002 and one that included all principals in 1999. The cohort of new principals included 641 principals in their first year (2000–02); the cohort of all principals included 1,339 principals as of 2001.

The following are key findings:

On demographic characteristics

- The majority of Wisconsin principals in 2009 were male, but the percentage of female principals increased 7.1 percentage

points, from 35.5 percent in 1999 to 42.6 percent in 2009.

- The majority of Wisconsin teachers in 2009 were female, and the percentage of female teachers increased 4.1 percentage points, from 69.5 percent in 1999 to 73.6 percent in 2009.
- The majority of Wisconsin principals and teachers in 2009 were White, but the percentage of racial/ethnic minority principals increased 0.7 percentage point, from 6.6 percent in 1999 to 7.3 percent in 2009, and the percentage of racial/ethnic minority teachers increased 0.4 percentage point, from 3.9 percent in 1999 to 4.3 percent in 2009.
- The average age of the Wisconsin principal workforce fell 0.5 year, from 48.6 years in 1999 to 48.1 years in 2009, and the average age of teachers did not change, remaining at 43.0 years.
- The majority of Wisconsin principals in 2009 held a master's degree, and the percentage of principals and teachers who held a master's degree increased from 1999 to 2009. The percentage of principals holding a master's degree increased 2.8 percentage points, from 84.2 percent in 1999 to 87.0 percent in 2009, and the percentage of teachers holding a master's degree increased 13.4 percentage points, from 36.3 percent in 1999 to 49.7 percent in 2009.

On principal retention

- After eight years, 43.7 percent of the new principal cohort and 46.1 percent of the

comparison cohort remained principals. Annual attrition rates for new principals ranged from 9.0 percentage points to 13.4 across the eight years, while annual attrition rates for comparison principals ranged from 8.8 percentage points to 12.0.

Thus, from 1999 to 2009, the workforce of Wisconsin principals remained predominantly male and White, but it became more diverse, with an increase in the share of female and racial/ethnic minority principals. Studies of principals in other states have reported that the percentages of female principals (Papa, Lankford, and Wyckoff 2002; RAND 2004) and racial/ethnic minority principals (Black, Bathon, and Poindexter 2007) have increased over time. The average age of principals decreased by 0.5 year, a finding that differs from research by Papa, Lankford, and Wyckoff (2002) and Gates et al. (2003), which reported increases over time in average principal age in New York and nationally. The share of principals who hold a master's degree increased, consistent with research in other states (Gates et al. 2006). Changes in Wisconsin teacher workforce demographics from 1999 to 2009 indicate trends parallel to those in the principal workforce, with increases in the share of female teachers, racial/ethnic minority teachers, and teachers holding a master's degree.

The cohort of new principals exhibited retention and attrition rates similar to those of the comparison cohort. The range of annual attrition rates observed in this study is less than the range reported in other states, which varied between 12 and 20 percent (Battle and Gruber 2010).

The findings from this study can help Wisconsin educators and policymakers better understand the principal workforce in the state and inform policy discussions on certification, training, and initiatives targeting workforce diversity and retention. Future research could include a thorough analysis of the career pathways of Wisconsin principals based on the initial results of this study.

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Notes

1. The report defines “principal” as a K–12 public school principal in the Wisconsin school system.
2. This report refers to academic years by the year in which the school year under consideration begins (for example, 1999 for the 1999/2000 academic year).
3. To obtain a comparable number of years across the two cohorts, data from the 1999 all-principal comparison cohort are reported beginning in 2001 for principals who remained in the cohort.

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This study describes trends in demographic characteristics and retention rates in the Wisconsin principal workforce between 1999 and 2009. Over the period, the principal workforce remained predominantly White and male, but the share of female and racial/ethnic minority principals rose. Less than half of new principals remained as principals in Wisconsin after eight years.

WHY THIS STUDY?

Researchers and policymakers have devoted more attention to the impact of principals on student achievement and school improvement (Leithwood et al. 2004). School leaders affect student achievement in many ways, including by establishing the school improvement agenda and creating safe and supportive teaching and learning environments (Hallinger and Murphy 1986). School leaders also influence the quality of instruction staff, by hiring teachers and evaluating performance (Baker and Cooper 2005), and they are a determining factor in teachers' decisions to accept employment at and remain in a school (Boyd et al. 2010).

Recent federal initiatives recognize the importance of school principals in improving school performance, especially in turning around underperforming schools (Herman et al. 2008). Race to the Top and other federal initiatives emphasize professional development and performance incentive systems to attract, improve, and retain principals.¹ National and state policymakers are concerned that the principal workforce is aging, that fewer new principals are joining the workforce, and that fewer female and racial/ethnic minority educators are entering and remaining in the principal workforce (Gates et al. 2006; Jackson and Kelley 2002).

Wisconsin has undertaken efforts to improve the number and quality of principals in the educator workforce. For example, the Wisconsin Department of Public Instruction (DPI) has revised certification program requirements and master principal licensure to retain principals and attract new ones. The state is also redesigning principal evaluation procedures to further systematize performance assessment and improve professional development systems (Wisconsin Department of Public Instruction 2011).

To help guide these policy efforts, the DPI requested that Regional Educational Laboratory Midwest examine trends in Wisconsin's school principal workforce and principal retention so that it can better inform policy discussions on

certification and educator workforce incentives. This study goes beyond broad changes, looking at principals' educational attainment, age, gender, and race/ethnicity, and it compares changes in principal demographics with changes in teacher demographics. (See box 1 for definitions of key terms.)

The DPI publishes an annual public educator workforce analysis that includes information on school principals, but it does not compare workforce data within the state.² Many teacher workforce studies have been conducted, but there are fewer principal workforce studies (Jacobson 2005;

Loeb, Kalogrides, and Horng 2010). Principal workforces tend to vary across states, and trends identified in one state may not apply to others (Gates et al. 2006; see appendix A for a detailed review of the literature).

In addition to the demographic workforce analysis, the DPI sought information on the retention rates of new principals and how these rates compare with those of a comparison cohort of all new and experienced principals. The second part of the request examining principal retention is a possible first step toward a career pathway analysis. A career pathway analysis would provide policymakers

BOX 1

Key terms

Cohort analysis. An analysis that tracks over time the behavior or classification of a group of individuals defined by a specific characteristic (for example, principals who began their careers as principals in 2000, 2001, or 2002).

Comparison cohort. A cohort of all principals employed in 1999 in Wisconsin public schools, regardless of their years of experience as principal. New comparison principals could not be identified in 1999 using the same method for determining a new principal (see definition above) because 1999 was the earliest year in the dataset. Data for this cohort are first presented in 2001. This cohort is followed for eight years and serves as a comparison group for the cohort of new principals.

Cross-sectional analysis. A type of analysis used to examine behavior at specific points in time. In the current study, principal demographics (educational attainment, age, gender, and

race/ethnicity) are examined using cross-sectional analyses (each year) from 1999 to 2009.

Descriptive analysis. A type of analysis used to summarize a dataset using such statistics as frequencies, averages, and variation.

Educational attainment. In the current study, the highest degree earned by a teacher or principal: bachelor's degree or other (for example, less than a bachelor's degree), master's degree, six-year specialist's degree, or doctorate.

