



Making Connections

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# Relationship between school professional climate and teachers' satisfaction with the evaluation process

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## Summary

Recent changes in the policy environment have led states and districts in the Regional Educational Laboratory (REL) Northeast & Islands Region to increase the rigor of their teacher evaluation systems by including more frequent observations or student test score data. States and districts nationwide began reforming their evaluation systems as early as 2006 and were further spurred to action by federal programs such as the Teacher Incentive Fund and the 2009 Race to the Top grant program. As of 2012, 30 states required that evaluations include evidence of student learning, 25 states required differentiation of teacher ratings into more than two categories, and 39 states required annual classroom observations (National Council on Teacher Quality, 2012).

A previous REL Northeast & Islands study of districts in the early stages of implementing new teacher evaluation systems found a relationship between school professional climate—specifically principal leadership, teacher influence on school policy, and trust—and teachers’ support for and fidelity of implementation of the new systems (Riordan, Lacireno-Paquet, Shakman, Bocala, & Chang, 2015). Given the many challenges in implementing a new evaluation system, members of the Northeast Educator Effectiveness Research Alliance wanted to explore what factors contribute to teachers’ satisfaction with new evaluation processes.

This study examined associations between teachers’ perceptions of school professional climate and their satisfaction with the evaluation process. It used the responses of a nationally representative sample of teachers from four linked questionnaires from the National Center for Education Statistics 2011/12 Schools and Staffing Survey and 2012/13 Teacher Follow-up Survey.

Key findings are:

- Most teachers reported being satisfied with the evaluation process: 79 percent reported strongly agreeing or somewhat agreeing that they were satisfied with the teacher evaluation process in the previous year.
- Teachers reported positive perceptions of their principal’s leadership but perceived themselves to have little influence over school policies. On average, teachers somewhat agreed that their principal provides positive leadership (mean of 3.1 on a scale of 1, strongly disagree, to 4, strongly agree) but that they had minor influence over school policies (mean of 2.2 on a scale of 1, no influence, to 4, great deal of influence).
- Of the two concepts used to measure school professional climate—principal leadership and teacher influence—only principal leadership was associated with teachers’ satisfaction with the evaluation process. Teachers with more positive perceptions of their principal’s leadership were more likely to be satisfied with the evaluation process.
- Teachers who were rated at the highest level on their evaluation in 2011/12 expressed more satisfaction with the evaluation process that year than teachers who were rated at lower levels.
- Teachers whose evaluation process included student test scores were 2.5 times less likely to be satisfied with the evaluation process than teachers whose evaluation process did not include student test scores.

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## Why this study?

Recent changes in the policy environment have led states and districts in the Regional Educational Laboratory (REL) Northeast & Islands Region to enhance their teacher evaluation systems with more frequent observations or the inclusion of student test score data. Federal grant programs, such as the Teacher Incentive Fund and Race to the Top, and policies, such as federal Elementary and Secondary Education Act flexibility waivers (U.S. Department of Education, 2013), offer incentives for states to change their evaluation systems. As of 2012, 30 states nationwide required that evaluations include evidence of student learning, 25 states required differentiation of teacher ratings into more than two categories, and 39 states required annual classroom observations (National Council on Teacher Quality, 2012). As of August 2014, 43 states, the District of Columbia, and Puerto Rico received federal Elementary and Secondary Education Act flexibility waivers, which, among other things, required enhancing teacher evaluations if the state had not already done so.

Given the challenges of implementing new teacher evaluation systems, education leaders want to understand teachers' perceptions of the new systems, as well as the factors related to successful implementation of evaluation systems. Research suggests that the reactions of those affected by a new policy influence its successful implementation (Datnow & Castellano, 2000; McLaughlin, 1987). One area of interest is how new teacher evaluation systems are related to school professional climate (see box 1 for definitions of key terms in the report). Since many new evaluation systems include multiple measures of teacher performance, successful implementation might be related to teachers' perceptions of their principal's leadership and their own influence over their school's policies and practice.

***Given the challenges of implementing new teacher evaluation systems, education leaders want to understand teachers' perceptions of the new systems, as well as the factors related to successful implementation of evaluation systems***

This study builds on a previous REL Northeast & Islands study in New Hampshire that identified elements of a strong school professional climate—principal leadership, teacher influence, and trust—as positively related to teacher support for a new evaluation system (Riordan et al., 2015). That study also found that teacher influence was related to the fidelity of implementation of the new system. Northeast Educator Effectiveness Research Alliance members wanted to further explore the relationship between school professional climate and teachers' satisfaction with the evaluation process. (For the literature base that informs this study, see appendix A.) In addition to addressing the alliance's research agenda, this study is intended to inform policymakers and education leaders in the REL Northeast & Islands Region and nationally about the relationships between school professional climate and teacher evaluation systems.

## What the study examined

The study examined teachers' perceptions of their school's professional climate and their satisfaction with the process by which they were evaluated. The data were from a nationally representative sample of teachers who responded to questionnaires that are part of the National Center for Education Statistics Schools and Staffing Survey and Teacher Follow-up Survey.

Five research questions were addressed:

- To what extent do teachers' responses on the Teacher Follow-up Survey indicate that they were satisfied with the evaluation process?

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## Box 1. Key terms

**Current teacher.** A respondent who was employed as a teacher during the 2011/12 and 2012/13 school years, although not necessarily at the same school.

**Former teacher.** A respondent who was employed as a teacher during the 2011/12 school year but left the teaching profession, as reported on the 2012/13 Teacher Follow-up Survey Questionnaire for Former Teachers.

**Principal leadership.** A composite variable from teachers' responses on a four-point scale indicating level of agreement (strongly disagree, somewhat disagree, somewhat agree, and strongly agree) on six items related to their principal's leadership on the National Center for Education Statistics 2011/12 Schools and Staffing Survey Teacher Questionnaire:

- The school administration's behavior toward the staff is supportive and encouraging.
- The principal enforces rules for student conduct and backs me up when I need it.
- The principal knows what kind of school he or she wants and has communicated it to the staff.
- In this school, staff members are recognized for a job well done.
- I am generally satisfied with being a teacher at this school.
- I like the way things are run at this school.

**Satisfaction with evaluation process.** Teachers' level of agreement (strongly disagree, somewhat disagree, somewhat agree, and strongly agree) with the following statement on the National Center for Education Statistics 2012/13 Teacher Follow-up Survey (Questionnaire for Former Teachers or Questionnaire for Current Teachers) about the process for evaluating their work as teachers during the previous school year (2011/12): I was satisfied with the formal evaluation process.

**School characteristics.** Enrollment, urbanicity, percentage of students who are English learner students, percentage of students approved for free or reduced-price lunch, percentage of students with an individualized education program, and percentage of students who are a racial/ethnic minority.

**School professional climate.** A rating generated by the study team that is based on teachers' survey responses to items on the National Center for Education Statistics 2011/12 Schools and Staffing Survey Teacher Questionnaire asking about the working environment for school professionals and that specifically focuses on principal leadership and teacher influence. See definitions for *principal leadership* and *teacher influence* and appendix B for more on the survey items for these scales.

**Teacher influence.** A composite variable from teachers' responses on a four-point scale (no influence, minor influence, moderate influence, and a great deal of influence) to seven items on the National Center for Education Statistics 2011/12 Schools and Staffing Survey Teacher Questionnaire:

How much actual influence do you think teachers have over school policy AT THIS SCHOOL in each of the following areas?

- Setting performance standards for students at this school.
- Establishing curriculum.
- Determining the content of in-service professional development programs.
- Evaluating teachers.
- Hiring new full-time teachers.
- Setting discipline policy.
- Deciding how the school budget will be spent.

**Teacher demographic characteristics.** Gender, Hispanic ethnicity, and a three-category race variable (Black, White, or other).

**Teacher professional characteristics.** School level taught (elementary or secondary), years of teaching experience, self-reported previous-year evaluation rating, and teaching status (current or former teacher).

