CHARACTERISTICS OF EFFECTIVE PRINCIPALS: EVIDENCE FROM THE 1999-2000 SCHOOLS AND STAFFING SURVEY

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ABSTRACT

Research suggests that principals are second only to teachers among the most important within-school factors affecting student achievement, yet relatively little is known about which principal characteristics are associated with principal effectiveness. Using data from the 1999-2000 Schools and Staffing Survey, I investigate the relationship between specific principal characteristics—experience, education/training, and beliefs—and principal effectiveness, as measured by teachers’ assessments of their principals and schools. I find that principals who prioritize certain school goals (promoting academic excellence, basic literacy, and good work habits) are more likely to receive higher ratings from their teachers. Other principal characteristics, such as previous teaching and school leadership experience, have marginally or no statistically significant relationships with teacher ratings. Together these findings suggest that, with the exception of principal beliefs regarding school goals, other less-easily measured characteristics may be more important determinants of principal effectiveness than the characteristics examined in this paper.
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# Table of Contents

I. Introduction ................................................................................................................. 1

II. Literature Review ...................................................................................................... 2

III. Conceptual Model & Hypotheses .............................................................................. 5

IV. Data ........................................................................................................................... 10

V. Empirical Strategy ..................................................................................................... 12

VI. Results ....................................................................................................................... 15

VII. Caveats ...................................................................................................................... 22

VIII. Discussion ............................................................................................................... 27

IX. Appendix .................................................................................................................. 31

X. References .................................................................................................................. 48
I. INTRODUCTION

In recent years, human capital has become a focal point of discussions regarding school quality. These conversations often concentrate on teachers, which is understandable given that research suggests teachers are the most important within-school factor affecting student achievement (Hanaway & Mittleman, 2011). Principals have too often been left out of the conversation, even though they are the second most influential in-school factor affecting student performance (Leithwood, Louis, Anderson, & Wahlstrom, 2004). Principals impact student outcomes in a number of ways, including by influencing teachers’ school placement choices and job satisfaction, setting organizational direction, and developing school culture (Beteille, Kalogrides, & Loeb, 2009; Brewer, 1993; Heck, Larsen, & Marcoulides, 1990). While researchers disagree over appropriate conceptions of principal leadership, there is broad consensus that principals matter.

At the same time, America’s public education system is under mounting pressure to close racial and income achievement gaps and to help preserve the country’s competitiveness in an increasingly global marketplace. The federal government has pursued a number of policy reforms designed to meet these objectives, including some recent efforts focused on principals. Promoting school leader quality was designated a top priority in Race to the Top, the Obama Administration’s signature education program, and replacing principals at persistently low-achieving schools is a central part of the Administration’s School Improvement Grants program. Moreover, other school improvement efforts, such as new teacher evaluation systems that incorporate principals’ ratings of teachers, often place greater demands on principals. These growing demands underscore the importance of identifying and hiring high-quality principals. To do this effectively, policymakers and district leaders need to develop evidence-based profiles of
successful principals so they can screen for the most preferable combination of training, experiences, and beliefs. Policymakers also need to ensure that principal certification policies require credentials and experiences that are associated with effectiveness.

Unfortunately, relatively little research has examined which principal characteristics are associated with positive school outcomes. What little research does exist has yielded conflicting results, making it difficult to credibly identify the characteristics of effective principals. I analyze data from a national survey, the 1999-2000 Schools and Staffing Survey (SASS), to better understand the characteristics effective principals possess. In particular, I explore the following research question: which principal characteristics are associated with the leadership behaviors and conditions found in successful schools, as measured by teachers’ ratings of these behaviors and conditions? Put more simply, what characteristics—beliefs, experiences, and training—do effective principals possess?

II. LITERATURE REVIEW

For several decades, researchers have sought to understand various aspects of school leadership. A number of studies have investigated whether principals influence school outcomes and, if they do, how they exert this influence. The general consensus is that principals do affect student outcomes, albeit indirectly, by influencing factors that in turn impact student achievement (Hallinger & Heck, 1998). Some scholars argue that principals influence student achievement by behaving as “instructional leaders”—leaders who shape school climate and oversee instructional organization (Heck et al., 1990). Others contend that effective principals exercise “transformational leadership,” meaning they work to develop organizational capacity and increase teachers’ commitment to school goals (Leithwood & Jantzi, 1999). Another group of researchers has sought to identify specific in-school factors that principals affect. For instance,
recent studies have found that principals strongly influence the makeup of their teacher workforce (Beteille et al., 2009; Boyd, Grossman, Ing, Lankford, Loeb, & Wyckoff, 2009; Grissom, 2011).

A smaller—and relatively newer—body of principal-related research has explored the characteristics that effective principals possess, as opposed to the actions they take or the specific factors they influence. In the four studies that make up this subset of the school leadership literature, the traits examined typically include principals’ education, pre-service training, and prior teaching and school leadership experience—traits that are often used to determine whether an individual is qualified for any job. With respect to outcome measures, three studies used student test scores and/or other student outcomes (Brewer, 1993; Clark, Martorell, & Rockoff, 2009; Eberts & Stone, 1988). A fourth paper utilized teachers’ ratings of their principal (Ballou & Podgursky, 1993).

Findings related to principals’ previous experience are mostly mixed. Some researchers have identified a positive relationship between prior teaching experience and principal quality (Ballou & Podgursky, 1993; Eberts & Stone, 1988), while others have found no evidence of a relationship (Brewer, 1993; Clark et al., 2009). Prior experience as a principal also yielded mixed results: Clark et al. (2009) and Eberts and Stone (1988) found a positive relationship, while others found a negative relationship (Ballou & Podgursky, 1993) or no evidence of a relationship (Brewer, 1993). Ballou and Podgursky (1993) also found that experience outside education had a negative relationship with teacher ratings, while a principal’s tenure at his current school had no significant relationship; Brewer (1993) corroborated the latter finding. To date, few researchers have explored the relationship between other school leadership positions held (e.g., department head) and principal quality. The one exception is Clark et al. (2009), who found that, among very
inexperienced principals, having previously served as an assistant principal in their current school had a positive relationship with school outcomes.

Research around principals’ education has yielded more consistent results. Two studies have identified a negative relationship between principals’ advanced degrees and student achievement or teachers’ ratings (Ballou & Podgursky, 1993; Eberts & Stone, 1988). Eberts and Stone (1988) offer two potential explanations for this finding: educators may pursue these degrees to move up a salary schedule, rather than to improve their effectiveness, as Murnane (1981) has suggested (as cited in Eberts & Stone, p. 297). Alternatively, perhaps principals with advanced degrees are more likely to be placed in challenging schools. In an effort to control for more highly educated principals receiving harder assignments, Ballou and Podgursky (1993) included measures of teacher satisfaction that are not influenced by the principal (for instance, satisfaction with their salary) in their analysis. If a teacher is unhappy with school attributes the principal does not control, they hypothesized, it might indicate the school is a more challenging environment overall. With this specification, the coefficients on the graduate degree variables did not change, which Ballou and Podgursky (1993) took to mean that principals with advanced degrees likely do not receive more challenging placements. Whether these specification changes adequately control for assignment difficulty, however, is open to debate.

There is limited evidence regarding other aspects of principal education and training. Clark et al. (2009) found no evidence of a relationship between the selectivity of the principal’s college or graduate school and student outcomes. There is little evidence regarding pre-service training, broadly speaking, though some studies have evaluated specific preparation programs. Corcoran, Schwartz, and Weinstein (2009) looked at New York City’s new principal training program for high-need schools, finding that elementary and middle schools led by these
principals had similar or better results than those of comparison schools, while results for high schools were inconclusive.

Very little past research has examined principals’ beliefs and values, despite the influence these factors likely have on school conditions (e.g., school culture). One exception is Brewer (1993), who found a positive association between student achievement and principals listing academic excellence as a top goal.

Overall, the existing evidence provides limited insight into the principal characteristics associated with positive school outcomes and other measures of principal quality. Aside from the finding that advanced degrees are negatively associated with principal effectiveness, relationships between quality and other characteristics are either mixed or require further study to corroborate results identified in only one study. Given both inconclusive results and limited research on this topic (only four papers in the last three decades), my paper seeks to add more clarity to this literature.

III. CONCEPTUAL MODEL & HYPOTHESES

Figure 1 depicts a model of how principals indirectly influence student outcomes by shaping key determinants of school quality. How principals shape these determinants of school quality is in turn influenced by their characteristics. Like other organizations, schools are complex, and this framework cannot capture all the factors that affect school conditions and outcomes. Nevertheless, it highlights key relationships that have been identified in prior research (e.g., Hallinger & Heck, 1998).

A. Overview of Conceptual Model

The principal lies at the top of this framework. How the principal behaves as a school leader is defined by his characteristics, which I divide into three broad categories: (1) beliefs and
attitudes, which range from beliefs about proper instructional technique to feelings of self-efficacy; (2) experience, such as previous teaching and administrative jobs; and (3) education and training, including formal preparation and ongoing professional development.