Joint appointment. A joint appointment exists when an individual is employed in two positions in a single year (for example, principal and assistant principal). See appendix B for further information.

Longitudinal analysis. A type of analysis that tracks the same people over time on the same set of variables.

New principal cohort. A cohort of principals who were new in 2000, 2001, or 2002 and were followed for eight years. A new principal is an individual that

was assigned the job title of principal in the Wisconsin Department of Public Instruction personnel database in 2000, 2001, or 2002 and was not assigned the principal job code in the previous year or did not appear in the database in the previous year.

Retention. Remaining a principal within the Wisconsin K–12 education system.

Schools and Staffing Survey. A national survey initiated by the National Center for Education Statistics in the mid-1980s to examine schools and school personnel. Topics on the survey include teachers' perceptions of school climate, teacher compensation, and district hiring practices (U.S. Department of Education n.d.).

Wisconsin Department of Public Instruction. The state agency responsible for public education and libraries in Wisconsin. The State Superintendent of Public Instruction leads the department, which functions much like the state education agencies in other states (Wisconsin Department of Public Instruction n.d. a).

and others information on the characteristics of candidates entering the profession, when and how principals move between jobs, where principals obtain their first and subsequent school leadership positions, and when principals leave the profession.³ So, to provide Wisconsin with state-specific information on principal workforce trends, this study examines two research questions:

- How do the demographic characteristics of Wisconsin school principals compare

with those of Wisconsin teachers, and how did these characteristics change over 1999–2009?

- How does the eight-year retention rate for a cohort of new Wisconsin principals from 2000 to 2002 compare with the retention rate of returning Wisconsin principals?

See box 2 for a description of the data, samples, and methods. See appendix B for more detail.

BOX 2

Data, samples, and methods

This box describes the study data, samples, and methods. (See appendix B for more details.)

Data. Data on educator demographics and retention came from the following databases:

- The Wisconsin public school personnel database, an annually updated database maintained by the Wisconsin Department of Public Instruction (DPI) that provides demographic, academic preparation, job classification (for example, principal, assistant principal, or teacher), and job placement (for example, name of school) information for all educators employed in public schools (Wisconsin Department of Public Instruction n.d. b).
- The Wisconsin certification database, which contains information on all certified and provisionally certified staff employed in public schools (Wisconsin Department of Public Instruction n.d. c). An assigned personnel

identifier allows certified staff to be tracked over time across job codes and locations.

The authors merged the Wisconsin public school personnel database and certification database into one file.

Samples. To conduct the cross-sectional demographic analyses, data from the total populations of principals and teachers were used for each school year from 1999 to 2009.

In examining principal retention, this study looked at a cohort of new principals and compared them with a cohort of all principals. The new principal cohort contained 641 principals in their first year as a principal from 2000 to 2002. The comparison cohort contained 1,703 principals in 1999. The analyses start in 2001 for the 1,339 principals remaining in the cohort from 1999. For comparison purposes, the report treats 2001 as the first year for the cohort of all principals. Because three years of data are combined for each “year in cohort,” the analyses implicitly average outcomes over time.

Methods. Cross-sections of principals and teachers from 1999 to 2009 were

used to examine four demographic characteristics (educational attainment, age, gender, and race/ethnicity) for Wisconsin school principals and teachers.¹ The demographic characteristics align with the DPI research request and are common for educator workforce analyses (see appendix A). Using common characteristics allows for comparison of findings between this study and other studies.

A year-to-year comparison of individual job-code changes using cohorts of new principals and comparison principals was conducted to determine principal retention rate. Principals who were in the database one year but not the next were considered to have stopped being principals in the Wisconsin public education system. This method does not allow for examining the total length of time in the profession because data are available for only eight years for the new and comparison cohorts, and there is no access to data for principals who left Wisconsin.

Note

1. Because the total populations of teachers and principals were used each year, statistical significance tests were not conducted.

FINDINGS

This section presents study findings first on the demographic characteristics of Wisconsin principals and then on retention rates.

Changes in demographic characteristics of Wisconsin school principals, 1999–2009

This section presents findings on the gender, race/ethnicity, age, and educational attainment of all Wisconsin principals between 1999 and 2009. To contextualize the principal workforce within the broader educator workforce, an analysis of teachers is provided for the same characteristics over the same period.

Gender. Among principals, the share who were female increased 7.1 percentage points, from 35.5 percent in 1999 to 42.6 percent in 2009 (figure 1). Among teachers, the share increased 4.1 percentage points, from 69.5 percent in 1999 to 73.6 percent in 2009. The increase in female principals (24.8 percent) is greater than the increase in female teachers (9.7 percent). See table C4 in appendix C for results for the distribution of principals and teachers by gender over 1999–2009.

Race/ethnicity. The share of racial/ethnic minority principals increased 0.7 percentage point from 1999 to 2009 (figure 2). The share of Black principals increased from 5.5 percent to 5.8 percent, the share of Hispanic principals increased from 0.9 percent to 1.1 percent, and the share of principals from other racial/ethnic minority groups increased from 0.3 percent to 0.5 percent. The share of White principals decreased from 93.4 percent to 92.7 percent.

The share of racial/ethnic minority teachers increased 0.4 percentage point from 1999 to 2009 (figure 3). The share of Hispanic teachers increased from 0.8 percent to 1.3 percent, and the share of teachers from other racial/ethnic minority groups increased from 0.5 percent to 1.0 percent. The share of Black teachers decreased from 2.6 percent to 2.1 percent. The share of White teachers decreased from 96.1 percent to 95.7 percent. See tables C5–C7 in appendix C for the counts and percentages of White and racial/ethnic minority principals and teachers over 1999–2009.