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- What are teachers' perceptions of school professional climate (that is, principal leadership and teacher influence), as measured by the Schools and Staffing Survey?
- Is teachers' satisfaction with the evaluation process related to how they perceive the school professional climate?
- Is teachers' satisfaction with the evaluation process related to teacher demographic characteristics, teacher professional characteristics, or school characteristics?
- Is teachers' satisfaction with the evaluation process related to whether the evaluation process included student test scores?

Data sources and methods are described in box 2, and more detail is provided in appendix B.

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## **Box 2. Data sources and methods**

### **Data sources**

The data for this study are from four linked survey questionnaires of public schools and teachers that are part of the National Center for Education Statistics 2011/12 Schools and Staffing Survey (School Questionnaire and Teacher Questionnaire) and 2013/14 Teacher Follow-up Survey (Questionnaire for Former Teachers and Questionnaire for Current Teachers). Some of the teachers who responded to the 2011/12 Teacher Questionnaire were surveyed again one year later with the Questionnaire for Former Teachers or the Questionnaire for Current Teachers, which have different questions for teachers who are still teaching and for teachers who have stopped teaching. All public schools are included in the sampling frame; thus teachers can come from any public or public charter school.

This study presents analyses of the responses from teachers who took the follow-up questionnaires because those questionnaires asked about teachers' satisfaction with the evaluation process. A total of 4,430 teachers were sampled as part of the Teacher Follow-up Survey, including 2,850 current teachers and 1,580 former teachers. The Schools and Staffing Survey and Teacher Follow-up Survey use a complex sampling design to produce a set of analytic weights that provide more accurate, unbiased estimates of a larger population. With these weights, the sample represents a population of more than 3 million teachers. See appendix B for more on the data sources.

### **Methods**

The study team performed the following steps to conduct the analysis:

- Teachers' responses to relevant survey items were converted into numerical ratings of their perceptions of principal leadership and teacher influence. For the third, fourth, and fifth research questions, teachers' ratings of their satisfaction with the evaluation process were collapsed from a four-point scale to a binary variable (translating a range of responses into satisfied or not satisfied).
  - Teachers' survey responses were analyzed to produce estimated averages, frequencies, and percentages for all variables in the study (see appendix C). Tests of association, including chi-square tests of association and Pearson's product moment correlations, were used to test for associations or correlations between variables.
  - Statistical analyses were conducted using logistic regression to predict the odds of a teacher being satisfied or not with his or her evaluation after school professional climate, teacher demographic characteristics, teacher professional characteristics, school characteristics, and whether the evaluation process included student test scores were controlled for.
  - For all analyses, sampling weights were used to ensure unbiased population estimates.
-



## What the study found

This section first describes the extent to which teachers were satisfied with the evaluation process and their perceptions of school professional climate. It then presents the results of analyses of the association between teachers' satisfaction with the evaluation process and several other factors, including teachers' perceptions of school professional climate, teacher demographic characteristics, teacher professional characteristics, school characteristics, and whether the evaluation process included student test scores.

### Most teachers reported being satisfied with the process by which they were evaluated

Overall, 79 percent of teachers in the sample reported strongly agreeing or somewhat agreeing that they were satisfied with the evaluation process conducted in the previous year (figure 1).

### Teachers reported positive perceptions of their principal's leadership but perceived themselves to have little influence over school policies

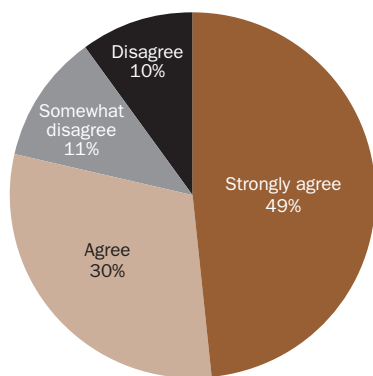
On average, teachers somewhat agreed that their principal provides positive leadership, as measured by the composite variable for principal leadership (mean of 3.1 on a scale of 1, strongly disagree, to 4, strongly agree; table 1). Teachers on average reported having minor influence over school policies (mean of 2.2 on a scale of 1, no influence, to 4, a great deal of influence), such as setting performance standards for students, establishing curriculum, and hiring full-time teachers, among others.

### Of the two concepts used to measure school professional climate—principal leadership and teacher influence—only principal leadership was associated teachers' satisfaction with the evaluation process

Teachers with more positive perceptions of their principal's leadership were more likely to be satisfied with the evaluation process. Teachers who rated their principal higher on

*Teachers with more positive perceptions of their principal's leadership were more likely to be satisfied with the evaluation process*

**Figure 1. Some 79 percent of teachers reported satisfaction with the evaluation process in 2011/12**



**Note:**  $n = 3,810$  weighted to represent a population estimate of 2,846,477. Refers to responses to the question "I was satisfied with the formal evaluation process." Teachers were asked in 2012/13 to report their satisfaction with the evaluation process based on their experiences in 2011/12.

**Source:** National Center for Education Statistics 2012/13 Teacher Follow-up Survey (Questionnaire for Former Teachers and Questionnaire for Current Teachers).

**Table 1. Statistics for teachers' responses to survey items about school professional climate, 2011/12**

Area of school professional climate	Mean	Standard error	Minimum value	Maximum value
Principal leadership <sup>a</sup>	3.1	0.02	1	4
Teacher influence <sup>b</sup>	2.2	0.02	1	4

**Note:**  $n = 4,430$  weighted to represent a population estimate of 3,377,858.

**a.** A composite variable indicating level of agreement (on a scale of 1, strongly disagree, to 4, strongly agree) with six items related to principal leadership (see appendix B).

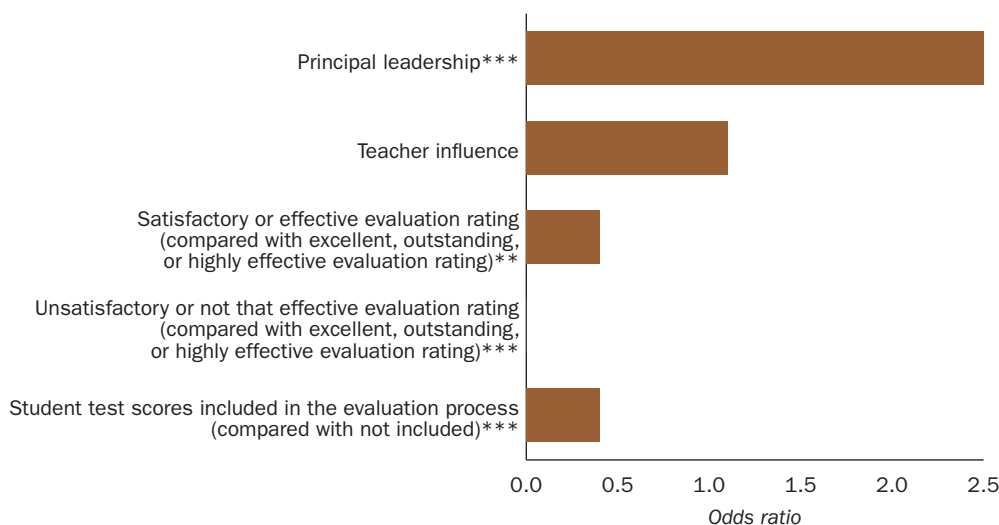
**b.** A composite variable indicating teachers' perception of their influence (on a scale of 1, no influence, to 4, a great deal of influence) on seven items related to school policy (see appendix B).

**Source:** Authors' calculations based on data from the National Center for Education Statistics 2011/12 Schools and Staffing Survey (Teacher Questionnaire).

leadership items tended to be more satisfied with the evaluation process. Specifically, the odds that a teacher was satisfied with the evaluation process increased 2.5 times for every one point increase in the rating of principal leadership, after teacher demographic characteristics, teacher professional characteristics, school characteristics, and whether the evaluation process included student test scores were controlled for (figure 2; see also table C12 in appendix C). This finding was statistically significant.

*Teachers' perceptions of their influence over school policies were not associated with their satisfaction with the evaluation process*

**Figure 2. Odds ratios of key variables show that teachers' satisfaction with the evaluation process was related to principal leadership, 2011/12**



\*\* is significant at  $p < .01$ ; \*\*\* is significant at  $p < .001$ .