As described above, prior research has identified some characteristics that may have a relationship with outcomes. Believing academic excellence should be a top goal is associated with positive student achievement, while holding an advanced degree has a negative relationship with school outcomes. Evidence regarding other characteristics, such as previous teaching experience and tenure at the current school, is mixed.

Moving down the flow chart, the principal influences his school’s attributes through his behaviors and actions. A fairly extensive body of research has demonstrated that by shaping school conditions, principals have an indirect—albeit important—impact on student outcomes (Brewer, 1993; Hallinger & Heck, 1998; Heck & Marcoulides, 1993; Heck et al., 1990; Waters, Marzano, & McNulty, 2003).

Further research on school leadership effects has sought to identify the intermediate variables through which principals influence student achievement. Hallinger and Heck (1998) provide evidence that principals affect student performance through four pathways: (1) by formulating and communicating the school’s purposes and goals; (2) by shaping organizational structures and social networks among school stakeholders; (3) by influencing people (e.g., changing teachers’ behavior, resolving conflicts); and (4) by shaping organizational culture. In an earlier paper, Heck et al. (1990) argue that principals influence (1) school climate, which they define as identifying school goals and promoting a positive learning environment, and (2) the school’s instructional program. A number of studies have also found that principals play an important role in the selection, retention, and removal of teachers (Beteille et al., 2009; Boyd et
al., 2009; Brewer, 1993; Grissom, 2011). In my conceptual model, I draw from this body of research to identify five school attributes that principals influence and that, in turn, affect student outcomes. These attributes are summarized in Table 1.

It is important to note that it is not just principals’ characteristics that impact their behaviors and actions; external factors like school accountability policies also exert influence. For instance, a principal who faces sanctions if his school fails to improve English Language Learner outcomes would probably focus more of his efforts on this subgroup relative to other subgroups. Additionally, outside actors, including school districts and state education agencies, influence school attributes. A school district, for instance, may make decisions about curriculum, and state agencies commonly set school achievement goals. Similarly, school-level factors are not the only determinants of student success, as depicted in the lower portion of Figure 1. External forces such as family income and parental engagement impact student outcomes as well.

While student outcomes—test scores and graduation rates, for instance—are the ultimate measures of school effectiveness, my data do not have such measures. Instead, teachers’ observations of principals’ behaviors and school attributes serve as indicators of school outcomes in my analysis. Though teachers’ ratings are not a perfect substitute for student outcomes, there is some evidence that the two measures are correlated (Heck, 1992; Valentine & Bowman, 1989).

**B. Principal Quality Indicators**

Additional empirical evidence provides the rationale for my selection of specific principal quality indicators, which serve as my outcome measures. With respect to my first group of outcome measures, principal behaviors and actions, I utilize portions of a framework
constructed by Waters et al. (2003) in a meta-analysis of three decades of school leadership research. This framework consists of 21 “leadership responsibilities” that are correlated with positive school outcomes. Table 2 identifies the principal behavior-related survey questions that serve as my outcome measures and the corresponding leadership responsibilities, as defined by Waters et al. (2003). Table 2 also lists the broader school attribute(s) from my conceptual model (Figure 1) that each leadership responsibility/behavior influences.

My second group of outcome measures relates directly to the attributes of effective schools. Delving into sub-categories of the school attributes identified in Figure 1, a number of different researchers have sought to pinpoint the characteristics of schools that produce positive student outcomes. In Table 3, I include a few of these more specific school attributes—each of which relates to one or more broader school attributes from Figure 1—and the related survey questions. It is important to note that principals are not the only determinants of these school attributes, as depicted in my conceptual model and explained previously. However, as the research I have cited suggests, principals play an important role in shaping school conditions, including those described in Table 3.

C. Hypotheses

Based on the findings of previous studies, I expect that principals who believe academic achievement should be a top school goal and principals who have previously served as assistant principals will be more likely to receive positive ratings (Brewer, 1993; Clark et al., 2009). On the other hand, I expect that advanced degree attainment will have a negative relationship with teachers’ ratings of their principals (Ballou & Podgursky, 1993; Eberts & Stone, 1988).

With respect to other principal characteristics I investigate, previous findings have been mixed. Because my analysis is most similar to that of Ballou and Podgursky (1993), who use the
1987-88 SASS and also focus on teacher ratings of principals as the primary outcome, I anticipate that my results will align most closely to theirs. As such, I expect that previous teaching experience will be associated with higher ratings, prior school leadership will exhibit a negative relationship with ratings, and principals’ tenure in their current position will bear little relationship to ratings.

I also explore the relationship between teachers’ ratings and other principal characteristics that, to my knowledge, researchers have not yet considered. These include previous positions held (other than assistant principal) and principals’ feelings of self-efficacy. I expect that principals who have previously served as department heads or curriculum specialists will be more likely to receive higher teacher ratings, since these positions might give principals the opportunity to develop the leadership skills and instructional expertise necessary to be effective school leaders. On the other hand, I do not anticipate finding a relationship between serving as a guidance counselor and teachers’ ratings, as there appears to be little overlap in the skills required to be an effective counselor and principal.

Turning to principal self-efficacy, I anticipate that principals who have a higher degree of self-efficacy will have better teacher ratings. In the context of school leadership, I define high self-efficacy as a principal believing he can influence his school’s environment and outcomes, despite facing constraints. If a principal believes he can have an impact on his school, I expect he would be more likely to take the steps necessary to have that anticipated impact—and this would be reflected in teachers’ assessments of his actions and overall school conditions.¹

¹ My definition of self-efficacy and description of its effects correspond to social cognitive theorists’ understanding of self-efficacy writ large. William Julius Wilson (1996) provides an excellent explanation in When Work Disappears: “perceived self-efficacy refers to beliefs in one’s own ability to take the steps necessary to achieve the goals required in a given situation. Such beliefs affect the level of challenge that an individual feels he or she is able to tackle, the amount of effort expended in a given venture, and the degree of perseverance when encountering difficulties” (p. 75).
IV. Data

I use data from the 1999-2000 Schools and Staffing Survey (SASS), a survey sponsored by the National Center for Education Statistics at the U.S. Department of Education. The SASS, which has been administered every three to four years since the late 1980s, gathers information about American schools and their staff for research purposes.

The 1999-2000 SASS consists of four surveys: the School Questionnaire, the Teacher Questionnaire, the Principal Questionnaire, and the School District Questionnaire. My analysis utilizes information from the Public School Principal Questionnaire and the Public School Teacher Questionnaire. Both the principal and teacher questionnaires provide information about the respondents’ backgrounds and their opinions regarding the school. Teachers are also asked about their perceptions of their principal. Student achievement data, however, are not included in the SASS.

Schools, which serve as the primary sampling unit, were selected to participate in the 1999-2000 SASS using a stratified probability sample design. Sampling procedures were specifically designed to ensure the sample is representative at the national and state level. Within schools, teachers were stratified based on certain characteristics, then sampled such that the probability of selection was roughly constant within each strata. The number of teachers sampled per principal ranged from one to 20, depending on school size.\(^2\) With multiple teachers connected to each principal in the sample, my unit of analysis is the teacher.

The number of respondents to the principal questionnaire is 8,524, and the number of teachers who completed the teacher questionnaire is 42,086. To create my analytic sample, I

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\(^2\) In my analytic sample, the number of teacher respondents per principal ranges from one to 19, with a mean of 4.90 and a mode of four. About a third of principals have three or fewer teacher respondents. As discussed further in Section VII (Caveats), the low number of teachers per principal could result in measurement error.
removed all observations with missing data: 478 principals without corresponding teachers, 2,872 teachers without corresponding principals, and 2,376 principal-teacher pairs who were missing four or five key school-level control variables. My resulting analytic sample consists of 7,519 principals and 36,383 teachers.

Tables 4 through 7 provide summary statistics for the principals, schools, and teachers in my sample, as well as the ratings principals received from their teachers. The principals in my sample have spent an average of 14 years teaching, an average of nine years as a principal, and an average of five years as principal of their current school. The most common previously held position is assistant principal/program director (66 percent of principals), followed by department head (37 percent), curriculum specialist (24 percent), and guidance counselor (8 percent). Just over half of the principals participated in an aspiring principals program before assuming their school leadership positions. The vast majority of principals—88 percent—hold a master’s degree or education specialist/professional diploma. Another 10 percent hold a doctorate or first professional degree (e.g., JD), and only 2 percent have earned less than a master’s degree. One-quarter of the principals in my sample report that their top three school goals are encouraging academic excellence, building basic literacy skills, and promoting good work habits and self-discipline. The mean self-efficacy score is 4.36, on a scale from one to five, with five indicating the highest degree of self-efficacy.

Teachers’ ratings of their principals are mostly positive. On all but one of the 11 survey questions related to principal behaviors and school conditions (the survey items that serve as my outcome measures), over 50 percent of teachers give their principal a positive rating. On eight of

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3 These school-level variables are: percent minority students, percent minority teachers, number of teachers, school program type, and total enrollment. The 2,376 principal-teacher pairs correspond to 527 unique schools.
4 See Section V (Empirical Strategy) for more information about how this variable was constructed.
the questions, more than two-thirds of teachers evaluate their principals positively. The lowest proportion of positive scores—46 percent—comes in response to a question about whether the principal talks to the teacher frequently about the teacher’s instructional practice. The most overwhelmingly positive response is related to general satisfaction: 90 percent of teachers strongly or somewhat agree that they are generally satisfied with being a teacher at their school.