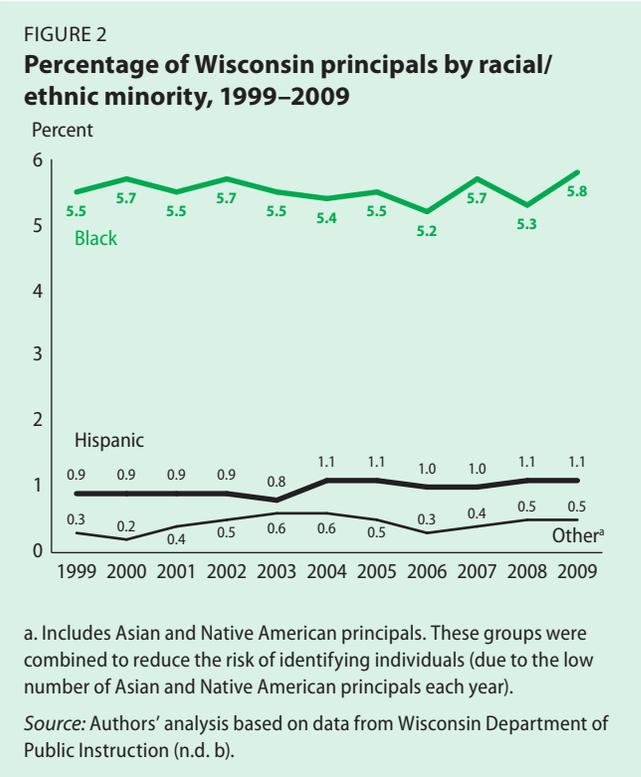
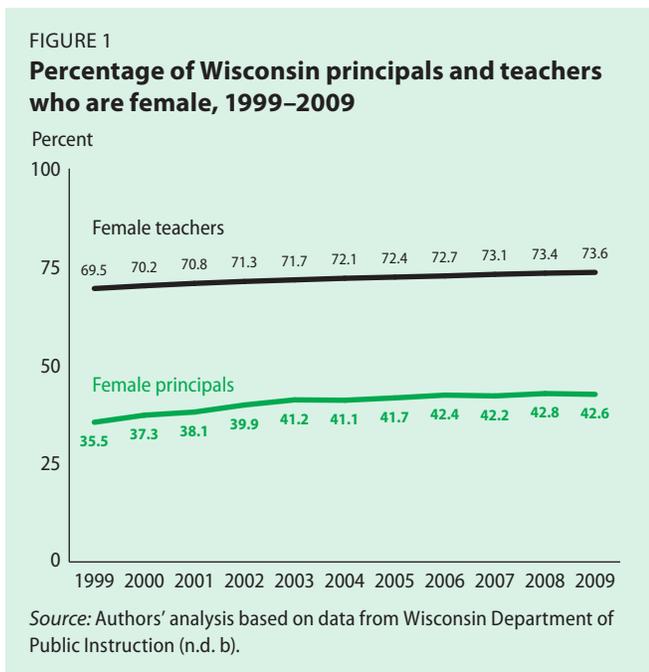
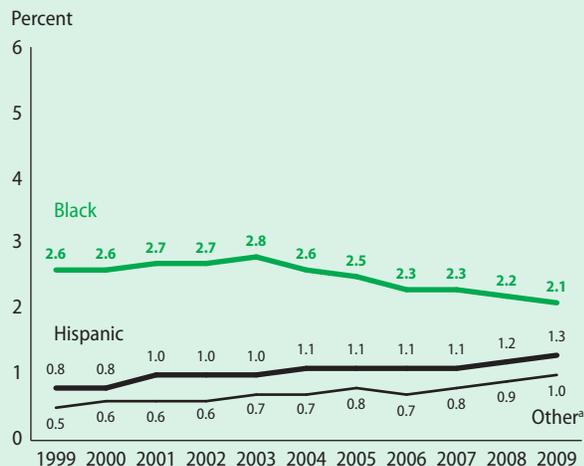


FIGURE 3
Percentage of Wisconsin teachers by racial/ethnic minority, 1999–2009



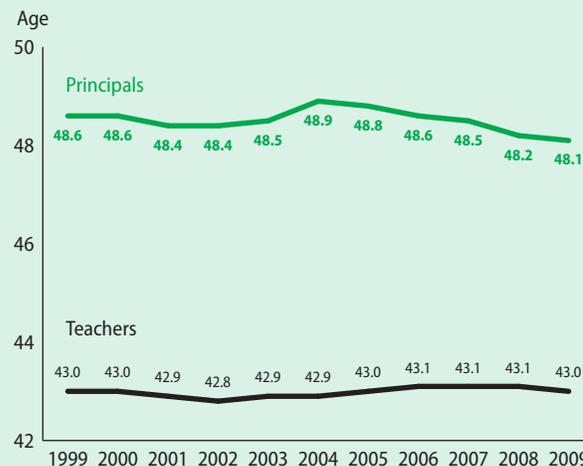
a. Includes Asian and Native American principals. These groups were combined to reduce the risk of identifying individuals (due to the low number of Asian and Native American principals each year).

Source: Authors' analysis based on data from Wisconsin Department of Public Instruction (n.d. b).

Age. The average age of principals decreased 0.5 year, from 48.6 in 1999 to 48.1 in 2009 (figure 4). For teachers, the average age was 43.0 in both 1999 and 2009. On average, principals were 5.6 years older than teachers in 1999 and 5.1 years older in 2009. See table C3 in appendix C for the average age of principals and teachers over 1999–2009.

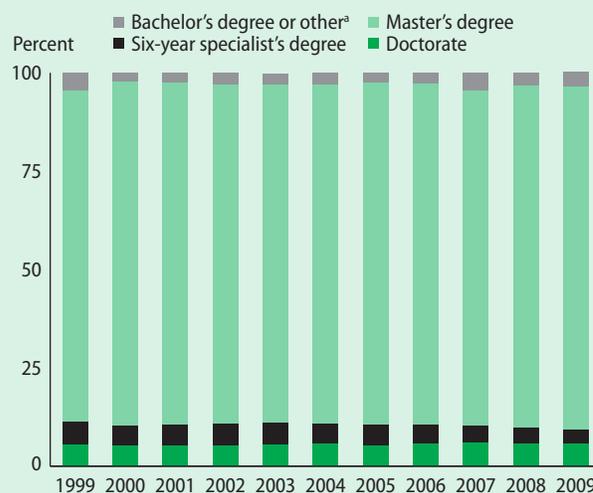
Educational attainment. Although the percentages fluctuate across years, the share of principals whose highest degree earned was a master's increased 2.8 percentage points, from 84.2 percent in 1999 to 87.0 percent in 2009 (figure 5). The share of principals with a doctorate increased 0.3 percentage point, from 5.4 percent in 1999 to 5.7 percent in 2009. The share of principals with a six-year specialist's degree⁴ fell 2.3 percentage points, from 5.9 percent in 1999 to 3.6 percent in 2009, and the share of principals with a bachelor's degree or other fell 0.7 percentage point, from 4.5 percent in 1999 to 3.8 percent in 2009. See table C1 in appendix C for the counts and percentages of the highest degree earned for principals over 1999–2009.

FIGURE 4
Wisconsin principals and teachers by average age, 1999–2009



Source: Authors' analysis based on data from Wisconsin Department of Public Instruction (n.d. b).

FIGURE 5
Percentage of Wisconsin principals by highest degree earned, 1999–2009

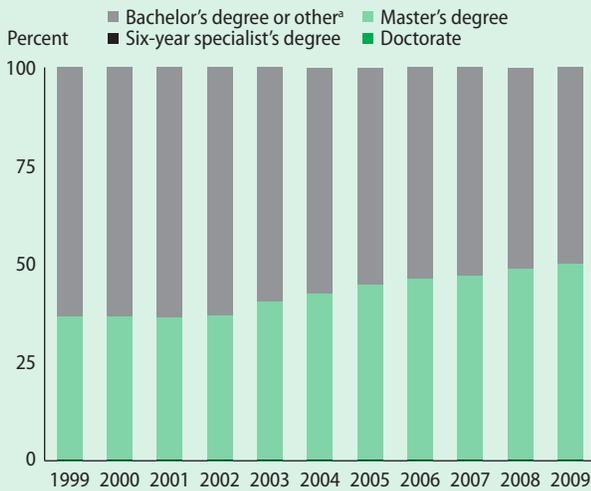


a. "Other" consists mostly of principals with less than a bachelor's degree and accounts for no more than 1.5 percent of principals for each year.