**Note:**  $n = 3,080$  weighted to represent a population estimate of 2,389,401. Teachers were asked in 2012/13 to report their evaluation ratings from 2011/12 and to report their satisfaction with the evaluation process based on their experiences in 2011/12. An odds ratio that approaches 0 indicates that the outcome is extremely unlikely to occur, an odds ratio of less than 1 indicates that the outcome is less likely, an odds ratio of 1 indicates an equal likelihood of the outcome, and an odds ratio of more than 1 indicates that the outcome is more likely. For continuous variables, such as teacher influence, which has a scale of 1 to 4, the odds ratio is the change in the odds of being satisfied for every one unit increase in the continuous variable. Odds ratios for dichotomous variables (such as whether the evaluation process included student test scores) compared the likelihood of the two groups being satisfied with the evaluation process. An odds ratio of zero can be a statistically significant finding. The model overall is significant:  $F(20, 68) = 4.4$ ,  $\text{Prob} > F = 0.00$ , design degrees of freedom = 87. Goodness-of-fit test: Hosmer & Lemeshow  $F(9,79) = 0.5$ ,  $\text{Prob} > F = 0.9$ .

**Source:** Authors' calculations based on data from the National Center for Education Statistics 2011/12 Schools and Staffing Survey (School Questionnaire and Teacher Questionnaire) and 2012/13 Teacher Follow-up Survey (Questionnaire for Former Teachers and Questionnaire for Current Teachers).

**Table 2. Teachers' self-reported evaluation ratings from 2011/12, weighted estimates**

Rating	Percent	Standard error
Excellent, outstanding, or highly effective	60.3	1.7
Satisfactory or effective	36.8	1.7
Unsatisfactory or not that effective	2.9	0.7

**Note:** Teachers were asked in 2012/13 to report their evaluation ratings from 2011/12.

**Source:** Authors' calculations based on data from the National Center for Education Statistics 2012/13 Teacher Follow-up Survey (Questionnaire for Former Teachers and Questionnaire for Current Teachers).

But teachers' perceptions of their influence over school policies were not associated with their satisfaction with the evaluation process. This finding was consistent before and after controlling for teacher demographic characteristics, teacher professional characteristics, school characteristics, and whether the evaluation process included student test scores (see table C12 in appendix C).

**Teachers who were rated at the highest level on their evaluation in 2011/12 expressed more satisfaction with the evaluation process that year than teachers who were rated at lower levels**

Almost all teachers in the sample (97 percent) reported receiving a favorable rating in the previous school year (2011/12). Specifically, 60.3 percent reported being rated excellent, outstanding, or highly effective, and 36.8 percent reported being rated satisfactory or effective (table 2).

The only teacher professional characteristic significantly associated with satisfaction with the evaluation process was teachers' self-reported previous-year evaluation rating (figure 2; see also table C12 in appendix C). Specifically, teachers who received an evaluation rating of satisfactory or effective were 0.4 times less likely to be satisfied with the evaluation process than those who received an evaluation rating of excellent, outstanding, or highly effective.

No other teacher professional characteristics (school level taught, years of teaching experience, and teaching status) and no teacher demographic characteristics (gender, ethnicity, and race) or school characteristics (enrollment, urbanicity, percentage of students who are English learner students, percentage of students approved for free or reduced-priced lunch, percentage of students with an individualized education program, and percentage of students who are a racial/ethnic minority) were associated with teachers' satisfaction with the evaluation process.

**Teachers whose evaluation process included student test scores were less likely to be satisfied with the evaluation process than teachers whose evaluation process did not include student test scores**

Teachers whose evaluation process included student test scores were 2.5 times less likely (odds ratio of 0.4) to be satisfied with the evaluation process than teachers whose evaluation process did not (see figure 2 and table C12 in appendix C). This finding remained consistent after teacher demographic characteristics (gender, ethnicity, and race), teacher professional characteristics (school level taught, years of teaching experience, previous-year evaluation rating, and teaching status), and school characteristics (enrollment, urbanicity, percentage of students who are English learner students, percentage of students approved for free or reduced-price lunch, percentage of students with an individualized education program, and percentage of students who are a racial/ethnic minority) were controlled for.

**The only teacher professional characteristic significantly associated with satisfaction with the evaluation process was teachers' self-reported previous-year evaluation rating**

Because the framework for evaluation systems is usually determined at the state level, it is possible that the significant relationship between the inclusion of student test scores in evaluations and teachers' satisfaction with the evaluation process may actually be capturing differences across states. However, the relationship remained significant when tested in an alternative model that controlled for differences across state teacher evaluation policies (see appendix B for details and table C13 in appendix C). Approximately 27 percent of teachers reported that the evaluation process included student test scores, such as growth models or value-added models, in 2011/12 (see table C3 in appendix C). This study does not address whether the relationship of lower satisfaction to the inclusion of student test scores is driven fully or partially by the new evaluation systems themselves or by the length of time the systems have been in place. Almost all states were revising their teacher evaluation policies during the time period covered by this study. Indeed, 30 of them required the inclusion of some measure of student learning by 2012 (National Council on Teacher Quality, 2012), although at the time of the study, only one state, Florida, was fully implementing its new evaluation system.

### **Implications of the study findings**

The findings from this study present several implications for future research, policy, and school practice.

The finding that principal leadership—as one measure of school professional climate—was associated with teachers' satisfaction with the evaluation process reinforces previous research about the importance of principals in establishing a positive school professional climate (Drago-Severson, 2012; Grissom, 2011; Kraft, Marinell, & Yee, 2015). It also reinforces research on Chicago's new teacher evaluation program, which similarly found that teachers' perceptions of their evaluation were related to both school leadership and the concepts of professional community (such as principal–teacher trust; Jiang, Sporte, & Luppescu, 2015). This finding might be because teachers view evaluation as a “top-down” activity, requiring the principal or other supervisor to render an assessment of their work, or it might be related to the principal's role of translating and implementing school policy. Further research could examine the following questions:

- Is there a causal relationship between principal leadership and teachers' satisfaction with the evaluation process? What is the nature and direction of that relationship?
- What elements of leadership—such as establishing a culture of trust or providing appropriate supports to teachers—are most directly related to teachers' satisfaction with the evaluation process?

States in the Northeast Educator Effectiveness Research Alliance might be interested in further exploring the relationships between school professional climate and teachers' satisfaction with the evaluation process. For example, Maine and Vermont, which are just beginning to implement new evaluation systems, might gather data before and after implementation to address this issue. State leaders may be interested in investigating whether and to what extent school professional climate is related to how successfully the new evaluation processes are implemented.

Other questions include:

***The finding that principal leadership was associated with teachers' satisfaction with the evaluation process reinforces previous research about the importance of principals in establishing a positive school professional climate***

- Are there different relationships between principal leadership and teachers' satisfaction with the evaluation processes in different Northeast Educator Effectiveness Research Alliance states? Are the differences related to key policy characteristics in the state?
- To what extent does successful implementation of a new system vary by teachers' perceptions of the new systems?

When the National Center for Education Statistics 2011/12 Schools and Staffing Survey and 2012/13 Teacher Follow-up Survey were administered, teachers' evaluation ratings varied little, and teachers' satisfaction with the evaluation process was high. Teachers overwhelmingly reported being rated effective or highly effective, with 60.3 percent rated excellent, outstanding, or highly effective and 36.8 percent rated as satisfactory or effective. Indeed, lack of differentiation in teacher ratings has been a criticism of and motivator for new evaluation systems (Toch & Rothman, 2008; Weisberg, Sexton, Mulhern, & Keeling, 2009). At the time of the study, many states were still revamping their educator evaluation systems, and some had begun implementation. Now that a majority of states have fully implemented new evaluation systems, it would be informative to replicate the study to see whether the results are consistent.