V. EMPIRICAL STRATEGY

My primary estimating equation is modeled on the equation Ballou and Podgursky (1993) developed for their similar study of teachers’ ratings of their principals:

$$ Z_{ij} = \beta_p P_i + \beta_s S_i + \beta_t T_{ij} + \beta_{pt} P_i \times T_{ij} + e_{ij} $$

In this equation, $Z_{ij}$ is the j-th teacher’s rating of the i-th principal. $P_i$ represents principal attributes; $S_i$ and $T_{ij}$ represent school and teacher characteristics. I include interactions for certain principal and teacher demographic characteristics to allow for variation in ratings as a result of demographic similarities or differences between the principal and teacher.

When employing this equation, I cluster my standard errors by principal, since teachers are nested within principals in my dataset. In addition, I apply sampling weights to ensure my results are representative.

A. Dependent Variables

My dependent variables, 11 of which are dummies and two of which are continuous composites, come from the SASS teacher survey. Each of the 11 original SASS survey questions—all of which are listed in Table 5—relates to principal behaviors or school attributes that prior research has identified as having a positive association with student outcomes (Leithwood et al., 2004; Purkey & Smith, 1983; Waters et al., 2003). Six of the 11 dummy variables relate to principal behaviors, while the remaining five correspond to school attributes.
For all 11 dummy variables, a value of zero corresponds to “strongly disagree” or “somewhat disagree” and a value of one corresponds to “somewhat agree” or “strongly agree,” meaning that a higher numerical value indicates better principal performance. I also created composite variables: one that averages all 11 of the zero-one dependent variables and another that averages the six principal behavior/action dependent variables. Before creating these indexes, I conducted Cronbach’s alpha tests to assess internal consistency. The Cronbach’s alpha for these two indexes exceeded 0.7, while the alpha for a third grouping of variables—the five school condition dependent variables—did not. As a result, the third index is excluded from my analysis.

**B. Independent Variables of Interest**

To test my hypotheses, I explore the relationship between several principal attributes and their teachers’ ratings. In the categories of experience and training, my variables of interest include principals’ years of teaching experience, years of school leadership experience, tenure in current position, previous positions held, whether the principal participated in an aspiring principals program, and highest degree earned. All “years of experience” variables are continuous variables where one unit equals one year. I use four separate dummy variables to indicate the previous positions each principal has held: assistant principal/program director, department head, curriculum specialist, and/or guidance counselor. A dummy variable also identifies principals who received training through an aspiring leaders program (set equal to one if yes). A group of three dummy variables indicates a principal’s highest degree earned, which is categorized as less than a master’s, a master’s or similar degree, and a doctorate or similar degree.
In my analysis, I also examine principals’ beliefs—specifically their top goals for their schools and their feelings of self-efficacy. I use one dummy variable to identify principals who have the combination of top school goals that I expect is most likely to have a positive association with teachers’ ratings.\(^5\) This variable is set equal to one if the principal’s top three school goals include encouraging academic excellence, building basic literacy skills, and promoting good work habits and self-discipline. As I describe in greater detail in Section VI-B, I also test several other variable specifications for measuring top school goals.

The second belief-related characteristic, self-efficacy, is measured using an index variable. This variable is an average of seven variables that come from questions about the degree of influence principals feel over certain school conditions—for example, curriculum and professional development. I selected these questions because they correspond closely to my definition of self-efficacy: a principal believing he can influence his school’s environment and outcomes. The seven original variables are measured on a scale of one to five, where one corresponds to “no influence” and five to “a great deal of influence.” The resulting index also ranges from one to five, where five indicates the highest degree of self-efficacy. A Cronbach’s alpha test suggests that the index’s seven items are sufficiently internally consistent (alpha = 0.765).

To support my hypotheses, coefficients on the following principal attribute variables would need to be positive and statistically significant: prior experience in teaching; prior experience as an assistant principal, department head, or curriculum specialist; top school goals include promoting academic excellence; and self-efficacy. On the other hand, coefficients on

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\(^5\) Compared to the other school goals listed in the survey, these three goals—promoting academic excellence, basic literacy skills, and good work habits—relate more closely to the outcomes schools are generally expected to produce (e.g., students who are capable readers).
some principal attribute variables would need to be negative and/or not statistically significant. These variables include advanced degree attainment (negative coefficient), prior experience as a principal or guidance counselor (negative and not significant, respectively), and tenure in the current position (not significant).

C. Control Variables

My regression models also include a number of controls to account for other factors that influence school effectiveness and student outcomes. Principal-specific controls include salary, gender, race, and age. At the school level, my controls include proportion of minority students, urbanicity, school level, and total enrollment. Since teachers with differing attributes may rate the same principal differently, I control for a number of teacher characteristics. These include race, gender, age, highest degree earned, years of experience, and union membership.

VI. RESULTS

Tables 8 through 10 report Linear Probability Model (LPM) estimates for the 11 dummy dependent variables and OLS estimates for the two composite dependent variables.

A. Primary Results

Some variables of interest yielded statistically significant results, though this is typically inconsistent across dependent variables. When results are significant, the magnitudes are mostly small: few variables are associated with more than a six or seven percentage point change in the likelihood of achieving a positive rating. As Ballou and Podgursky (1993) point out, however, the number of schools and teachers in the U.S. is so great that even a change of just a few percentage points could affect many thousands of teachers and students.

Some of my findings confirm those of Ballou and Podgursky’s 1993 paper, the previous study that is most similar to mine, while others do not. My findings deviate from theirs across
two of the three principal experience variables that we both examine (years of teaching experience and years of experience as a principal). The areas in which our results converge are years as principal of this school and principal educational attainment. We both find little evidence of a relationship between years as principal of the current school and teacher ratings. We also both find a significant negative relationship between holding advanced degrees and teachers’ ratings, though my results for these education variables are less consistently significant.

1. Prior Experience

Delving more deeply into my results, I begin with the variables that concern principals’ prior experience. A principal’s years of experience as a teacher is marginally significantly (p<0.1) related to just one dependent variable out of 13 total, and that relationship is small: an additional year of experience is associated with less than a one percentage point increase in the likelihood of receiving a positive rating, holding other covariates constant. This suggests that little to no relationship exists between principals’ prior teaching experience and teachers’ ratings—a finding that mirrors that of Clark et al. (2009) and Brewer (1993), but contradicts the positive relationship identified by Ballou and Podgursky (1993) and Eberts and Stone (1988).

A principal’s prior years of experience as a school leader also bears little relationship to principal effectiveness, as measured by teachers’ ratings. Prior principal experience has a small significant (p<0.05) or marginally significant (p<0.1) positive relationship with two dependent variables. Brewer (1993) came to a similar conclusion that little relationship exists here, while other studies found a positive relationship (Clark et al., 2009; Eberts & Stone, 1988) and Ballou and Podgursky (1993) identified a negative relationship.

A principal’s years of experience leading his current school has a significant positive relationship (p<0.05) with two dependent variables as well, but it also has a significant negative
relationship (p<0.05) with a third variable. Regardless of direction, the relationship size is small, with all coefficients indicating that an additional year at the current school is associated with less than a one percentage point increase or decrease in the chances of receiving a positive rating. This mixed relationship does not differ greatly from the findings of previous studies, including Ballou and Podgursky’s (1993) work, which found no evidence of a relationship here.

In looking at the previous positions principals have held, just one variable—having previously served as a department head—yielded a marginally significant relationship (p<0.1) with one dependent variable. This relationship is fairly small and negative. No other variables of interest in this category (previously served as curriculum coordinator, assistant principal, or guidance counselor) produced statistically significant results. Only Clark et al. (2009) have investigated similar variables, and they found that among the most inexperienced principals, having served as an assistant principal in the current school was associated with better school performance. My findings do not necessarily contradict theirs since I cannot identify where principals in my dataset served as assistant principals.

2. Education & Training

With respect to principals’ educational attainment, some of my findings confirm the results of previous studies. Like Ballou and Podgursky (1993) and Eberts and Stone (1988), I find that principals with a master’s or doctorate degree are less likely to receive positive ratings than principals with less than a master’s degree, holding other covariates constant. The relationship size—ranging from 5.1 to 7.1 percentage points—is fairly large relative to my other findings, but coefficients are only significant for two dependent variables in each model (p<0.1 for one master’s coefficient and p<0.01 for the other; p<0.05 for the two doctorate coefficients). It is important to note, however, that 88 percent of principals in my sample fall into the category
of holding a master’s or similar degree, while just 2 percent have less than a master’s degree, the reference category. As a result, there is likely a great deal of variation in the effectiveness of principals with master’s degrees. Moreover, principals with less than a master’s degree may have to demonstrate that they are especially effective in order to avoid being replaced with a principal with higher educational attainment. This selection effect may thus be driving the observed relationship, meaning that these results may not indicate that earning an advanced degree reduces the effectiveness of a principal.