Source: Authors' analysis based on data from Wisconsin Department of Public Instruction (n.d. b).

The share of teachers whose highest degree held is a master's increased 13.4 percentage points, from 36.3 percent in 1999 to 49.7 percent in 2009 (figure 6). The share of teachers with a bachelor's degree or other fell 13.3 percentage points, from

FIGURE 6

Percentage of Wisconsin teachers by highest degree earned, 1999–2009

a. "Other" consists mostly of teachers with less than a bachelor's degree and accounts for no more than 1.6 percent of teachers for each year.

Source: Authors' analysis based on data from Wisconsin Department of Public Instruction (n.d. b).

63.4 percent in 1999 to 50.1 percent in 2009. In both 1999 and 2009, 0.2 percent of teachers held a doctorate, and 0.1 percent held a six-year specialist's degree. See table C2 in appendix C for the counts and percentages of the highest degree earned for teachers over 1999–2009.

From 1999 to 2009, the increase in teachers who held a master's degree (42.3 percent) was greater than that of principals (7.3 percent). However, a greater percentage of principals than teachers held a master's degree in all years examined, with a difference of 37.3 percentage points in 2009.

The eight-year retention rate for new Wisconsin principals, compared with that of returning Wisconsin principals

After eight years, 43.7 percent of the new principal cohort remained Wisconsin principals. Each year, 86.6–91.0 percent of new principals remained principals in the Wisconsin public school system from the prior year. Annual attrition rates for new principals ranged from 9.0 to 13.4 percentage points across the eight years (table 1).⁵

TABLE 1

New principals retained as principals in Wisconsin, by number of years in cohort

Year in cohort	Total remaining principals	Percentage remaining from the prior year ^a	Percentage annual attrition rates ^b	Cumulative percentage remaining from year 1 total ^c
1	641	—	—	—
2	583	91.0	9.0	91.0
3	506	86.8	13.2	78.9
4	452	89.3	10.7	70.5
5	401	88.7	11.3	62.6
6	359	89.5	10.5	56.0
7	311	86.6	13.4	48.5
8	280	90.0	10.0	43.7

— is not applicable.

Note: Attrition starts in year 2. New principals were new to the Wisconsin public school system in 2000, 2001, or 2002 (see box 1).

a. The percentage of principals remaining in a given year relative to the total number of principals from the prior year.

b. The difference between 100 percent and the percentage remaining from the prior year.

c. The percentage of principals remaining each year relative to the 641 principals in year 1.

Source: Authors' analysis based on data from Wisconsin Department of Public Instruction (n.d. c).

Of the comparison cohort, 46.1 percent remained principals after eight years (table 2). Each year, 88.0–91.2 percent of the comparison cohort remained principals from the prior year. Annual cumulative attrition rates for comparison principals ranged from 8.8 to 12.0 percentage points.

CONCLUSIONS

This study found changes in the demographic characteristics of Wisconsin principals. From 1999 to 2009, the workforce remained predominantly White and male but became more diverse, with an increase in the share of female principals (7.1 percentage points) and a smaller increase in the share of racial/ethnic minority principals (0.7 percentage point). Studies of principals in other states have reported that the percentages of female principals (Papa, Lankford, and Wyckoff 2002; RAND 2004)

TABLE 2
Principals in the comparison cohort retained as principals in Wisconsin, by number of years in cohort

Year in cohort	Total remaining principals	Percentage remaining from the prior year ^a	Percentage annual attrition rates ^b	Cumulative percentage remaining from year 1 total ^c
1	1,339	—	—	—
2	1,198	89.5	10.5	89.5
3	1,085	90.6	9.4	81.0
4	989	91.2	8.8	73.9
5	890	90.0	10.0	66.5
6	783	88.0	12.0	58.5
7	701	89.5	10.5	52.4
8	617	88.0	12.0	46.1

na is not applicable.

Note: Attrition starts in year 2. Comparison principals are all principals in the Wisconsin system in 1999, regardless of their number of years of experience as principals in Wisconsin (see box 1). Data are first reported for comparison principals in 2001 (year 1 in cohort) for remaining principals from the 1999 cohort.

a. The percentage of principals remaining in a given year relative to the total number of principals from the prior year.

b. The difference between 100 percent and the percentage remaining from the prior year.

c. The percentage of principals remaining each year relative to the 1,339 principals in year 1.

Source: Authors' analysis based on data from Wisconsin Department of Public Instruction (n.d. c).

and racial/ethnic minority principals (Fuller and Young 2007; Black, Bathon, and Poindexter 2007; Gates et al. 2003) have increased over time.

The average age of Wisconsin principals decreased 0.5 year between 1999 and 2009, a finding that contradicts Papa, Lankford, and Wyckoff (2002) and Gates et al. (2003), which reported increases in average principal age over time. Analysis of Wisconsin teacher workforce demographics from 1999 to 2009 shows increases in the share of female teachers (4.1 percentage points) and racial/ethnic minority teachers (0.4 percentage point) but no change in the average age.

The percentage of principals who held a master's degree increased from 1999 to 2009 (2.8 percentage

points), consistent with prior research in other states. Gates et al. (2006) found an increase in the percentage of principals holding a master's degree in Illinois (from 85.2 percent in 1990 to 86.9 percent in 2000) and North Carolina (from 98.4 percent in 1990 to 99.7 percent in 2000).⁶ Changes in Wisconsin teacher workforce educational attainment from 1999 to 2009 show an increase of 13.4 percentage points in the share of teachers holding a master's degree.

This study found that 43.7 percent of the new principal cohort and 46.1 percent of the comparison cohort remained as principals in Wisconsin. Annual attrition rates for new principals were between 9.0 percent and 13.4 percent across the eight years, while attrition rates for comparison cohort principals were between 8.8 percent and 12.0 percent. Based on national data, Battle and Gruber (2010) found that 8 percent of principals with less than three years of experience as a principal in 2007/08 had left the principalship in 2008/09, while 18 percent of principals with 10 or more years of experience in 2007/08 had left the principalship in 2008/09. The similar rates of attrition for new and comparison principals found in this study differ from research reporting that more experienced principals leave the principalship at higher rates. The comparison principal cohort in this study included principals at all levels of experience, which might have masked more pronounced differences between new principals and those with 10 or more years of experience.

The findings from this study can help Wisconsin educators and policymakers better understand the principal workforce and inform policy discussions on certification, training, and initiatives targeting workforce diversity and retention. Future research could include a thorough analysis of the career pathway of Wisconsin principals based on the initial results from this study. A career pathway study would provide policymakers and others different perspectives on which candidates become principals (for example, teachers and assistant principals), on when and how they move within the position and between organizations, and on

when they leave the position (Gottfredson 1981; Hackett, Lent, and Greenhaus 1991). This type of analysis could examine school characteristics that may be driving principals to accept another position or leave certain types of schools. A better understanding of principals' movement in and out of the field would further inform efforts to increase principal diversity and retention.