The finding that teachers are less likely to be satisfied with the evaluation process when student test scores are included warrants further exploration, given that many policymakers advocate for evaluation systems that include a measure of student achievement or growth. In the REL Northeast & Islands Region the weight of test scores in new evaluation systems varies across states, providing an opportunity to understand whether and how different weights of test scores in evaluation are related to teachers' satisfaction. However, the finding might be because teachers believe that student test scores do not accurately measure their instructional practice (Coggshall, Ott, & Lasagna, 2010; Darling-Hammond, 2015). Further research on this topic could examine the following questions:

- Does satisfaction depend on specific features, such as the weight of test scores or the types of student learning measures?
- Does satisfaction with the teacher evaluation system depend on the amount of time the system has been in place?
- Does satisfaction with the teacher evaluation system depend on the subject area taught (for example, math, music, or special education)?

***The finding that teachers are less likely to be satisfied with the evaluation process when student test scores are included warrants further exploration, given that many policymakers advocate for evaluation systems that include a measure of student achievement or growth***

### **Limitations of the study**

This study has four main limitations.

First, the study finds an association between teachers' satisfaction with the evaluation process and their perceptions of school professional climate (that is, principal leadership and teacher influence) but does not support causal conclusions about the association.

Second, the findings are from a national sample, but the education systems and evaluation policy contexts of individual states may differ from the average or representative school in the National Center for Education Statistics Schools and Staffing Survey dataset.

Third, the study is a national snapshot of the relationship between school professional climate and teacher evaluation processes at a particular time. The relationships may

change as evaluation policies shift. At the time of the survey many states were implementing new teacher evaluation systems, but it was not possible to use the Schools and Staffing Survey and Teacher Follow-up Survey to determine whether teachers' satisfaction was related to the stage of implementation of the new evaluation systems.

Fourth, the Schools and Staffing Survey measures only two dimensions of school professional climate (principal leadership and teacher influence on school policy). The research suggests that other dimensions, such as trust, that were not considered in this study may be related to support of or satisfaction with the evaluation process (Riordan et al., 2015).

## **Appendix A. Literature review**

This study draws on research and policy literature on teacher evaluation reform, school professional climate, and the inclusion of student outcomes in teacher evaluations.

### **Teacher evaluation reform**

Recent research has identified the need to reform teacher evaluation systems because many systems are considered pro-forma, lack rigor, are unable to differentiate teacher quality, and have little impact on or relationship to student outcomes (Daley & Kim, 2010; Gordon, Kane, & Staiger, 2006; Heneman, Milanowski, Kimball, & Odden, 2006; Measures of Effective Teaching Project, 2010, 2012; Toch & Rothman, 2008; Weisberg et al., 2009).

### **School professional climate**

Researchers have examined the role of school professional climate—also known as school culture or teachers’ working conditions—on principals, teachers, and students. Common components across frameworks that define school professional climate include structural conditions, such as facilities and resources specific to instruction; relational conditions, such as opportunities to collaborate and form community; and emotional or psychological conditions, such as safety, trust, and self-efficacy (Cohen, McCabe, Michelli, & Pickeral, 2009; Drago-Severson, 2012; Johnson, 2006).

Overall, the literature supports the idea that schools’ professional climate contributes to teachers’ job satisfaction, which is ultimately related to teacher retention or turnover (Borman & Dowling, 2008) and student achievement (Johnson, Kraft, & Papay, 2012; Ladd, 2011). Working conditions, in addition to salaries and benefits, figure highly in teachers’ career plans as they consider whether to stay at their current school (Boyd et al., 2011; Ladd, 2011). Johnson, Papay, Fiarman, Munger, and Qazilbash (2010), who analyzed evidence from a Massachusetts statewide school survey on teachers’ working conditions along with school and student achievement data, found that working conditions matter as predictors of teachers’ satisfaction and career intentions: as working conditions improve, teachers’ intentions to transfer tend to decrease.

School professional climate is also associated with teacher effectiveness. Researchers using data from North Carolina’s Charlotte-Mecklenburg Schools found that teachers working in more supportive professional environments improved their effectiveness (as measured by student achievement on standardized tests) more over time than teachers working in less supportive contexts (Kraft & Papay, 2014). Another study found that schools with overall better working conditions also tended to have higher student achievement in math and English language arts (Johnson et al., 2012).

Studies have found that the school principal plays an important role in establishing and maintaining positive working conditions. Drago-Severson’s (2012) study of 25 principals in public, private, and religious schools found that principals understood their role in shaping professional school climate to support teachers and employed strategies to strengthen the professional climate, such as promoting shared values, sharing leadership with teachers, and supporting teacher collaboration. Moreover, teachers’ positive perceptions of their principals might lead them to remain in their schools. Grissom’s (2011) study using data from

the 2003/04 Schools and Staffing Survey and the 2004/05 Teacher Follow-up Survey found that teachers who rated their principal as more effective were more satisfied with their jobs and less likely to leave within a year. Kraft et al.'s (2015) study found that improvements in school leadership were associated with reductions in teacher turnover.

### **Inclusion of student outcomes in teacher evaluations**

While researchers and policymakers debate the value and reliability of including student outcomes and measures of student growth in teacher evaluations (for example, Darling-Hammond, 2012), states and districts have begun incorporating them. A National Council on Teacher Quality (2012) report found that as of 2012, 30 states require that teacher evaluations include evidence of student learning, 25 states require that evaluation systems differentiate ratings into more than two categories, and 39 states require annual classroom observations. The same report noted that teacher evaluations have higher stakes, with nine states mandating that teacher tenure decisions be tied to student performance (National Council on Teacher Quality, 2012).

Emerging research examines the use of student outcomes in teacher evaluations. Denver's evaluation of the ProComp System pilot, in which teachers could voluntarily opt into a new evaluation system with differentiated compensation, found that students experienced gains regardless of whether their teacher participated in the new system (Goldhaber & Walch, 2011). Many studies have focused on the relationship between measures of student learning, such as growth or value-added scores, and other evaluation measures, such as observations of teachers. In a study of evaluation instruments used in the pilot of Chicago Public Schools' new evaluation system, the Chicago Consortium for School Research found that observation ratings (including ratings of the same teacher by more than one observer) correlated with student performance on achievement tests (Sartain, Stoelinga, & Brown, 2011). Similarly, the Measures of Effective Teaching project found that teachers with value-added scores also perform well on other measures, such as on observation rubrics and ratings from their students (Measures of Effective Teaching Project, 2010, 2012). The findings have not been consistent, however. Walsh and Lipscomb's (2013) comparison of observation ratings by principals and evaluators in Pennsylvania's evaluation system pilot with value-added scores for the same teachers found that observation scores clustered in the two high categories while the value-added estimates were more variable. Daley and Kim's (2010) study of the System for Teacher and Student Advancement found a correlation between observational components and value-added components in teacher evaluation scores.



## Appendix B. Data sources and study methods

This appendix describes the data sources and study methods.

### Data sources

Data are from the National Center for Education Statistics (NCES) Schools and Staffing Survey and Teacher Follow-up Survey, which collect information on U.S. elementary and secondary schools and their staffs through surveys of districts, schools, principals, teachers, and library media centers (Goldring, Taie, Rizzo, Colby, & Fraser, 2013). This study relied on data from four linked survey questionnaires:

- The 2011/12 Schools and Staffing Survey School Questionnaire.
- The 2011/12 Schools and Staffing Survey Teacher Questionnaire.
- The 2012/13 Teacher Follow-up Survey Questionnaire for Former Teachers.
- The 2012/13 Teacher Follow-up Survey Questionnaire for Current Teachers.

Some of the teachers who responded to the 2011/12 Teacher Questionnaire were surveyed again one year later with a follow-up questionnaire that has different questions for teachers who are still teaching and for teachers who have stopped teaching. The dataset links teachers' responses to the Teacher Follow-up Survey with their responses to the previous year's Schools and Staffing Survey Teacher Questionnaire and to their school's responses to the previous year's Schools and Staffing Survey School Questionnaire. The sample of interest for this study was current and former teachers who were asked in 2012/13 about evaluations conducted the previous school year (table B1).