Another education-related variable, having participated in an aspiring principals program, did not produce statistically significant results for any dependent variables. This finding is perhaps unsurprising given that this measure does not capture the diverse levels of quality that likely exist among these programs.

3. Beliefs

A variable measuring principals’ top school goals yielded the most consistently significant results of any variable of interest. A principal who lists encouraging academic excellence, building basic literacy skills, and promoting good work habits as his top three school goals, no matter the order, is between 1.3 and 2.1 percentage points more likely to receive a positive rating than a principal who lists a different combination of top goals, holding other factors constant (p<0.05 for six dependent variables, p<0.01 for one dependent variable). The principals in the reference category either report that their top goals are a combination of three of the other five options in the survey (promoting occupational or vocational skills, promoting personal growth, promoting human relations skills, promoting specific moral values, and promoting multi-cultural awareness) or a combination that includes one or two, but not all, of the goals the dummy variable identifies (academic excellence, basic literacy, and good work habits).
This finding is similar to that of Brewer (1993), who found an association between positive school outcomes and the principal believing academic excellence should be a top goal.

Finally, principal self-efficacy produced significant results (p<0.05) for one dependent variable and marginally significant results (p<0.1) for a second dependent variable. Having the highest degree of self-efficacy—a rating of five—is associated with between a 7.2 and 7.6 percentage point increase in the likelihood of receiving a positive rating, when compared with having the lowest self-efficacy score (one), holding other covariates constant. Though this relationship is among the largest I identify, it is not consistent enough across my dependent variables to support drawing strong conclusions about the importance of self-efficacy among principals.

B. Robustness Checks

To ensure that my results are not being driven by model assumptions, I estimate the same regressions for the 11 dummy dependent variables using a logistic model. In general, results from both my LPM and logistic models are similar with respect to statistical significance, the direction of relationships, and magnitude.\(^\text{6}\) As such, my discussion in the previous section is limited to LPM/OLS estimates.

The OLS results I report, which come from my expanded model, are not sensitive to the addition of variables, relative to my baseline model. In my expanded model, I added two variables (a variable indicating whether the principal hired the teacher and a variable measuring the teacher’s satisfaction with his salary) and two sets of interactions (between principal and teacher gender and between principal and teacher race/ethnicity). These four additions were also

\(^6\) To compare the magnitudes of LPM and logistic results for key statistically significant coefficients, I converted the logistic odds ratios to proportions. I then compared (1) the difference between the baseline group proportions and the non-baseline group proportions predicted by the odds ratio estimate with (2) the corresponding LPM coefficient. The LPM estimates and converted logistic estimates reported in Tables 11 and 12 are very similar.
included in Ballou and Podgursky’s (1993) model. Ballou and Podgursky (1993) designed the hiring variable to control for teachers potentially having unfairly favorable views of principals who hired them, while the salary variable provides an additional control for principals receiving more difficult school assignments—where teachers are perhaps less satisfied with their salaries, for instance. The interaction variables control for differences in how teachers with similar or different demographics rate their principals, since Ballou and Podgursky (1993) found that some demographic differences and similarities color teachers’ views.

Other specification changes, however, do alter some results. When I changed the specification of the principal’s teaching experience variable from continuous with a squared term to the three categorical variables utilized by Ballou and Podgursky (1993), teaching experience appears to have a more consistently significant relationship with teachers’ ratings—a finding that is similar to Ballou and Podgursky’s. Principals with six to 15 years of teaching experience are 1.6 to 2.8 percentage points more likely to receive a positive rating than principals with zero to five years of experience, holding other covariates constant. Results are marginally significant (p<0.1) for three dependent variables and significant (p<0.05) for two dependent variables, out of 13 variables total. Similarly, principals who taught for more than 15 years are 1.7 to 2.5 percentage points more likely be rated highly than principals with just a few years of teaching experience, holding other covariates constant—though these results are just marginally significant (p<0.1) for three dependent variables. Results for other variables of interest do not change when using this new teaching experience specification. These findings suggest that prior teaching experience may be more important than my earlier results indicate, but it is difficult to draw strong conclusions, given that results are sensitive to specification and that findings vary across other studies.
I also tested different specifications for the top school goals variable. Including variables that identify each principal’s top school goal (e.g., a variable set equal to one if the principal’s number one goal is promoting moral values) in several regressions one at a time yielded very few significant relationships. This is perhaps not surprising since school staff can focus on more than one goal at a time, so the difference between listing a goal as number one, versus listing it as number two or three, may not have a meaningful impact. I next ran several regressions with dummies identifying goals that appear anywhere in the principal’s top three (e.g., a variable set equal to one if the principal’s first, second, or third goal is promoting moral values), again inserting one goal variable at a time. This yielded more significant results than the previous specification, but not enough to warrant further investigation.

My third step involved creating zero-one variables that identify principals with certain combinations of top goals (e.g., academic excellence and basic literacy skills in the top two) that I thought might yield positive teacher ratings. Among those variables, the one that produced the most consistently significant results was the variable identifying principals whose top three goals are encouraging academic excellence, basic literacy, and work habits. I ultimately selected this variable for my primary analyses in part because it has statistically significant relationships with several dependent variables, but also because I expected this would be one of the more effective combination of goals. Among the eight choices in the survey, these three relate most closely to the outcomes that schools are typically expected to produce—students with strong academic skills and good work ethic—while the other goal choices, such as promoting multi-cultural awareness, relate to building softer skills that are often secondary to academic outcomes. Though the principals in my dataset selected a total of 54 combinations of top three school goals, it was not worthwhile to test most combinations, given that 47 of the 54 combinations were each
selected by less than 5 percent of the sample. The preferences of principals in my sample lend further credence to my variable choice: it was by far the most popular grouping of top three goals, with 25 percent of principals choosing this combination. The next most popular combination received the endorsement of less than 10 percent of principals.

VII. Caveats

Like any empirical investigation, particularly one that involves observational data, this analysis is subject to some limitations. I begin by addressing the potential limitations of using teachers’ ratings as a proxy for principal effectiveness. I then discuss other considerations.

A. The Validity of Teachers’ Ratings

As referenced earlier, teachers’ opinions are an imperfect measure of principal effectiveness. For one, teachers’ views are inherently subjective, so I cannot be certain that teachers are giving fair assessments of their principals. Fortunately, the SASS teacher survey asks a number of relatively objective questions about principals’ practices (e.g., the principal knows what kind of school he/she wants and has communicated it to the staff), rather than more open-ended questions that would encourage teachers to pass judgment on the effectiveness of the principals’ actions (for instance, the principal communicates effectively). This likely reduces how much the survey results capture teachers’ biases—though it does not ensure that the teachers’ assessments are fair.

In a similar vein, some researchers have expressed skepticism that teachers’ assessments of their principals are strongly related to student achievement (Clark et al., 2009). Clark and his colleagues level this criticism at Ballou and Podgursky’s 1993 paper in particular—though they do not have a mechanism for testing this assertion, since the SASS data Ballou and Podgursky use does not include student achievement data. Because I too am using SASS data, it is
impossible for me to evaluate this contention as part of my investigation. However, there is some evidence that this criticism is unfounded. Valentine and Bowman (1989) and Heck (1992) found that academic achievement and other outcomes are in fact correlated with teachers’ opinions of their principals. Moreover, other research has pinpointed leadership practices and school attributes that are associated with increased student achievement (Leithwood et al., 2004; Purkey & Smith, 1983; Waters et al., 2003). Some of these studies (e.g., Waters et al.) utilize teachers’ views to identify principals’ behaviors and school conditions—measures that parallel the teacher survey questions I use in my investigation.

If teachers’ opinions do not accurately reflect principal quality, I would expect that it is because teachers are unintentionally biased or are merely incorrect—not because they are being dishonest. Teachers have no incentive to lie on their SASS surveys, since the principal does not see the results, and there are no rewards or punishments for schools based on survey answers. As such, any measurement error in my dependent variables is likely random, and so may inflate the standard errors of my estimated coefficients but not necessarily bias them. This may explain, in part, why my results are so often statistically insignificant.

An additional source of measurement error may be the relatively small number of teachers per principal. The mean number of teachers per principal in my analytic sample is 4.90, and roughly one third of principals have three or fewer corresponding teacher respondents. It is hard to know how often a small number of teachers per principal reflects the size of the school and how often it is the result of lower response rates among teachers at certain schools. Given that the overall response rate for teachers is 83 percent, I would expect that it is likely the former problem, not the latter. If some schools do indeed have lower response rates, I might worry that the teachers’ ratings represent the views of teachers who have a greater desire to share their
opinions—perhaps teachers who are especially unhappy with their circumstances. The average teachers’ ratings, however, are largely positive: a majority of teachers evaluated their principals positively on 10 out of the 11 survey questions that serve as my dependent variables. As a result, it seems less likely that the ratings are weighed down by particularly negative teachers.