STUDY LIMITATIONS

Study findings are limited by the quality of data. According to Pantal et al. (2008), state databases hold greater potential for rigorous study than do national surveys (for example, Schools and Staffing Survey or census data) because data are collected directly from the districts that employ the educators and are available for the universe of educators, not just a sample. Consistent reporting across the state, however, is a challenge for data accuracy. The DPI complies with federal and state guidelines on—and maintains procedures for ensuring—principal data quality. The authors attempted to ensure that the report included all available data by carefully reviewing and cleaning datasets and rerunning analyses after changes in the data were made, but there were some instances of missing data for individual characteristics each year (less than 1 percent in all cases).

The study is also limited in describing principal retention because it studies cohorts of individuals and it includes a limited number of years. A description of principal retention was not possible

for all principals in the 1999–2009 dataset. Instead, the study describes two cohorts—school principals who were new from 2000 to 2002 and comparison principals who were shown as principals in the data files in 1999. The comparison group was first reported in this study in 2001 (year 1 in cohort) to provide a comparable amount of time for a year-by-year analysis of each cohort participant's principal retention.

Using this time period for each cohort might have limited the ability to identify individuals who were principals in the years before or after the cohort year or who were previously a principal in another state. Although the demographics for the cohorts were similar to those of the other years of data in this study, these cohorts may not be representative of the retention and employment history of other cohorts of principals.

Another limitation of this study is that no effort was made to gain insight into the motivations of members of the new and comparison cohorts. Due to the nature of the data, it was not possible to determine why a given principal stayed or left employment as a principal in the Wisconsin public school system.

Finally, trends in available data suggest commonalities among states, but readers must use caution when applying the findings in the current study to states other than Wisconsin. Policymakers need more precise data on their state—or regions within the state—to establish incentives or programs for the principal workforce.

APPENDIX A BACKGROUND LITERATURE ON PRINCIPAL DEMOGRAPHIC CHARACTERISTICS AND RETENTION

This appendix describes previous research on principal demographic characteristics and retention that provides context for the results described in this report.

Principal workforce demographics

Research found that 73.2–77.4 percent of principals currently working in schools have a master’s degree or higher (Baker and Cooper 2005; Black, Bathon, and Poindexter 2007; Fuller and Young 2007; Gates et al. 2006; Papa, Lankford, and Wyckoff 2002). Research by Gates et al. (2006) found that, in both Illinois and North Carolina, the percentage of principals with a master’s degree increased over 1990–2000 (in Illinois by 1.7 percentage points, from 85.2 percent to 86.9 percent, and in North Carolina by 1.3 percentage points, from 98.4 percent to 99.7 percent). The percentage of principals with a doctorate decreased over the same period in Illinois by 0.9 percentage point (from 9.5 percent to 8.6 percent) but increased in North Carolina by 1.3 percentage points (from 8.5 percent to 9.8 percent).

National analyses of principal workforce age conducted by Gates et al. (2003) and Battle and Gruber (2010) indicate that the average age of the principal workforce has increased. Gates et al. (2003) reported an increase in average age from 1987 (38.4 years) to 2000 (41.2 years) in Illinois but a decrease for the same time period in North Carolina (from 35.5 years to 30.2 years). Gates et al. (2003) also found that the average age of principals nationally increased from 1987 (46.0 years) to 2000 (49.9 years), with the largest concentration between 46 and 55 years. Gates et al. (2003) also found that in 1987, 38 percent of principals nationally were younger than 40 years, while in 2000, just 12 percent were.⁷

The majority of the national principal workforce is male, but the share of female principals is rising.

Using National Center for Education Statistics data, Jacobson (2005) found that 56.3 percent of public school principals in the United States are male. In terms of specific state results, in 2005/06, 61.4 percent of principals in Indiana were male (Black, Bathon, and Poindexter 2007). Longitudinal analyses suggest that the share of women in the principal workforce is increasing. Papa, Lankford, and Wyckoff (2002) found that in New York 39.8 percent of first-time principals were female in 1990 and 61.5 percent were in 2000. Also, RAND (2004) found that the percentage of female principals in Illinois and North Carolina increased from 26 percent in 1990 to 47 percent in 2000. In addition, 54 percent of new principal hires nationally are female (Jacobson 2005).

Research found that the principal workforce has historically had a higher share of men than the teacher workforce has (Black, Bathon, and Poindexter 2007; Fuller and Young 2007; Gates et al. 2003; Loeb, Kalogrides, and Horng 2010; RAND 2004). In North Carolina in 2000, 94 percent of elementary school teachers, 63.2 percent of high school teachers, 58.3 percent of elementary school principals, and 24.1 percent of high school principals were female (RAND 2004).

Across a number of states, the majority of principals are White. In 2000, using data for New York, Papa, Lankford, and Wyckoff (2002) reported that 61.4 percent of principals were White. Also, Battle and Gruber (2010) reported that, in 2008/09 in Washington, DC, 80.9 percent of principals were White. The percentage of racial/ethnic minority school administrators, however, has increased. In an analysis of Texas data, Fuller and Young (2007) found that White principals were less likely than principals of other races/ethnicities to remain principals after 10 years. Additionally, studies found that the principal workforce has historically had a higher share of White members than the teacher workforce has (Black, Bathon, and Poindexter 2007; Fuller and Young 2007; Gates et al. 2003; Loeb, Kalogrides, and Horng 2010; RAND 2004). However, in some states the percentage increase in the share of racial/ethnic minority

principals has been greater than that in the share of racial/ethnic minority teachers (Black, Bathon, and Poindexter 2007; Fuller and Young 2007; Gates et al. 2003; RAND 2004).

Principal retention

Research found that annual turnover rates in the principal workforce have varied between

12 percent and 20 percent (Battle and Gruber 2010; Loeb, Kalogrides, and Horng 2010; RAND 2004). In addition, using nationally representative public school data, Battle and Gruber (2010) found that 8 percent of principals with less than three years of experience as a principal in 2007/08 had left the principalship in 2008/09, while 18 percent of principals with 10 or more years of experience had left the principalship in 2008/09.

APPENDIX B DATA SOURCES AND ANALYSIS

This appendix describes the data sources and the study methodology.

Data collection

This study used the Wisconsin public school educator personnel and certification databases, both maintained by the Wisconsin Department of Public Instruction (DPI). These two databases were used for school years between 1999 and 2009 and are detailed below.

All Wisconsin databases are compiled and maintained through annual reporting mechanisms as stipulated by state policy (P.I. 34, P.I. 1202) and federal guidelines for certification and employment status reporting. A preliminary data analysis confirmed that data for necessary variables were consistently collected using the same reporting mechanisms during the 11 school years from 1999 to 2009.

The authors of the current study gained access to both databases through a request to the DPI, which maintains the databases separately and assigns each individual a unique code in each database for the period of employment in the state's public school system. Therefore, a single individual has one certification code and one personnel code. The authors had access to the codebook for both databases, which provided a detailed description of the databases' contents.

The personnel database in Wisconsin, as in other states, consists of annually updated master files on all educators employed by the state's public schools (Wisconsin Department of Public Instruction n.d. b). Wisconsin's personnel database includes individual demographic information, position codes for each academic year, start and end dates for employment in the current position, highest degrees earned, and codes for the school or district where the individual is currently employed.