Schools and Staffing Survey and Teacher Follow-up Survey procedures for sampling and weighting ensure that the samples of schools and teachers are representative at the national, regional, and state levels. The survey datasets contain a series of weights that, when used with the appropriate statistical software procedures, increase the accuracy of estimates by using adjusted standard errors for all statistics, such as means and frequencies. Standard errors are adjusted using balanced repeated replication procedures to account for nonresponse and for the complex, stratified design of the samples.<sup>1</sup>

The variables of interest to this study, their purpose, source, and relevant details, are shown in table B2. The key outcome variable is teachers' satisfaction with the evaluation process. The Schools and Staffing Survey asks this as: "To what extent do you agree or disagree with each of the following statements about the formal evaluation of your work as a teacher last school year (2011/12): I was satisfied with the formal evaluation process." The answer options are a four-point scale of strongly disagree, somewhat disagree, somewhat

**Table B1. Teaching status in Teacher Follow-up Survey sample, 2012/13**

Teaching status	Unweighted percentage	Weighted estimated percentage	Standard error
Former teachers	35.6	7.7	0.6
Current teachers	64.4	92.3	0.6

**Note:**  $n = 4,430$  unweighted to represent a population of almost 3 million teachers.

**Source:** Authors' calculations based on data from the National Center for Education Statistics 2012/13 Teacher Follow-up Survey (Questionnaire for Former Teachers and Questionnaire for Current Teachers).

agree, and strongly agree. To conduct the logistic regression to assess whether school professional climate is associated with teachers' satisfaction with the evaluation process, the satisfaction variable was transformed into a dichotomous variable. Strongly agree and somewhat agree were grouped into an agree category. Strongly disagree and somewhat disagree were grouped into a disagree category.

Schools and Staffing Survey and Teacher Follow-up Survey data are collected by the Census Bureau for the NCES (Goldring et al., 2013). The data collection period for the 2011/12 School Questionnaire and Teacher Questionnaire was from June 2011 to June 2012. The data collection period for the 2012/13 Questionnaire for Former Teachers and Questionnaire for Current Teachers was January 2013 to August 2013. Teachers could respond to all surveys via a web-based questionnaire or on paper.

**Table B2. Schools and Staffing Survey and Teacher Follow-up Survey variables used in this study, 2011/12 and 2012/13**

Variable	Question	Purpose	Survey source	Details
<b>Explanatory variable</b>				
Satisfaction with evaluation process	To what extent do you agree or disagree with each of the following statements about the formal evaluation of your work as a teacher last school year (2011/12): I was satisfied with the formal evaluation process?	Dependent variable	2012/13 Teacher Follow-up Survey (Questionnaire for Former Teachers and Questionnaire for Current Teachers): F1323	<ul style="list-style-type: none"> <li>• Categorical variable: strongly agree, somewhat agree, somewhat disagree, strongly disagree</li> <li>• Collapsed to two categories (strongly agree/somewhat agree and somewhat disagree/strongly disagree) for the third, fourth, and fifth research questions</li> </ul>
<b>Independent variables</b>				
Principal leadership	To what extent do you agree or disagree with each of the following statements?	Key independent variable	2011/12 Schools and Staffing Survey (Teacher Questionnaire): composite of T0435, T0441, T0446, T0449, T0451, and T0467	<ul style="list-style-type: none"> <li>• Composite of six items selected via principal components analysis</li> <li>• Continuous variable on a scale of 1–4</li> </ul>
Teacher influence	How much influence do you think teachers have over school policy AT THIS SCHOOL in the following areas?	Key independent variable	2011/12 Schools and Staffing Survey (Teacher Questionnaire): composite of T0420, T0421, T0422, T0423, T0424, T0425, and T0426	<ul style="list-style-type: none"> <li>• Composite of seven items</li> <li>• Continuous variable on a scale of 1–4</li> </ul>
Evaluation process includes student test scores	Are student test score outcomes or test score growth included as an evaluation criterion in your FORMAL evaluation this school year?	Key independent variable	2011/12 Schools and Staffing Survey (Teacher Questionnaire): T0403	<ul style="list-style-type: none"> <li>• Dichotomous variable: yes or no</li> </ul>

(continued)

**Table B2. Schools and Staffing Survey and Teacher Follow-up Survey variables used in this study, 2011/12 and 2012/13 (continued)**

Variable	Question	Purpose	Survey source	Details
<b>Teacher demographic characteristics</b>				
Gender	Are you male or female?	Other covariate	2011/12 Schools and Staffing Survey (Teacher Questionnaire): GENDER_S	• Dichotomous variable: female or male
Ethnicity	Are you of Hispanic or Latino origin?	Other covariate	2011/12 Schools and Staffing Survey (Teacher Questionnaire): T0527	• Dichotomous variable: Hispanic or not Hispanic
Race	What is your race?	Other covariate	2011/12 Schools and Staffing Survey (Teacher Questionnaire): RACE	• Categorical variable • Collapsed to three categories: White, Black, or other
<b>Teacher professional characteristics</b>				
School level taught	Do you currently teach students in any of these grades AT THIS SCHOOL?	Other covariate	2011/12 Schools and Staffing Survey (Teacher Questionnaire): TLEVEL	• Dichotomous variable: elementary or secondary
Years of teaching experience	How many school years have you worked as an elementary- or secondary-level teacher in public, public charter, or private schools?	Other covariate	2011/12 Schools and Staffing Survey (Teacher Questionnaire): TOTYREXP_S	• Continuous variable
Teaching status	Do you CURRENTLY TEACH any regularly scheduled class(es) in any of grades preK–12?	Other covariate	2012/13 Teacher Follow-up Survey (Questionnaire for Former Teachers and Questionnaire for Current Teachers): STTUS_TF	• Dichotomous variable: current teacher or former teacher
Previous-year evaluation rating	Which of the following best describes the evaluation rating you received for your work as a teacher last school year (2011/12)?	Other covariate	2012/13 Teacher Follow-up Survey (Questionnaire for Former Teachers and Questionnaire for Current Teachers): STTUS_TF	• Categorical variable: excellent, outstanding, or highly effective; satisfactory or effective; or unsatisfactory or not that effective
<b>School characteristics</b>				
Enrollment	Around the first of October, how many students in grades K–12 and comparable ungraded levels were enrolled in this school?	Other covariate	2011/12 Schools and Staffing Survey (School Questionnaire): ENRK12	• Continuous variable
Urbanicity	Based on census location of school	Other covariate	2011/12 Schools and Staffing Survey (School Questionnaire): URBANS12	• Categorical variable • Collapsed from 12 categories to 4: city, suburb, town, rural

(continued)

**Table B2. Schools and Staffing Survey and Teacher Follow-up Survey variables used in this study, 2011/12 and 2012/13 (continued)**

Variable	Question	Purpose	Survey source	Details
Percentage of students who are English learner students	How many limited-English proficient students or English-language learners are enrolled in this school?	Other covariate	2011/12 Schools and Staffing Survey (School Questionnaire): LEP	<ul style="list-style-type: none"> <li>• Continuous variable</li> <li>• Calculated as a percentage</li> </ul>
Percentage of students approved for free or reduced-price lunch	Around the first of October, how many students at this school were APPROVED for free or reduced-price lunches?	Other covariate	2011/12 Schools and Staffing Survey (School Questionnaire): NSLAPP_S	<ul style="list-style-type: none"> <li>• Continuous variable</li> <li>• Calculated as a percentage</li> </ul>
Percentage of students with an individualized education program	How many students have an Individual Education Plan (IEP) because they have special needs?	Other covariate	2011/12 Schools and Staffing Survey (School Questionnaire): IEP	<ul style="list-style-type: none"> <li>• Continuous variable</li> <li>• Calculated as a percentage</li> </ul>
Percentage of students who are a racial/ethnic minority	Around the first of October, how many students enrolled in grades K–12 and comparable ungraded levels were: <ul style="list-style-type: none"> <li>• Hispanic or Latino regardless of race?</li> <li>• White, not of Hispanic or Latino origin?</li> <li>• Black or African American, not of Hispanic or Latino origin?</li> <li>• Asian, not of Hispanic or Latino origin?</li> <li>• Native Hawaiian or other Pacific Islander, not of Hispanic or Latino origin?</li> <li>• American Indian or Alaska Native, not of Hispanic or Latino origin?</li> <li>• Two or more races, not of Hispanic or Latino origin?</li> </ul>	Other covariate	2011/12 Schools and Staffing Survey (School Questionnaire): MINENR	<ul style="list-style-type: none"> <li>• Continuous variable</li> <li>• Calculated as a percentage</li> </ul>
<b>Sample definition variables</b>				
Evaluated in 2011/12	Were you, or are you going to be, rated in a FORMAL evaluation this school year?	Sample definition	2011/12 Schools and Staffing Survey (Teacher Questionnaire): T0402	<ul style="list-style-type: none"> <li>• Dichotomous: yes or no</li> <li>• Only those responding yes are included</li> </ul>
Evaluated last school year (2011/12)	Were you formally evaluated for your work as a teacher last school year (2011/12)?	Sample definition	2012/13 Teacher Follow-up Survey (Questionnaire for Former Teachers and Questionnaire for Current Teachers): F1320	<ul style="list-style-type: none"> <li>• Dichotomous: yes or no</li> <li>• Only those responding yes are included</li> </ul>

**Source:** National Center for Education Statistics 2011/12 Schools and Staffing Survey (School Questionnaire and Teacher Questionnaire) and 2012/13 Teacher Follow-up Survey (Questionnaire for Former Teachers and Questionnaire for Current Teachers).