In an effort to gauge the extent to which these issues might pose a problem in my analysis, I conducted tests to evaluate the validity of teachers’ ratings of their principals. In my first test, I sought to measure the likelihood that teachers’ ratings are unfairly biased. I hypothesized that if teachers typically assess their principals fairly in the survey questions I use as my dependent variables, then these variables would not correlate strongly with other teacher satisfaction variables that the principal is less likely to impact. In other words, these correlations would be low if teachers are either happy or upset for other reasons (e.g., they are satisfied or dissatisfied with their salary), but do not let those feelings bias their ratings of their principal and other school conditions. I tested this hypothesis by calculating correlations between (1) my dependent variables and (2) a variable that assesses whether teachers are satisfied with their salaries and a variable that measures whether teachers are worried about losing their jobs because of their students’ low test scores. Table 1 lists these correlations, which range from -0.05 to 0.13. These low correlations suggest that teachers’ ratings of their principals are not colored by teachers’ feelings about certain factors outside principals’ control.

A second related test examined the likelihood that teachers’ views are accurate. To test this, I calculated correlations between teachers’ and principals’ perceptions of school problems. These school problem variables are useful for this test, since both principals and teachers are asked a series of identical questions about potential issues in their schools. If teachers’ and principals’ views align, then teachers’ other impressions of their schools (i.e., my dependent
variables) may be a more accurate assessment of reality. The correlations from this test are reported in Table 15. Correlations range from 0.19 to 0.59, with an average correlation of 0.35. Given this fairly wide range, it is hard to draw reliable conclusions from these results.

**B. Other Considerations**

Turning to the principal characteristics that comprise my variables of interest, one limitation is that this is not an exhaustive list of attributes. There are both observable and unobservable factors that likely influence a principal’s effectiveness that, given data limitations, I cannot analyze here. These characteristics (e.g., advanced degree subject area, management style, work ethic) may be important for district human resources to evaluate when hiring principals. More problematic, some of these omitted characteristics (e.g., ability, motivation) might be positively correlated with educational attainment, self-efficacy, and certain school goals (e.g., the combination I investigate: academic achievement, basic literacy, and work habits), as well as with my dependent variables. As a result, these omitted variables could be exerting an upward bias on some of the coefficients of interest. On the other hand, strong motivation might be more common among younger, less experienced principals. A negative correlation between omitted motivation measures and experience, combined with a positive correlation between motivation and dependent variables, could instead result in downward bias on the experience estimates.

Another potential issue with my variables of interest relates to their specification. Though my self-efficacy measure aligns with a well-established definition of self-efficacy—a person’s belief in his ability to meet certain goals—I cannot be certain that the survey results upon which I base this measure accurately reflect a principal’s self-efficacy. Since these survey questions ask about a principal’s degree of influence over various school-level conditions, they may also
reflect the presence of rules that constrain a principal’s ability to control these conditions. On the other hand, I would expect that principals with high self-efficacy might not express feelings of constraint in their survey responses, since this type of principal would be more likely to find ways to overcome rules and bureaucratic obstacles to achieve his goals. As a result, he would express greater feelings of self-efficacy than a similarly constrained principal who does not find ways to get around rules. Further, the mean self-efficacy rating in my analytic sample is 4.36 (where five indicates the highest degree of influence); as such, I see little evidence that my self-efficacy measure is artificially low.

My top school goals measure may also imperfectly reflect a principal’s true beliefs. Some principals may face external pressure (e.g., from the school district) to elevate certain school goals, regardless of the principal’s beliefs. I do not expect this to be a serious problem in my data, however, since principals’ survey answers are not shared with their supervisors. As a result, I presume that principals are more likely to share their true beliefs, rather than what they think their supervisors want them to say.

Additionally, two kinds of sorting bias, student sorting bias and school sorting bias, may be problematic in this study. First, students are not randomly assigned to principals: parents who highly value education and have the means to seek out relevant information may send their children to schools run by principals with more experience, more education, or other qualifications they expect to lead to increased effectiveness. If these students would do well regardless of who leads their school, and student success is correlated with teachers’ ratings of their principal, the coefficients on principal experience and education may be upwardly biased. Second, principals are not randomly assigned to schools: for instance, principals who are more experienced may choose to work in lower-poverty schools. If it is easier for principals to
engender positive outcomes and higher teacher satisfaction in lower-poverty schools, this may also upwardly bias coefficients on measures of experience.

In general, because I am using a dataset that is generated from a large national survey, I can be fairly confident that the data are nationally representative—at least for schools/principals, the primary sampling unit. The tradeoff, however, is that the data are less detailed than some of the administrative datasets other researchers have used to conduct similar inquiries (e.g., Clark et al., 2009). As a result, I am relatively more limited in my ability to objectively assess school outcomes, to identify all key principal characteristics, and to control for observable factors that might be associated with principals’ effectiveness and characteristics.

VIII. DISCUSSION

Given my findings and the conflicting results of other similar studies, I would argue that it is not yet possible to create an empirically sound list of the precise characteristics belonging to effective principals. While some relationships between principal characteristics and quality are beginning to emerge, this body of research still suggests that certain characteristics should not be weighed too heavily in hiring decisions.

Beginning with my results related to principal experience, several characteristics—years of teaching, years as a principal, tenure at the current school, and prior positions held—do not appear to be strong predictors of principal quality, as measured by teachers’ ratings. Previous studies confirm this finding for principal tenure at the current school (Ballou & Podgursky, 1993; Brewer, 1993). Findings are mixed for the other variables that were studied previously: teaching experience and prior experience as a principal. While I expected my results might differ from those of studies that utilized student achievement as their dependent variable, it is more

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7 See Table 13 for a summary of my findings.
surprising that my results differ from Ballou and Podgursky’s (1993), given the similarities in our investigations. With respect to teaching experience, this may be the result of differing specifications. As I describe in my robustness checks section, my results align more closely with theirs—I find some evidence of a statistically significant positive relationship, rather than essentially no relationship—when I use their categorical variable specification.

The differing results related to principal experience are harder to explain, as our specifications are identical. Ballou and Podgursky (1993) find a negative relationship, while I find little evidence of a consistent relationship, though where one exists, it is positive. Perhaps some of the differences are due in part to disparities in the richness of our datasets. Ballou and Podgursky (1993) likely had access to a restricted-use version of the 1987-88 SASS, while my analysis is limited to the public-use 1999-2000 SASS. As a result, their regressions included more controls for the difficulty of the principal’s school assignment (e.g., median home values in the surrounding county, starting pay for teachers), and therefore could better control for the selection bias I describe in the previous section. The few positive relationships I identify may thus be the result of upward bias due to selection problems. On the other hand, the role of the principal may have evolved over the course of the 1990s, as accountability measures became more popular in some states. Perhaps the relationship between previous principal experience and principal quality, as measured by teachers’ ratings, has changed because of the new demands of principalship in the late 1990s.

My results are mostly inconclusive when it comes to principal self-efficacy, but are more consistent with respect to principals’ beliefs regarding top school goals. Self-efficacy appears to have little relationship with teacher ratings, although where a statistically significant relationship does exist, it is positive. To my knowledge, no one else has studied self-efficacy in this manner,
so I do not have results with which to compare mine. Principals’ beliefs around certain top school goals yielded the most consistent results across my models, compared to my other variables of interest. The combination of believing that academic excellence, basic literacy, and good work habits are important goals has a positive relationship with several teachers’ ratings variables. Similarly, Brewer (1993) found that believing academic excellence should be a top goal was positively associated with student achievement. It is not particularly surprising, though still useful for policymakers and district leaders to note, that principals who believe academic excellence is important are more likely to be effective, as measured by teachers’ ratings and student achievement.

From the credentialing perspective, this study provides some additional evidence that it may not be helpful to require principals to earn a master’s or other advanced degree in order to enter the profession. Both Ballou and Podgursky (1993) and Eberts and Stone (1988) came to similar conclusions in their papers, although Ballou and Podgursky find more consistent evidence of this relationship than either Eberts and Stone or I do. One important caveat here, however, is the lack of variation in my sample with respect to highest degree earned. The overwhelming majority of principals—88 percent—hold a master’s or similar degree, while 10 percent hold a doctorate and 2 percent possess a degree lower than a master’s. Ballou and Podgursky’s (1993) dataset had a very similar composition: 87.5 percent of principals earned a master’s, 9.6 percent held a doctorate, and roughly 3 percent had less than a master’s. Eberts and Stone (1988) did not provide sufficient documentation to determine whether they faced a similar problem. As a result, further study may be necessary to determine whether this finding is the result of sample composition and selection issues, rather than the effect of holding an advanced degree.
With respect to pre-service training as a credentialing requirement, it is unclear whether aspiring principals programs in general offer effective training for school leaders. Looking at a specific program, Corcoran et al. (2009) provide some evidence that the Aspiring Principals Program in New York City has produced positive results. It is perhaps these kinds of evaluations of particular programs that will be most useful for policymakers who can then identify and create evidence-based programs for training new principals.

Ultimately, the lack of clear, consistent relationships between principal quality and many characteristics may signal that less-easily measured traits—or at least those not documented in the current or previous studies—are more important determinants of principal quality. As such, district human resources departments would be wise to maintain a degree of flexibility in assessing principals’ qualifications while districts and outside researchers gather more information to develop a clearer picture of what effective principals look like.