The certification database includes all certified and provisionally certified staff employed in public schools (Wisconsin Department of Public Instruction n.d. c). The assigned identifier for each certified staff member allows them to be tracked across job codes and schools or districts from year to year. The identifiers were necessary for examining school principal retention.

Data were gathered for 1999–2009 because 2009 was the latest year of data available from the databases and because DPI staff described 1999 to 2009 as a period when state data definitions, collection methods, and warehousing were stable for the variables analyzed. The results from this study do not reflect changes prior to 1999 or after 2009.

Significance tests make inferences from samples to whole populations. Because the whole population was studied, no inference is necessary. See table B1 for the variables (data elements), their data coding, and their data use.

Data analysis

This section describes the study's unit of analysis and methodology.

Unit of analysis. The unit of analysis for this study was the individual. The numbers of principals and teachers represent the actual number of people occupying each position for each year.

The data file was prepared through a series of merges and recoding steps, because the Wisconsin databases contain personnel files in which the same person is assigned multiple rows (or records) within the same year. In the simplest case, the same person occupied the same position at the same school for some or all study years (one row of data per year). In other cases, an individual was a teacher in multiple schools or held multiple positions in one school. In still other cases, individuals held multiple positions in multiple schools.

To track individuals, the raw number of rows (or records) could not be counted, else individuals

TABLE B1

Data elements, coding, and use of selected elements from original datasets for Wisconsin staff and school characteristics

Data element	Data coding	Data use
Unique staff identifier	Each unique staff number assigned by the state (no coding needed)	Unique record identifier
Year	None	To stratify the sample for yearly analyses
Positions held	See table B2	To categorize staff and select principals only for certain analyses
Race/ethnicity	5 = White, 4 = Black, 3 = Hispanic, 2 = Asian, 1 = American Indian	Demographic group analysis
Gender	0 = male, 1 = female	Demographic group analysis
Highest degree	1 = bachelor's, 2 = master's, 3 = doctorate, 4 = six-year specialist's, 5 = other	Demographic group analysis
Birth year	Calculated age	Demographic group analysis
School identification code	Code used by the school to note the job status of each staff member	Principal retention

Source: Authors' compilation based on data from Wisconsin Department of Public Instruction (n.d. b, c).

would be counted multiple times. Alternatively, if an individual had multiple rows (for example, principal and teacher within the same year) and the individual weight was split to “half” a teacher and “half” a principal, the person would be counted as a half-person in each analysis. Using similar logic, rows cannot be deleted to create one per person; doing so would result in lost information about their multiple assignments. To address these situations, individuals with multiple rows of data within a year were weighted according to the number of times they appeared in the data file for that year, and each individual was assigned to one job category of analysis (the highest of all positions within a year).

First, individuals with multiple positions were recoded into their highest position. See table B2 for the decision rules for this categorization and table B3 for the number of individuals in all possible single and multiple job code categories.

A weighting scheme was applied if a given individual had the same job title (for example, principal) across multiple schools within a year. The data were weighted so a given individual would count as one and not be counted as a principal more than once per year.

TABLE B2

Classification scheme for coding multiple positions in the Wisconsin public school personnel database

Existing multiple job codes	New code
Teacher Assistant principal Principal	Principal
Teacher Principal	Principal
Assistant principal Principal	Principal
Teacher Assistant principal	Not a principal Coded as assistant principal

Source: Authors' compilation based on data from the Wisconsin public school personnel database.

For instance, assume that an individual was a principal at four schools. Each row of that person's data was weighted at 0.25. When the data were then analyzed with weights for that individual, he or she was counted as one person ($4 \times 0.25 = 1.00$).

See table B4 for the number of principals and teachers, after collapsing categories based on their highest position as shown in table B3.

TABLE B3

Number and percentage of individuals assigned principal, assistant principal, teacher, and multiple job codes in Wisconsin, 1999–2009

Year	Principals		Assistant principals		Teachers		Multiple job codes ^a		Total
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
1999	1,701	2.7	690	1.1	59,803	96.1	9	0.0	62,203
2000	1,708	2.7	691	1.1	60,706	96.2	8	0.0	63,113
2001	1,717	2.7	691	1.1	61,891	96.2	8	0.0	64,307
2002	1,774	2.7	722	1.1	62,586	96.2	5	0.0	65,087
2003	1,768	2.7	726	1.1	63,287	96.2	4	0.0	65,785
2004	1,766	2.7	711	1.1	62,068	96.2	5	0.0	64,550
2005	1,742	2.7	731	1.1	62,209	96.2	8	0.0	64,690
2006	1,727	2.7	710	1.1	61,746	96.2	9	0.0	64,192
2007	1,729	2.7	694	1.1	61,565	96.2	13	0.0	64,001
2008	1,733	2.7	678	1.1	61,456	96.2	20	0.0	63,887
2009	1,742	2.7	698	1.1	61,919	96.2	28	0.0	64,387

a. Includes individuals who were principal, assistant principal, and teacher; principal and assistant principal; principal and teacher; and assistant principal and teacher. Although cells have count values greater than zero, the corresponding percentage is listed as zero because these percentages round to less than one-tenth of a percent and therefore are reported as zero.

Source: Authors' analysis based on data from Wisconsin Department of Public Instruction (n.d. b).

TABLE B4

Number and percentage of individuals in principal and teacher jobs in Wisconsin, 1999–2009

Year	Principals		Teachers	
	Number	Percent ^a	Number	Percent ^a
1999	1,703	2.7	59,803	96.1
2000	1,710	2.7	60,706	96.2
2001	1,720	2.7	61,891	96.2
2002	1,777	2.7	62,586	96.2
2003	1,771	2.7	63,287	96.2
2004	1,770	2.7	62,068	96.2
2005	1,747	2.7	62,209	96.2
2006	1,733	2.7	61,746	96.2
2007	1,736	2.7	61,565	96.2
2008	1,751	2.7	61,456	96.2
2009	1,769	2.7	61,919	96.2

a. Based on the total across all job categories, as shown in table B3.

Source: Authors' analysis based on data from Wisconsin Department of Public Instruction (n.d. b).

Research questions. After the databases were identified, data files were merged, and cohorts were identified, the next step was to analyze the data. Table B5 shows for both research questions the

analysis used to answer the question and where to find the analysis in this report.

To conduct the cross-sectional demographic analyses, data from the total populations of principals and teachers were used each year from 1999 to 2009.

Principal retention was examined using two cohorts over an eight-year period. One cohort consisted of new principals; a second cohort, consisting of new and continuing principals, served as a comparison group for the new cohort. The personnel database does not indicate whether a principal is new or in his or her first year in a school. New principals were defined as those who held principal positions in one year but not in the previous year. These principals were considered “new” for that year, but they were not necessarily first-time principals. (They might have been principals two or more years before the first year of study.) It is possible that some “new” principals were once principals, but that information could be missing from the data, their prior principalship could have been at least two years before

TABLE B5

Study research questions, analyses, and data representations

Research question	Analysis	Data representation
How do the demographic characteristics of Wisconsin school principals compare with those of Wisconsin teachers, and how did these characteristics change over 1999–2009?	Descriptive analysis of teachers and principals for all years from 1999 to 2009 (includes analyses of average age and counts and percentages of gender, race/ethnicity, and highest degree obtained; see appendix C)	Figures 1–6 and tables C1–C7
How does the eight-year retention rate for a cohort of new Wisconsin principals from 2000 to 2002 compare with the retention rate of returning Wisconsin principals?	Counts and percentages of principals by cohort (new and comparison) who remained in the principalship for eight years	Tables 1 and 2

Source: Authors' compilation.

their re-entry, or they could have been principals in another state. The dataset did not provide any other way to distinguish a “new” principal, such as an entry or exit date.