## Sampling

Teachers sampled for the Teacher Follow-up Survey were drawn from the Schools and Staffing Survey teacher sample, which was drawn from the Schools and Staffing Survey school sample. The Schools and Staffing Survey defines teachers as staff members who teach regularly scheduled classes to students in any K–12 grade. Because the Schools and Staffing Survey and the Teacher Follow-up Survey are so interrelated, the description of sampling frames and sample selection begins with the Schools and Staffing Survey and then moves to the Teacher Follow-up Survey sampling process.

**2011/12 Schools and Staffing Survey.** The 2011/12 Schools and Staffing Survey universe includes schools in the 50 states plus the District of Columbia and excludes other jurisdictions, Department of Defense overseas schools, Bureau of Indian Education schools, and Common Core of Data schools that do not offer teacher-provided classroom instruction in grades 1–12 or the ungraded equivalent. Lists of teachers for each sampled school are generated, and a sample of teachers from the lists is selected. Sampling is conducted so that results of national, regional, and state estimates of all variables can be reliably produced.

The maximum number of teachers per school was set at 20 to reduce the burden on schools. About 18 percent of the eligible public schools and 23 percent of the eligible private schools did not provide teacher lists, so no teachers were selected for those schools. About 51,100 public school teachers and 7,100 private school teachers were sampled. Full details of the sampling plan for the surveys can be found in Goldring et al. (2013).

**2012/13 Teacher Follow-up Survey.** The sampling frame for the Teacher Follow-up Survey consisted of the public and private school teachers who completed the Schools and Staffing Survey 2011/12 Teacher Questionnaire. The sample for the Teacher Follow-up Survey is a stratified sample allocated to allow comparisons of teachers by teaching status (stayers, movers, and leavers) within sector (traditional public, public charter, and private), experience groups (first year, second year, third year, fourth or fifth year, and experienced), grade level taught (primary, middle, or high school), and teacher's race/ethnicity (White, Hispanic, Black, or other). Information collected from schools at the beginning of the 2012/13 school year was used to determine a teacher's status as stayer, mover, leaver, or unknown. More details about the sampling for the Teacher Follow-up Survey can be found in Goldring, Taie, & Riddles (forthcoming).

For this study, only regular teachers who teach grade K–12 or a comparable ungraded level in any public school and who responded to the Teacher Follow-up Survey were included because these teachers were more likely to be covered by evaluation systems.

## Response rates and bias analysis

NCES data cleaning procedures include checks for response bias, such that if the unit or item response rates fall below certain thresholds, the data files are examined for possible bias. The nonresponse bias analysis checks district, school, and teacher characteristics for evidence of bias.

NCES considers two types of nonresponse for the Schools and Staffing Survey: unit-level nonresponse (that is, a questionnaire was not filled out or only partially filled out by an

eligible respondent, and key questionnaire items were left out) and item-level nonresponse (that is, questionnaire items were missing in a questionnaire that had passed the threshold to be considered completed).

For the 2011/12 Schools and Staffing Survey the weighted unit response rate was 72.5 percent on the School Questionnaire (for public schools only) and 77.7 percent on the Teacher Questionnaire (for public school teachers only). The item response rates for the School Questionnaire and the Teacher Questionnaire were very high: over 94 percent of items on the Teacher Questionnaire and the School Questionnaire had a response rate of 85 percent or higher. Between 4 percent and 6 percent of the items on both questionnaires had a response rate of 70.0–84.9 percent. NCES analyzed these items for potential bias.

The 2012/13 Teacher Follow-up Survey underwent similar nonresponse analyses by NCES. The weighted unit response rate was 73.8 percent for the Questionnaire for Former Teachers and 81.3 percent for the Questionnaire for Current Teachers. The item response rate was moderate: the percentage of items with a response rate of 85 percent or higher was 72 percent for the Questionnaire for Former Teachers and 84 percent for the Questionnaire for Current Teachers. Both questionnaires contained items with response rates below 70 percent, which is considered a low response rate according to NCES. Items with low response rates were not used in this study.

The study team conducted nonresponse analyses for each variable used in the analysis (table B2). Overall, rates of nonresponse were low, less than 2 percent. Two variables—satisfaction with the evaluation process and the previous-year evaluation rating—had an item nonresponse rate of about 9 percent.

The Schools and Staffing Survey datasets provided by NCES contain imputed data for items with missing data. The results shown in the main report were estimated using imputed data. The logistic regression results were rerun without imputed data, and the results were consistent.

To measure the key variables of interest related to school professional climate, the study team built on a study of the implementation of educator evaluations in New Hampshire (Riordan et al., 2015), which identified three constructs of school professional climate related to teachers' support of the new evaluation system. The three constructs are principal leadership, trust, and teacher influence. The Schools and Staffing Survey includes items related to two of these constructs of school professional climate—principal leadership and teacher influence—but does not contain items related to teacher trust.

Both professional climate variables were constructed by making a composite based on teacher responses to a series of questions about principal leadership and teacher influence.

The principal leadership composite was created by averaging each respondent's response to six items that address leadership issues in the school. These six items came from two questions that ask about a wide range of items related to school climate. These items were selected because they relate to or were specifically about the leadership and climate or were similar to items included in previous research about professional climate and implementation of new evaluation systems (Riordan et al., 2015). The study team selected the six items after examining a set of 12 items in a principal components analysis. The results

of the principal components analysis suggested the items were measuring two different underlying concepts. Six items were strongly related to principal leadership. The other items addressed teacher collaboration and were thus removed from the principal leadership composite. Cronbach's alpha was calculated on the six items identified for the leadership composite and showed high internal consistency (Cronbach's alpha = .86). The six items in the leadership composite are:

- The school administration's behavior toward the staff is supportive and encouraging.
- The principal enforces rules for student conduct and backs me up when I need it.
- The principal knows what kind of school he or she wants and has communicated it to the staff.
- In this school, staff members are recognized for a job well done.
- I am generally satisfied with being a teacher at this school.
- I like the way things are run at this school.

The items are similarly phrased and have the identical response option scale of strongly agree, somewhat agree, somewhat disagree, and strongly disagree. The scale originally indicated that strongly agree carried a value of 1, so the response options were reverse coded such that the more positive response of strongly agree would be 4. The principal leadership composite score for any individual respondent ranged from 1 to 4, with a higher value indicating a more positive teacher perception of school leadership. The mean value for leadership was 3.13.

To construct the teacher influence composite, a principal components analysis was conducted on seven items in a question that asks teachers "how much actual influence do you think teachers here have over school policy AT THIS SCHOOL in each of the following areas." The seven items are similarly phrased and have the following identical response option scale: no influence, minor influence, moderate influence, and a great deal of influence, with affiliated scores of 1 for no influence to 4 for a great deal of influence. The results of the principal components analysis showed that the items were highly related to the same underlying concept, and Cronbach's alpha was calculated to see whether the items had high internal consistency (Cronbach's alpha = .8). The seven items included in the composite are:

- Setting performance standards for students at this school.
- Establishing curriculum.
- Determining the content of in-service professional development programs.
- Evaluating teachers.
- Hiring new full-time teachers.
- Setting discipline policy.
- Deciding how the school budget will be spent.