All is not lost for district leaders, however. One finding that can provide them more direction relates to beliefs: principals who believe academic excellence, basic literacy, and good work habits should be top school goals may be more effective, as measured by teachers’ ratings. District leaders might consider screening candidates for these beliefs, as well as encouraging training programs to foster adherence to these values among aspiring principals.
IX. APPENDIX

Figure 1. Conceptual Model
Table 1. School Attribute Definitions

<table>
<thead>
<tr>
<th>School Attribute</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional Program</td>
<td>Curriculum, pedagogy, and other instructional policies.</td>
</tr>
<tr>
<td>School Culture</td>
<td>Agreement across the organization regarding values, beliefs, and norms</td>
</tr>
<tr>
<td></td>
<td>(Hallinger &amp; Heck, 1998).</td>
</tr>
<tr>
<td>School Goals</td>
<td>Goals related to school outcomes, as well as the school’s mission, vision,</td>
</tr>
<tr>
<td></td>
<td>and/or purposes.</td>
</tr>
<tr>
<td>Teacher Quality</td>
<td>Degree of effectiveness of all teachers, as measured by student achievement</td>
</tr>
<tr>
<td></td>
<td>or other outcomes.</td>
</tr>
<tr>
<td>Organizational Structure</td>
<td>Allocation of staff and other resources, systems and processes, etc.</td>
</tr>
</tbody>
</table>

Table 2. Theoretical Basis for Dependent Variables Selected (Principal Behaviors/Actions)

<table>
<thead>
<tr>
<th>School Attribute (As Defined in Table 1)</th>
<th>Principal Behavior/Action (As Defined by Waters et al., 2003) Associated with School Attribute</th>
<th>Question(s) from SASS Teacher Survey Used to Measure Behavior/Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional Program</td>
<td>Curriculum, instruction &amp; assessment: the extent to which the principal is directly involved in</td>
<td>The principal talks with me frequently about my instructional practice.</td>
</tr>
<tr>
<td></td>
<td>the design and implementation of curriculum, assessment, and instruction practices.</td>
<td></td>
</tr>
<tr>
<td>School Culture</td>
<td>Affirmation: the extent to which the principal recognizes and celebrates school accomplishments.</td>
<td>In this school, staff members are recognized for a job well done.</td>
</tr>
<tr>
<td>School Culture</td>
<td>Culture: the extent to which the principal fosters shared beliefs and a sense of community and</td>
<td>The school administration’s behavior toward the staff is supportive and encouraging. The principal knows what kind of school he/she wants and has communicated it to the staff.</td>
</tr>
<tr>
<td>School Culture/ Organizational Structure</td>
<td>Order: the extent to which the principal establishes a set of standard operating procedures and routines.</td>
<td>My principal enforces school rules for student conduct and backs me up when I need it.</td>
</tr>
<tr>
<td>School Goals</td>
<td>Focus: the extent to which the principal establishes clear goals and keeps those goals in the</td>
<td>The principal lets staff members know what is expected of them.</td>
</tr>
<tr>
<td></td>
<td>forefront of the school’s attention.</td>
<td></td>
</tr>
</tbody>
</table>
**Table 3. Theoretical Basis for Dependent Variables Selected (School Attributes)**

<table>
<thead>
<tr>
<th>School Attribute (As Defined in Table 1)</th>
<th>Key Component of the School Attribute(^a)</th>
<th>Question(s) from SASS Teacher Survey Used to Measure School Attribute Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>School Culture</td>
<td><strong>Staff cooperation:</strong> collaborative planning and collegial relationships among staff members (Purkey &amp; Smith, 1983).</td>
<td>There is a great deal of cooperative effort among the staff members.</td>
</tr>
<tr>
<td>School Culture/Organizational Structure</td>
<td><strong>Clear and consistent rules:</strong> clear and reasonable rules that are fairly and consistently enforced (Purkey &amp; Smith, 1983).</td>
<td>Rules for student behavior are consistently enforced by teachers in this school, even for students who are not in their classes.</td>
</tr>
<tr>
<td>School Culture/Organizational Structure</td>
<td><strong>Teacher working conditions:</strong> positive working conditions, such as access to needed resources and limited student misbehavior, increase teachers’ job satisfaction and effort (Leithwood et al., 2004).</td>
<td>Necessary materials such as textbooks, supplies, and copy machines are available as needed by staff. The level of student misbehavior in this school interferes with my teaching. I am generally satisfied with being a teacher at this school.</td>
</tr>
</tbody>
</table>

\(^a\)These school attributes represent sub-categories of the broader school attributes I include in my conceptual model. The relevant broader school attributes are listed in the left-hand column.
Table 4. Principal Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Experience</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years of teaching experience</td>
<td>14.0</td>
<td></td>
</tr>
<tr>
<td>Years as a principal</td>
<td>8.97</td>
<td></td>
</tr>
<tr>
<td>Years as principal of this school</td>
<td>5.09</td>
<td></td>
</tr>
<tr>
<td><strong>Experience (cont.)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous positions held</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department head</td>
<td>0.368</td>
<td></td>
</tr>
<tr>
<td>Curriculum specialist or coordinator</td>
<td>0.241</td>
<td></td>
</tr>
<tr>
<td>Assistant principal or program director</td>
<td>0.661</td>
<td></td>
</tr>
<tr>
<td>Guidance counselor</td>
<td>0.080</td>
<td></td>
</tr>
<tr>
<td><strong>Education &amp; training</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participated in aspiring principals program?</td>
<td>0.507</td>
<td></td>
</tr>
<tr>
<td><strong>Highest degree earned</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than master's</td>
<td>0.016</td>
<td></td>
</tr>
<tr>
<td>Master's or education specialist/professional diploma</td>
<td>0.884</td>
<td></td>
</tr>
<tr>
<td>Doctorate or first professional degree (e.g., JD)</td>
<td>0.100</td>
<td></td>
</tr>
<tr>
<td><strong>Beliefs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top three school goals: academics, literacy, work skills^a</td>
<td>0.248</td>
<td></td>
</tr>
<tr>
<td><strong>Beliefs (cont.)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-efficacy^b</td>
<td>4.36</td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.575</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 40</td>
<td>0.102</td>
<td></td>
</tr>
<tr>
<td>40 - 54</td>
<td>0.684</td>
<td></td>
</tr>
<tr>
<td>55 and over</td>
<td>0.214</td>
<td></td>
</tr>
<tr>
<td><strong>Race/ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>0.107</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>0.829</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.049</td>
<td></td>
</tr>
<tr>
<td><strong>Number of observations</strong></td>
<td></td>
<td>7,519</td>
</tr>
</tbody>
</table>
Note: Principal sampling weights have been applied.

\( a \) Principal’s top three school goals are encouraging academic excellence, building basic literacy skills, and promoting good work habits and self-discipline (order does not matter): 0 otherwise.

\( b \) Self-efficacy is measured on a scale of 1-5, with higher numbers corresponding to greater feelings of self-efficacy.

Table 5. Teachers’ Ratings of Principal/School

<table>
<thead>
<tr>
<th>Survey Question(^a)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>The school administration’s behavior toward the staff is supportive and encouraging.</td>
<td>0.790</td>
</tr>
<tr>
<td>The principal knows what kind of school he/she wants and has communicated it to the staff.</td>
<td>0.831</td>
</tr>
<tr>
<td>My principal enforces school rules for student conduct and backs me up when I need it.</td>
<td>0.824</td>
</tr>
<tr>
<td>The principal talks with me frequently about my instructional practice.</td>
<td>0.458</td>
</tr>
<tr>
<td>The principal lets staff members know what is expected of them.</td>
<td>0.878</td>
</tr>
<tr>
<td>In this school, staff members are recognized for a job well done.</td>
<td>0.686</td>
</tr>
<tr>
<td>There is a great deal of cooperative effort among the staff members.</td>
<td>0.784</td>
</tr>
<tr>
<td>Rules for student behavior are consistently enforced by teachers in this school, even for students who are not in their classes.</td>
<td>0.628</td>
</tr>
<tr>
<td>Necessary materials such as textbooks, supplies, and copy machines are available as needed by staff.</td>
<td>0.755</td>
</tr>
<tr>
<td>The level of student misbehavior in this school does not interfere with my teaching.</td>
<td>0.593</td>
</tr>
<tr>
<td>I am generally satisfied with being a teacher at this school.</td>
<td>0.900</td>
</tr>
</tbody>
</table>

Number of observations 36,838

Note: Teacher sampling weights have been applied.

\( a \) Originally rated on a scale of 1-4 where a higher number corresponds to a more positive rating of the school/principal (1=strongly agree, 4=strongly disagree). Collapsed into 0-1 variables, where 0 = 1 or 2 and 1 = 3 or 4, except for one variable, as noted below.

\( b \) Original question asked if misbehavior interfered with teaching, making this the only question where a higher number corresponded to a lower rating of the principal/school. Collapsed variable was flipped (0 = 3 or 4, 1 = 1 or 2), and the wording of the question was altered in this table to reflect the variable’s new meaning.
Table 6. Teacher Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.253</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>0.075</td>
</tr>
<tr>
<td>White</td>
<td>0.847</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.054</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years of teaching experience</td>
<td>14.8</td>
</tr>
</tbody>
</table>

Number of observations 36,838

Note: Teacher sampling weights have been applied.