Members of the new principal cohort included principals who began their position in 2000, 2001, or 2002. The data for these three years were combined to form year 1 in a dataset of new principals. Data from 2001, 2002, and 2003 were combined to form year 2, and so on. One dataset across three years of new principals allows for greater parsimony in presenting the data than would presenting three sets of data (new principals who started in each of the three years—2000, 2001, and 2002) for every analysis. The new principal cohort began with new principals in 2000, as opposed to 1999, because data for 1998 was unavailable, making it impossible to determine whether a principal assigned in 1999 was also assigned as a principal in 1998. The cohort of new principals contains data for eight years: 2000–07, 2001–08, and 2002–09. Because three years of data are combined for each “year in cohort,” the analyses implicitly average outcomes over time.

A second cohort of all principals (new and continuing) in the dataset in 1999 was used as a comparison group for the new principal cohort. While this comparison group began as a cohort in 1999, the analyses are first presented for the cohort in 2001 (year 1 in cohort). Analyses are first presented in 2001 to have a comparable number

of years across the two cohorts (eight years) and to have similar starting years in the cohorts (2000–02 for the new cohort and 2001 for the comparison cohort). For the comparison cohort, year 1 included data from all remaining principals in 1999 who were still principals in 2001, year 2 included data from all remaining principals in the cohort in 2002, and so on through 2008.

Data confidentiality. To ensure confidentiality—and according to the limited data-use agreements negotiated with Wisconsin—data were stored on secure, password-protected servers accessible only to the authors of the study and technology administrators from Learning Point Associates (which merged with the American Institutes for Research in August 2010). Current American Institutes for Research data security procedures meet criteria for federal restricted data-use agreements, and the Wisconsin data are secured according to these security procedures.

Missing data. Missing data for the demographic characteristics of principals and teachers are noted below each table, where applicable. The amount of missing data for individual characteristics each year is less than 1 percent in all cases. A concerted effort was made to find missing data at the individual level—for instance, Regional Educational Laboratory Midwest staff populated missing data through state databases and conversations with state personnel—but in some cases recovery was impossible.

APPENDIX C

SUPPLEMENTAL TABLES ON THE DEMOGRAPHICS OF WISCONSIN PRINCIPALS AND TEACHERS

This appendix contains tables that provide details on the demographic characteristics of Wisconsin principals and teachers.

TABLE C1

Distribution of Wisconsin principals by highest degree earned, 1999–2009

Year	Bachelor's degree and other ^a		Master's degree		Six-year specialist's degree		Doctorate		Total
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
1999	77	4.5	1,434	84.2	100	5.9	92	5.4	1,703
2000	37	2.2	1,494	87.4	91	5.3	88	5.1	1,710
2001	46	2.7	1,494	86.9	91	5.3	90	5.2	1,721
2002	55	3.1	1,530	86.1	102	5.7	90	5.1	1,777
2003	54	3.0	1,522	85.9	100	5.6	95	5.4	1,771
2004	51	2.9	1,528	86.3	91	5.1	100	5.6	1,770
2005	43	2.5	1,518	86.9	93	5.3	93	5.3	1,747
2006	50	2.9	1,504	86.8	80	4.6	100	5.8	1,734
2007	77	4.4	1,483	85.4	74	4.3	103	5.9	1,737
2008	57	3.2	1,524	87.0	70	4.0	100	5.7	1,751
2009	66	3.8	1,539	87.0	63	3.6	101	5.7	1,769

Note: Percentages may not sum to 100 percent because of rounding.

a. The "other" subcategory is a small percentage of the total sample and consists mostly of individuals with less than a bachelor's degree.

Source: Authors' analysis based on data from Wisconsin Department of Public Instruction (n.d. b).

TABLE C2

Distribution of Wisconsin teachers by highest degree earned, 1999–2009

Year	Bachelor's degree and other ^a		Master's degree		Six-year specialist's degree		Doctorate		Total
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
1999	37,820	63.4	21,611	36.3	45	0.1	130	0.2	59,606
2000	38,310	63.4	21,989	36.4	37	0.1	127	0.2	60,463
2001	39,398	63.7	22,261	36.0	69	0.1	141	0.2	61,869
2002	39,536	63.2	22,822	36.5	78	0.1	139	0.2	62,575
2003	37,744	59.7	25,328	40.0	79	0.1	131	0.2	63,282
2004	35,772	57.6	26,098	42.0	73	0.1	122	0.2	62,065
2005	34,440	55.3	27,586	44.3	72	0.1	110	0.2	62,208
2006	33,290	54.0	28,284	45.8	63	0.1	109	0.2	61,746
2007	32,689	53.1	28,701	46.6	61	0.1	114	0.2	61,565
2008	31,554	51.3	29,717	48.4	66	0.1	119	0.2	61,456
2009	30,989	50.1	30,757	49.7	67	0.1	106	0.2	61,919

Note: Percentages may not sum to 100 percent because of rounding. There were missing cases in data for the following years: 197 in 1999, 243 in 2000, 22 in 2001, 11 in 2002, 5 in 2003, 3 in 2004, and 1 in 2005.

a. The "other" subcategory is a small percentage of the total sample and consists mostly of individuals with less than a bachelor's degree.

Source: Authors' analysis based on data from Wisconsin Department of Public Instruction (n.d. b).

TABLE C3

Distribution of Wisconsin principals and teachers by average age, 1999–2009

Year	Principals			Teachers		
	Average age	Standard deviation	Total	Average age	Standard deviation	Total
1999	48.6	7.1	1,703	43.0	10.1	59,803
2000	48.6	7.2	1,710	43.0	10.2	60,706
2001	48.4	7.5	1,720	42.9	10.4	61,891
2002	48.4	7.7	1,777	42.8	10.4	62,586
2003	48.5	7.8	1,770	42.9	10.6	63,287
2004	48.9	7.7	1,770	42.9	10.6	62,068
2005	48.8	7.9	1,747	43.0	10.7	62,209
2006	48.6	8.0	1,733	43.1	10.7	61,746
2007	48.5	8.2	1,736	43.1	10.8	61,565
2008	48.2	8.3	1,751	43.1	10.8	61,456
2009	48.1	8.4	1,769	43.0	10.9	61,919

Note: There was one case of missing data for 2003.

Source: Authors' analysis based on data from Wisconsin Department of Public Instruction (n.d. b).