The composite variable "teacher influence" was calculated by averaging each respondent's answers to the seven items above. The values of the new variable range from 1 to 4, with a higher value indicating more influence. The mean value of the teacher influence is 2.15.

### **Data analysis**

For data analyses the study team used the NCES-recommended balanced repeated replication procedures for weighting, which weights each response to produce more accurate estimates by compensating for sampling stratification and missing data.

Data were first analyzed descriptively, producing estimated means, frequencies, and percentages, as appropriate, for each variable of interest (see appendix C). The study team tested for correlation between the explanatory and control variables and calculated pairwise correlations of each variable, with the specific correlation measure used dependent on the type of variable. The chi-square test of independence was used to test the correlation between two categorical variables (for example, gender and race/ethnicity). Pearson's  $r$  was used to test the correlation between two continuous variables (for example, school size and percentage of students approved for free or reduced-priced lunch). Parametric or nonparametric one-way analysis of variance was used to test the correlation between a continuous and categorical variable (for example, years of teaching and grade level taught). There is no absolute guidance on what level of correlation is too high to include both variables in the same regression. According to Hamilton (1990), correlations of  $\pm .5$  are moderate and those of  $\pm .8$  are strong. Variables with moderately high correlations, of  $\pm .65$  or greater, were excluded from the same regression equation. Examples of variables with high correlations where only one of the pair was included in the analyses are teacher's age and years of teaching experience.

To answer the first two research questions, the study team calculated frequencies and means for the variables of interest: teacher satisfaction with the evaluation process and measures of school professional climate. To answer the third, fourth, and fifth research questions, the study team conducted logistic regression, which predicts the odds of a teacher being satisfied with his or her evaluation given a set of predictors, such as teacher demographic characteristics, teacher professional characteristics, school characteristics, and whether the evaluation process included student test scores. The logistic regression used the set of Schools and Staffing Survey replicate weights. The model included the variables described in table C12 in appendix C. The explanatory or outcome variable was satisfaction with the evaluation process. The key independent variables were two indicators of school professional climate: principal leadership and teacher influence. A set of other variables of interest related to teacher demographic characteristics (gender, ethnicity, and race), teacher professional characteristics (school level taught, years of teaching experience, self-reported previous-year evaluation rating, and teaching status), and school characteristics (enrollment, urbanicity, percentage of students who are English learner students, percentage of students approved for free or reduced-priced lunch, percentage of students with an individual education program, and percentage of students who are a racial/ethnic minority) were used. The final key variable of interest was whether the evaluation process included student test scores. Logistic regression results are presented in table C12 in appendix C. The logistic regression model can be summarized as:

$$\ln\left(\frac{D_i}{[1 - D_i]}\right) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} \dots \beta_k X_{ki} + \varepsilon_i$$

where  $D_i$  is a dummy variable for which 1 = satisfied with the evaluation and 0 = not satisfied,  $\beta_0$  is a constant term,  $\beta_{1-k}$  are the coefficients for the explanatory and control variables, and  $X_{1i-k_i}$  are the values of the explanatory and control variables for each variable 1- $k$  and each observation.

An odds ratio that approaches 0 indicates that the outcome is extremely unlikely, an odds ratio of less than 1 indicates that the outcome is less likely, an odds ratio of 1 indicates an equal likelihood of the outcome, and an odds ratio of more than 1 indicates that the outcome is more likely. An odds ratio of 0 can be a statistically significant finding.



### Alternative model specification

Decisions about the framework for the evaluation system, including whether the evaluation process included student test scores, are frequently made at the state level. Thus it is possible that the observed effect for this variable may be partially explained by the state in which the teacher works. To test this possibility, it would be ideal to run a logistic regression with state fixed effects or a conditional logit model. However, it was not possible to run a logistic regression with both state fixed effects and teacher-specific replicate weights; only state-level replicate weights are allowed. Thus, an alternative specification was run treating the outcome variable as continuous, including state fixed effects, and using replicate weights. The results of the alternative specification to the full model were almost identical, with odds ratios being consistent in size, direction, and significance. The results of this model are in table C13 in appendix C.

## Appendix C. Supplementary tables and analyses

This appendix provides descriptive statistics for all variables used in the analysis (tables C1–C11). Logistic regression results are provided in table C12, and an alternative specification of the model with state fixed effects is provided in table C13.

### Explanatory variable

**Table C1. Teachers' satisfaction with the evaluation process in 2011/12, weighted estimates**

Satisfied with evaluation process	Percent	Standard error
Somewhat agree or strongly agree	78.9	1.3
Somewhat disagree or strongly disagree	21.1	1.3

**Note:** Teachers were asked in 2012/13 to report their satisfaction with the evaluation process based on their experiences in 2011/12.

**Source:** Authors' calculations using data from the National Center for Education Statistics 2012/13 Teacher Follow-up Survey (Questionnaire for Former Teachers and Questionnaire for Current Teachers).

### Independent variables

**Table C2. Teachers' perceptions of school professional climate, weighted estimates, 2011/12**

School climate item	Mean	Standard error
Principal leadership <sup>a</sup>	3.1	0.02
Teacher influence <sup>b</sup>	2.2	0.02

**a.** A composite variable indicating level of agreement (on a scale of 1, strongly disagree, to 4 strongly agree) with six items related to principal leadership (see appendix B).

**b.** A composite variable indicating teachers' perception of influence (on a scale of 1, no influence, to 4, a great deal of influence) on seven items related to school policy (see appendix B).

**Source:** Authors' calculations using data from the National Center for Education Statistics 2011/12 Schools and Staffing Survey (Teacher Questionnaire).

**Table C3. Evaluation process included student test scores, weighted estimates, 2011/12**

Evaluation process included student test scores	Percent	Standard error
Yes	26.7	1.2
No	73.3	1.2

**Source:** Authors' calculations using data from the National Center for Education Statistics 2012/13 Teacher Follow-up Survey (Questionnaire for Former Teachers and Questionnaire for Current Teachers).

## Teacher demographic characteristics

**Table C4. Teachers' gender, weighted estimates, 2011/12**

Gender	Percent	Standard error
Female	23.7	0.5
Male	76.3	0.5

**Source:** Authors' calculations using data from the National Center for Education Statistics 2011/12 Schools and Staffing Survey (Teacher Questionnaire).

**Table C5. Teachers' ethnicity, weighted estimates, 2011/12**

Ethnicity	Percent	Standard error
Hispanic	7.7	0.4
Not Hispanic	92.3	0.4

**Source:** Authors' calculations using data from the National Center for Education Statistics 2011/12 Schools and Staffing Survey (Teacher Questionnaire).

**Table C6. Teachers' race, weighted estimates, 2011/12**

Race	Percent	Standard error
White	89.5	0.9
Black	7.8	0.5
Other	2.8	0.8

**Note:** Percentages do not sum to 100 because of rounding.

**Source:** Authors' calculations using data from the National Center for Education Statistics 2011/12 Schools and Staffing Survey (Teacher Questionnaire).

## Teacher professional characteristics

**Table C7. Teachers' school level taught, weighted estimates, 2011/12**

School level	Percent	Standard error
Elementary	51.4	1.3
Secondary (middle or high school)	48.6	1.3

**Source:** Authors' calculations using data from the National Center for Education Statistics 2011/12 Schools and Staffing Survey (Teacher Questionnaire).

**Table C8. Teachers' years of teaching experience, weighted estimates, 2011/12**

Teaching experience	Mean	Standard error
Years of teaching experience	13.8	0.3

**Source:** Authors' calculations using data from the National Center for Education Statistics 2011/12 Schools and Staffing Survey (Teacher Questionnaire).