Table 7. School Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urbanicity</td>
<td></td>
</tr>
<tr>
<td>Large or mid-size central city</td>
<td>0.228</td>
</tr>
<tr>
<td>Urban fringe of large or mid-size city</td>
<td>0.449</td>
</tr>
<tr>
<td>Small town/rural</td>
<td>0.323</td>
</tr>
<tr>
<td>Percent minority students</td>
<td></td>
</tr>
<tr>
<td>Less than 5%</td>
<td>0.261</td>
</tr>
<tr>
<td>5% to 19%</td>
<td>0.253</td>
</tr>
<tr>
<td>20% to 49%</td>
<td>0.218</td>
</tr>
<tr>
<td>50% or more</td>
<td>0.268</td>
</tr>
<tr>
<td>School level</td>
<td></td>
</tr>
<tr>
<td>Elementary</td>
<td>0.716</td>
</tr>
<tr>
<td>Secondary</td>
<td>0.249</td>
</tr>
<tr>
<td>Combined</td>
<td>0.035</td>
</tr>
<tr>
<td>Total enrollment</td>
<td></td>
</tr>
<tr>
<td>Less than 300</td>
<td>0.272</td>
</tr>
<tr>
<td>300 to 499</td>
<td>0.275</td>
</tr>
<tr>
<td>500 or more</td>
<td>0.452</td>
</tr>
</tbody>
</table>

Number of observations 7,519

Note: School sampling weights have been applied.
### Table 8. Linear Probability Model: Principal Action/Behavior Dependent Variables

<table>
<thead>
<tr>
<th>Principal characteristics</th>
<th>(1) P. supportive, encouraging</th>
<th>(2) P. knows kind of school wanted</th>
<th>(3) P. enforces rules/backs me up</th>
<th>(4) P. discusses instruct’l practice</th>
<th>(5) P. lets staff know expectations</th>
<th>(6) Staff recognized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years of teaching experience</td>
<td>0.002 (0.002)</td>
<td>0.001 (0.002)</td>
<td>0.001 (0.002)</td>
<td>0.002 (0.003)</td>
<td>0.001 (0.002)</td>
<td>0.004 (0.003)</td>
</tr>
<tr>
<td>Years as a principal</td>
<td>0.001 (0.002)</td>
<td>0.002 (0.002)</td>
<td>0.001 (0.002)</td>
<td>-0.003 (0.002)</td>
<td>0.002* (0.001)</td>
<td>-0.003 (0.002)</td>
</tr>
<tr>
<td>Years as principal of this school</td>
<td>0.0002 (0.003)</td>
<td>0.001 (0.002)</td>
<td>-0.005** (0.002)</td>
<td>0.003 (0.003)</td>
<td>0.001 (0.002)</td>
<td>0.005 (0.003)</td>
</tr>
<tr>
<td>Previous positions held</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department head</td>
<td>0.0003 (0.008)</td>
<td>0.006 (0.008)</td>
<td>0.010 (0.007)</td>
<td>-0.005 (0.010)</td>
<td>0.002 (0.006)</td>
<td>0.002 (0.009)</td>
</tr>
<tr>
<td>Curriculum specialist</td>
<td>0.005 (0.010)</td>
<td>0.008 (0.008)</td>
<td>-0.005 (0.009)</td>
<td>-0.0004 (0.012)</td>
<td>-0.006 (0.007)</td>
<td>0.005 (0.011)</td>
</tr>
<tr>
<td>Asst. principal/program director</td>
<td>0.009 (0.010)</td>
<td>0.0004 (0.009)</td>
<td>0.010 (0.009)</td>
<td>-0.009 (0.012)</td>
<td>0.003 (0.008)</td>
<td>-0.003 (0.011)</td>
</tr>
<tr>
<td>Guidance counselor</td>
<td>0.006 (0.014)</td>
<td>-0.008 (0.012)</td>
<td>-0.006 (0.013)</td>
<td>-0.006 (0.016)</td>
<td>0.005 (0.010)</td>
<td>-0.009 (0.015)</td>
</tr>
<tr>
<td>Education &amp; training</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did aspiring principals program?</td>
<td>0.006 (0.008)</td>
<td>0.006 (0.007)</td>
<td>0.004 (0.007)</td>
<td>-0.009 (0.010)</td>
<td>-0.004 (0.006)</td>
<td>0.013 (0.009)</td>
</tr>
<tr>
<td>Highest degree earneda</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master's</td>
<td>-0.025 (0.037)</td>
<td>-0.066*** (0.025)</td>
<td>-0.051* (0.026)</td>
<td>0.031 (0.066)</td>
<td>-0.033 (0.025)</td>
<td>-0.024 (0.048)</td>
</tr>
<tr>
<td>Doctorate</td>
<td>-0.047 (0.039)</td>
<td>-0.071** (0.028)</td>
<td>-0.062** (0.028)</td>
<td>0.039 (0.067)</td>
<td>-0.042 (0.027)</td>
<td>-0.003 (0.050)</td>
</tr>
</tbody>
</table>
Beliefs

<table>
<thead>
<tr>
<th></th>
<th>0.013</th>
<th>0.009</th>
<th>-0.001</th>
<th>0.009</th>
<th>0.009</th>
<th>0.019**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-efficacy</td>
<td>(0.009)</td>
<td>(0.007)</td>
<td>(0.008)</td>
<td>(0.010)</td>
<td>(0.006)</td>
<td>(0.009)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>0.021**</th>
<th>0.020**</th>
<th>0.030***</th>
<th>-0.00004</th>
<th>0.013**</th>
<th>0.008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top three school goals: academics, literacy, work habits</td>
<td>(0.009)</td>
<td>(0.008)</td>
<td>(0.008)</td>
<td>(0.011)</td>
<td>(0.007)</td>
<td>(0.010)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>0.032</th>
<th>0.027</th>
<th>0.027</th>
<th>0.058</th>
<th>0.017</th>
<th>0.046</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: N = 36,838 for all regressions. *** p<0.01, ** p<0.05, * p<0.1. Standard errors (in parentheses) clustered by principal identification number. Teacher sampling weights were applied in all regressions. Each regression utilized a different dependent variable. For all dependent variables, 1 = teacher strongly or somewhat agrees with the statement; 0 = strongly or somewhat disagrees. See Tables 2 and 3 for more details about dependent variables. In addition to the variables in the table, the model also included several control variables. Principal-level controls: squared terms for the three years of experience variables, salary, gender, race/ethnicity, and age. School-level controls: urbanicity (central city, city fringe, small town/rural), census region, total enrollment, percent minority students, number of FTE teachers, percent minority teachers, school program type (e.g., alternative school), and school level (elementary, secondary, combined). Teacher-level controls: gender, race/ethnicity, age, years of teaching experience, years of teaching experience squared, years of teaching at this school, years of teaching at this school squared, highest degree earned, union membership, satisfaction with salary, and whether the principal hired the teacher. Principal hired teacher variable constructed in the manner conceived by Ballou and Podgursky (1993): 1 = principal reports considerable influence over hiring decisions and teacher’s tenure at school < principal’s tenure at school; 0 otherwise. Also included interactions between (1) principal race/ethnicity and teacher race/ethnicity and (2) principal gender and teacher gender to control for differences in ratings based on gender or race/ethnicity similarities and differences identified by Ballou and Podgursky. 

a Reference category = less than a master’s degree.
b Self-efficacy is measured on a scale of 1-5, with higher numbers corresponding to greater feelings of self-efficacy.
c 1 = principal’s top three school goals are encouraging academic excellence, building basic literacy skills, and promoting good work habits and self-discipline (order does not matter); 0 otherwise.
## Table 9. Linear Probability Model: School Attribute Dependent Variables