TABLE C4

Distribution of Wisconsin principals and teachers by gender, 1999–2009

Year	Principals					Teachers				
	Female		Male		Total	Female		Male		Total
	Number	Percent	Number	Percent		Number	Percent	Number	Percent	
1999	604	35.5	1,099	64.5	1,703	41,535	69.5	18,268	30.5	59,803
2000	639	37.3	1,072	62.7	1,711	42,638	70.2	18,068	29.8	60,706
2001	656	38.1	1,065	61.9	1,721	43,845	70.8	18,046	29.2	61,891
2002	708	39.9	1,069	60.1	1,777	44,622	71.3	17,964	28.7	62,586
2003	729	41.2	1,041	58.8	1,770	45,408	71.7	17,880	28.3	63,288
2004	728	41.1	1,042	58.9	1,770	44,757	72.1	17,311	27.9	62,068
2005	728	41.7	1,019	58.3	1,747	45,054	72.4	17,155	27.6	62,209
2006	735	42.4	998	57.6	1,733	44,904	72.7	16,842	27.3	61,746
2007	734	42.2	1,003	57.8	1,737	44,994	73.1	16,572	26.9	61,566
2008	749	42.8	1,002	57.2	1,751	45,091	73.4	16,365	26.6	61,456
2009	754	42.6	1,015	57.4	1,769	45,560	73.6	16,359	26.4	61,919

Note: There was one case of missing data for 2003.

Source: Authors' analysis based on data from Wisconsin Department of Public Instruction (n.d. b).

TABLE C5

Summary of Wisconsin White and racial/ethnic minority principal and teacher distributions, 1999–2009

Year	Principals					Teachers				
	Racial/ethnic minority		White		Total	Racial/ethnic minority		White		Total
	Number	Percent	Number	Percent		Number	Percent	Number	Percent	
1999	113	6.6	1,590	93.4	1,703	2,305	3.9	57,498	96.1	59,803
2000	118	6.9	1,592	93.1	1,710	2,460	4.1	58,246	95.9	60,706
2001	116	6.7	1,605	93.3	1,721	2,574	4.2	59,316	95.8	61,890
2002	126	7.1	1,651	92.9	1,777	2,664	4.3	59,923	95.7	62,587
2003	123	6.9	1,648	93.1	1,771	2,864	4.5	60,424	95.5	63,288
2004	127	7.2	1,643	92.8	1,770	2,708	4.4	59,359	95.6	62,067
2005	124	7.1	1,622	92.9	1,746	2,740	4.4	59,464	95.6	62,204
2006	113	6.5	1,620	93.5	1,733	2,603	4.2	59,141	95.8	61,746
2007	122	7.1	1,608	93.0	1,730	2,596	4.2	58,789	95.8	61,385
2008	120	6.9	1,631	93.1	1,751	2,618	4.3	58,838	95.7	61,456
2009	130	7.3	1,639	92.7	1,769	2,666	4.3	59,253	95.7	61,919

Note: There were missing cases in principal data for the following years: one in 2005 and six in 2007. There were missing cases in teacher data for the following years: 1 in 2004, 1 in 2003, 1 in 2004, 5 in 2005, 2 in 2006, and 180 in 2007.

Source: Authors' analysis based on data from Wisconsin Department of Public Instruction (n.d. b).

TABLE C6

Distribution of Wisconsin principals by race/ethnicity, 1999–2009

Year	Black		Hispanic		White		Other ^a		Total
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
1999	93	5.5	15	0.9	1,590	93.4	5	0.3	1,703
2000	98	5.7	16	0.9	1,592	93.1	4	0.2	1,710
2001	95	5.5	15	0.9	1,605	93.3	6	0.4	1,721
2002	102	5.7	16	0.9	1,651	92.9	8	0.5	1,777
2003	98	5.5	15	0.8	1,648	93.1	10	0.6	1,771
2004	96	5.4	20	1.1	1,643	92.8	11	0.6	1,770
2005	96	5.5	20	1.1	1,622	92.9	8	0.5	1,746
2006	90	5.2	17	1.0	1,620	93.5	6	0.3	1,733
2007	98	5.7	17	1.0	1,608	92.9	7	0.4	1,730
2008	92	5.3	20	1.1	1,631	93.1	8	0.5	1,751
2009	102	5.8	19	1.1	1,639	92.7	9	0.5	1,769

Note: There were missing cases in data for the following years: one in 2005 and six in 2007.

a. Consists of Asian and Native American principals.

Source: Authors' analysis based on data from Wisconsin Department of Public Instruction (n.d. b).

TABLE C7

Distribution of Wisconsin teachers by race/ethnicity, 1999–2009

Year	Black		Hispanic		White		Other ^a		Total
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
1999	1,525	2.6	459	0.8	57,498	96.1	321	0.5	59,803
2000	1,605	2.6	506	0.8	58,246	95.9	349	0.6	60,706
2001	1,661	2.7	550	1.0	59,316	95.8	363	0.6	61,891
2002	1,668	2.7	602	1.0	59,923	95.7	394	0.6	62,587
2003	1,793	2.8	646	1.0	60,424	95.5	425	0.7	63,288
2004	1,599	2.6	653	1.1	59,359	95.6	456	0.7	62,068
2005	1,566	2.5	694	1.1	59,464	95.6	480	0.8	62,210
2006	1,422	2.3	700	1.1	59,141	95.8	481	0.7	61,746
2007	1,383	2.3	709	1.1	58,789	95.8	504	0.8	61,565
2008	1,357	2.2	725	1.2	58,838	95.7	536	0.9	61,456
2009	1,310	2.1	774	1.3	59,253	95.7	582	1.0	61,919

a. Consists of Asian and Native American principals.

Source: Authors' analysis based on data from Wisconsin Department of Public Instruction (n.d. b).

NOTES

1. Race to the Top is a federal competitive grant program that encourages states to create conditions for innovation in education. One of four emphasis areas of the incentive program is the recruitment, development, reward, and retention of school principals and teachers (U.S. Department of Education 2011a). The Teacher Incentive Fund is a competitive grant program that encourages states, districts, and consortia to create innovative principal and teacher performance evaluation and compensation systems to motivate individuals to enter, remain in, and perform well in the profession (U.S. Department of Education 2011c). The School Improvement Grant program provides funding through the Elementary and Secondary Education Act to improve Title I schools, in part by improving district- and school-level principal and teacher hiring, evaluation, professional development, and compensation systems (U.S. Department of Education 2011b).
2. Workforce analyses tend to describe worker demographics such as race/ethnicity, gender, educational attainment, and salary; they can also describe changes in workforce demographics (Gottfredson 1981).
3. See Gottfredson (1981) and Hackett, Lent, and Greenhaus (1991) for descriptions of career pathways research.
4. The six-year specialist's degree is a master's-equivalent, terminal academic degree awarded to students completing a principal preparation course sequence.
5. The annual attrition rate was calculated by subtracting from 100 percent the percentage remaining in a given year (see table 1), relative to the prior year. An assigned personnel identifier allows tracking of certified staff across job codes and locations over time.
6. The demographic changes observed in this study are not necessarily directly comparable to research in other states from other time periods. Use caution in comparing the changes in Wisconsin from the current study to findings drawn from other states and periods of time.
7. Percentages are sometimes reported as whole numbers and other times are reported to one decimal place. This variation reflects differences in reporting for the research being cited.

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