**Table C9. Teachers' previous-year evaluation rating, weighted estimates, 2011/12**

Evaluation rating	Percent	Standard error
Excellent, outstanding, or highly effective	60.3	1.7
Satisfactory or effective	36.8	1.7
Unsatisfactory or not that effective	2.9	0.7

**Note:** Teachers were asked in 2012/13 to report their evaluation ratings from 2011/12.

**Source:** Authors' calculations using data from the National Center for Education Statistics 2012/13 Teacher Follow-up Survey (Questionnaire for Former Teachers and Questionnaire for Current Teachers).

### School characteristics

**Table C10. School enrollment characteristics, weighted estimates, 2011/12**

Enrollment characteristic	Mean	Standard error
Enrollment	839.5	25.0
Percentage of students who are English learner students	8.4	0.5
Percentage of students approved for free or reduced-price lunch	48.5	1.0
Percentage of students with individualized education program	12.8	0.6
Percentage of students who are a racial/ethnic minority	46.6	1.2

**Source:** Authors' calculations using data from the National Center for Education Statistics 2011/12 Schools and Staffing Survey (School Questionnaire).

**Table C11. Urbanicity of school, weighted estimates, 2011/12**

Urbanicity	Percent	Standard error
City	27.7	1.7
Suburb	32.6	1.7
Town	11.7	1.0
Rural	28.1	1.6

**Note:** Percentages do not sum to 100 because of rounding.

**Source:** Authors' calculations using data from the National Center for Education Statistics 2011/12 Schools and Staffing Survey (Teacher Questionnaire).

## Logistic regressions

**Table C12. Logistic regression results of school climate and teacher satisfaction with the evaluation process, 2011/12**

Variable	Coefficient β	Standard error β	Significance (p)	Odds ratio
Constant	-1.00	0.70	.16	0.4
<b>Independent variables</b>				
Principal leadership <sup>a</sup>	0.91	0.17	.00	2.5***
Teacher influence <sup>b</sup>	0.07	0.20	.73	1.1
Student test scores included in evaluation process (compared to not included)	-1.02	0.23	.00	0.4***
<b>Teacher demographic characteristics</b>				
Female (compared to male)	0.26	0.33	.43	1.3
Hispanic (compared to non-Hispanic)	0.03	0.57	.95	1.0
Black (compared to White)	0.29	0.53	.58	1.3
Other (compared to White)	0.31	0.90	.73	1.4
<b>Teacher professional characteristics</b>				
School level taught is elementary (compared to secondary)	-0.22	0.31	.49	0.8
Years of teaching experience	-0.01	0.01	.24	1.0
Satisfactory or effective evaluation rating in previous year (compared to excellent, outstanding, or highly effective rating)	-0.88	0.24	.00	0.4**
Unsatisfactory or not that effective evaluation rating in previous year (compared to excellent, outstanding, or highly effective rating)	-5.11	1.13	.00	0.0***
Current teacher (compared to former teacher)	0.18	0.31	.57	1.2
<b>School characteristics</b>				
Enrollment	..	..	.98	1.0
Suburban (compared to city)	-0.14	0.36	.69	0.9
Town (compared to city)	-0.22	0.38	.58	0.8
Rural (compared to city)	0.12	0.36	.74	1.1
Percentage of students who are English learner students	0.01	0.01	.50	1.0
Percentage of students approved for free or reduced-price lunch	..	..	.92	1.0
Percentage of students with an individualized education program	0.01	0.01	.53	1.0
Percentage of students who are a racial/ethnic minority	..	0.01	.61	1.0

.. is a negligible value.

\*\* is significant at  $p < .01$ ; \*\*\* is significant at  $p < .001$ .

**a.** A composite variable indicating level of agreement (on a scale of 1, strongly disagree, to 4 strongly agree) with six items related to principal leadership (see appendix B).

**b.** A composite variable indicating teachers' perception of influence (on a scale of 1, no influence, to 4, a great deal of influence) on seven items related to school policy (see appendix B).

**Note:**  $n = 3,080$  weighted to represent a population estimate of 2,389,401. Teachers were asked in 2012/13 to report their evaluation ratings from 2011/12 and to report their satisfaction with the evaluation process based on their experiences in 2011/12. Model overall is significant  $F(20, 68) = 4.4$ ,  $\text{Prob} > F = 0.0$ , Design degrees of freedom = 87. Goodness-of-fit test: Hosmer & Lemeshow  $F(9,79) = 0.5$ ,  $\text{Prob} > F = 0.9$ .

**Source:** Authors' calculations using data from the National Center for Education Statistics 2011/12 Schools and Staffing Survey (School Questionnaire and Teacher Questionnaire) and 2012/13 Teacher Follow-up Survey (Questionnaire for Former Teachers and Questionnaire for Current Teachers).

**Table C13. Ordinary least squares regression results of school climate and teacher satisfaction with the evaluation process with state fixed effects, 2011/12**

Variable	Coefficient $\beta$	Standard error $\beta$	Significance ( $p$ )
Constant	0.57	0.10	.00***
<b>Independent variables</b>			
Principal leadership <sup>a</sup>	0.13	0.02	.00***
Teacher influence <sup>b</sup>	-0.01	0.02	.78
Student test scores included in evaluation process (compared to not included)	-0.09	0.04	.04*
<b>Teacher demographic characteristics</b>			
Female (compared to male)	0.20	0.04	.59
Hispanic (compared to non-Hispanic)	0.02	0.06	.77
Black (compared to White)	0.03	0.05	.57
Other (compared to White)	..	0.10	.98
<b>Teacher professional characteristics</b>			
School level taught is elementary (compared to secondary)	-0.03	0.03	.41
Years of teaching experience	..	..	.20
Satisfactory or effective evaluation rating in previous year (compared to excellent, outstanding, or highly effective rating)	-0.12	0.03	.00***
Unsatisfactory or not that effective evaluation rating in previous year (compared to excellent, outstanding, or highly effective rating)	-0.73	0.07	.00***
Current teacher (compared to former teacher)	0.03	0.05	.48
<b>School characteristics</b>			
School enrollment	..	..	.86
Suburban (compared to city)	-0.02	0.04	.65
Town (compared to city)	-0.02	0.05	.72
Rural (compared to city)	0.01	0.04	.78
Percentage of students who are English learner students	..	..	.42
Percentage of students approved for free or reduced-price lunch	..	..	.66
Percentage of students with an individualized education program	..	..	.83
Percentage of students who are a racial/ethnic minority	..	..	.93

.. is a negligible value.

\* is significant at  $p < .05$ ; \*\*\* is significant at  $p < .001$ .

**a.** A composite variable indicating level of agreement (on a scale of 1, strongly disagree, to 4 strongly agree) with six items related to principal leadership (see appendix B).

**b.** A composite variable indicating teachers' perception of influence (on a scale of 1, no influence, to 4, a great deal of influence) on seven items related to school policy (see appendix B).

**Note:**  $n = 3,080$  weighted to represent a population estimate of 2,389,401. Teachers were asked in 2012/13 to report their evaluation ratings from 2011/12 and to report their satisfaction with the evaluation process based on their experiences in 2011/12. The model overall is significant  $F(70, 12) = 9.3$ ,  $\text{Prob} > F = 0.00$ , design degrees of freedom = 81.  $R\text{-squared} = 0.29$ .

**Source:** Authors' calculations using data from the National Center for Education Statistics 2011/12 Schools and Staffing Survey (School Questionnaire and Teacher Questionnaire) and 2012/13 Teacher Follow-up Survey (Questionnaire for Former Teachers and Questionnaire for Current Teachers).

## **Note**

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1. According to the 2012 revised statistical standards and guidelines for the National Center for Education Statistics, “variance estimates must be calculated by a method appropriate to a survey’s sample design (for example, unequal probabilities of selection, stratification, clustering, and the effects of nonresponse, post-stratification, and raking). These estimates must reflect the design effect resulting from the complex design. Approximate variance estimation methods that adjust for most of the impact of clustering and stratification include replication methods [bootstrap, jackknife, balanced repeated replication] and Taylor-series linearization. Replication methods can also adjust for the impact of nonresponse, post-stratification, and raking” (National Center for Education Statistics, 2012, Standard 5). The balanced repeated replication method is recommended for use with the Schools and Staffing Survey and Teacher Follow-up Survey.

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