<table>
<thead>
<tr>
<th>Principal characteristics</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperative effort among staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rules consistently enforced</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nec. materials available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of misbehav. does not interfere</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generally satisfied</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years of teaching experience</td>
<td>0.004*</td>
<td>0.002</td>
<td>0.001</td>
<td>0.001</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Years as a principal</td>
<td>0.001</td>
<td>0.001</td>
<td>0.002</td>
<td>0.001</td>
<td>0.002**</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Years as principal of this school</td>
<td>0.002</td>
<td>0.00008</td>
<td>0.006**</td>
<td>0.008***</td>
<td>-0.0003</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.003)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Previous positions held</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department head</td>
<td>-0.007</td>
<td>-0.006</td>
<td>-0.001</td>
<td>-0.017*</td>
<td>0.007</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.009)</td>
<td>(0.009)</td>
<td>(0.010)</td>
<td>(0.005)</td>
</tr>
<tr>
<td>Curriculum specialist</td>
<td>-0.004</td>
<td>-0.016</td>
<td>-0.003</td>
<td>-0.009</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.011)</td>
<td>(0.011)</td>
<td>(0.012)</td>
<td>(0.007)</td>
</tr>
<tr>
<td>Asst. principal/program director</td>
<td>0.002</td>
<td>0.005</td>
<td>0.004</td>
<td>0.005</td>
<td>0.008</td>
</tr>
<tr>
<td></td>
<td>(0.009)</td>
<td>(0.011)</td>
<td>(0.011)</td>
<td>(0.012)</td>
<td>(0.007)</td>
</tr>
<tr>
<td>Guidance counselor</td>
<td>-0.004</td>
<td>-0.012</td>
<td>0.011</td>
<td>0.008</td>
<td>0.012</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>(0.017)</td>
<td>(0.014)</td>
<td>(0.016)</td>
<td>(0.009)</td>
</tr>
<tr>
<td>Education &amp; training</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did aspiring principals program?</td>
<td>0.007</td>
<td>0.015</td>
<td>-0.001</td>
<td>-0.012</td>
<td>-0.005</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.009)</td>
<td>(0.008)</td>
<td>(0.010)</td>
<td>(0.005)</td>
</tr>
<tr>
<td>Highest degree earned</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master's</td>
<td>-0.018</td>
<td>-0.037</td>
<td>-0.022</td>
<td>0.004</td>
<td>0.033</td>
</tr>
<tr>
<td></td>
<td>(0.037)</td>
<td>(0.044)</td>
<td>(0.045)</td>
<td>(0.056)</td>
<td>(0.029)</td>
</tr>
<tr>
<td>Doctorate</td>
<td>-0.027</td>
<td>-0.024</td>
<td>-0.045</td>
<td>0.007</td>
<td>0.037</td>
</tr>
<tr>
<td></td>
<td>(0.039)</td>
<td>(0.046)</td>
<td>(0.047)</td>
<td>(0.058)</td>
<td>(0.030)</td>
</tr>
</tbody>
</table>
Beliefs

<table>
<thead>
<tr>
<th>Self-efficacy&lt;sup&gt;b&lt;/sup&gt;</th>
<th>-0.002</th>
<th>-0.004</th>
<th>0.018*</th>
<th>0.008</th>
<th>0.002</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.008)</td>
<td>(0.009)</td>
<td>(0.009)</td>
<td>(0.010)</td>
<td>(0.005)</td>
<td></td>
</tr>
</tbody>
</table>

Top three school goals: academics, literacy, work habits<sup>c</sup>

<table>
<thead>
<tr>
<th></th>
<th>0.020**</th>
<th>0.016</th>
<th>0.008</th>
<th>0.0003</th>
<th>0.008</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.009)</td>
<td>(0.010)</td>
<td>(0.010)</td>
<td>(0.011)</td>
<td>(0.006)</td>
<td></td>
</tr>
</tbody>
</table>

R-squared

<table>
<thead>
<tr>
<th></th>
<th>0.035</th>
<th>0.097</th>
<th>0.056</th>
<th>0.048</th>
<th>0.030</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(0.009)</td>
<td>(0.010)</td>
<td>(0.010)</td>
<td>(0.011)</td>
<td></td>
</tr>
</tbody>
</table>

Notes: N = 36,838 for all regressions. *** p<0.01, ** p<0.05, * p<0.1. Standard errors (in parentheses) clustered by principal identification number. Teacher sampling weights were applied in all regressions.

Each regression utilized a different dependent variable. For all dependent variables, 1 = teacher strongly or somewhat agrees with the statement; 0 = strongly or somewhat disagrees. See Tables 2 and 3 for more details about dependent variables.

In addition to the variables in the table, the model also included several control variables. Principal-level controls: squared terms for the three years of experience variables, salary, gender, race/ethnicity, and age. School-level controls: urbanicity (central city, city fringe, small town/rural), census region, total enrollment, percent minority students, number of FTE teachers, percent minority teachers, school program type (e.g., alternative school), and school level (elementary, secondary, combined). Teacher-level controls: gender, race/ethnicity, age, years of teaching experience, years of teaching experience squared, years of teaching at this school, years of teaching at this school squared, highest degree earned, union membership, satisfaction with salary, and whether the principal hired the teacher. Principal hired teacher variable constructed in the manner conceived by Ballou and Podgursky (1993): 1 = principal reports considerable influence over hiring decisions and teacher’s tenure at school < principal’s tenure at school; 0 otherwise. Also included interactions between (1) principal race/ethnicity and teacher race/ethnicity and (2) principal gender and teacher gender to control for differences in ratings based on gender or race/ethnicity similarities and differences identified by Ballou and Podgursky.

<sup>a</sup> Reference category = less than a master’s degree.

<sup>b</sup> Self-efficacy is measured on a scale of 1-5, with higher numbers corresponding to greater feelings of self-efficacy.

<sup>c</sup> 1 = principal’s top three school goals are encouraging academic excellence, building basic literacy skills, and promoting good work habits and self-discipline (order does not matter); 0 otherwise.
### Table 10. OLS Model: Index Dependent Variables

<table>
<thead>
<tr>
<th>Principal characteristics</th>
<th>(12) Index: all dep. vars.</th>
<th>(13) Index: all p. action dep. vars.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years of teaching experience</td>
<td>0.002</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>Years as a principal</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Years as principal of this school</td>
<td>0.002</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>Previous positions held</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department head</td>
<td>-0.001</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.006)</td>
</tr>
<tr>
<td>Curriculum specialist</td>
<td>-0.002</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.007)</td>
</tr>
<tr>
<td>Asst. principal/program director</td>
<td>0.003</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.007)</td>
</tr>
<tr>
<td>Guidance counselor</td>
<td>-0.0002</td>
<td>-0.003</td>
</tr>
<tr>
<td></td>
<td>(0.009)</td>
<td>(0.010)</td>
</tr>
<tr>
<td>Education &amp; training</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did aspiring principals program?</td>
<td>0.002</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.006)</td>
</tr>
<tr>
<td>Highest degree earned</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master's</td>
<td>-0.019</td>
<td>-0.028</td>
</tr>
<tr>
<td></td>
<td>(0.028)</td>
<td>(0.027)</td>
</tr>
<tr>
<td>Doctorate</td>
<td>-0.022</td>
<td>-0.031</td>
</tr>
<tr>
<td></td>
<td>(0.029)</td>
<td>(0.028)</td>
</tr>
</tbody>
</table>
Beliefs

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-efficacy</td>
<td>0.007</td>
<td>0.010</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.006)</td>
</tr>
<tr>
<td>Top three school goals: academics, literacy, work habits</td>
<td>0.013**</td>
<td>0.015**</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.006)</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.080</td>
<td>0.056</td>
</tr>
</tbody>
</table>

Notes: N = 36,838 for all regressions. *** p<0.01, ** p<0.05, * p<0.1. Standard errors (in parentheses) clustered by principal identification number. Teacher sampling weights were applied in all regressions.

In addition to the variables in the table, the model also included several control variables. Principal-level controls: squared terms for the three years of experience variables, salary, gender, race/ethnicity, and age. School-level controls: urbanicity (central city, city fringe, small town/rural), census region, total enrollment, percent minority students, number of FTE teachers, percent minority teachers, school program type (e.g., alternative school), and school level (elementary, secondary, combined). Teacher-level controls: gender, race/ethnicity, age, years of teaching experience, years of teaching experience squared, years of teaching at this school, years of teaching at this school squared, highest degree earned, union membership, satisfaction with salary, and whether the principal hired the teacher. Principal hired teacher variable constructed in the manner conceived by Ballou and Podgursky (1993): 1 = principal reports considerable influence over hiring decisions and teacher’s tenure at school < principal’s tenure at school; 0 otherwise. Also included interactions between (1) principal race/ethnicity and teacher race/ethnicity and (2) principal gender and teacher gender to control for differences in ratings based on gender or race/ethnicity similarities and differences identified by Ballou and Podgursky.

a Index (average) of all 11 dependent variables listed in Table 5. Before creating this index variable, I conducted a Cronbach’s alpha test to ensure the 11 original variables were sufficiently internally consistent to create an index. Alpha = 0.7795.

b Index (average) of the six principal behavior/action dependent variables. Before creating this index variable, I conducted a Cronbach’s alpha test to ensure the six original variables were sufficiently internally consistent to create an index. Alpha = 0.7718.

c Reference category = less than a master’s degree.

d Self-efficacy is measured on a scale of 1-5, with higher numbers corresponding to greater feelings of self-efficacy.

e 1 = principal’s top three school goals are encouraging academic excellence, building basic literacy skills, and promoting good work habits and self-discipline (order does not matter); 0 otherwise.
### Table 11. Linear Probability Model vs. Logistic Regression Results

<table>
<thead>
<tr>
<th>Principal characteristics</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LPM&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Logit&lt;sup&gt;b&lt;/sup&gt;</td>
<td>LPM</td>
<td>Logit</td>
<td>LPM</td>
<td>Logit</td>
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<tr>
<td>Experience</td>
<td></td>
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<tr>
<td>Years of teaching experience</td>
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<tr>
<td>Years as a principal</td>
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<tr>
<td>Years as principal of this school</td>
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<tr>
<td>Previous positions held</td>
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<tr>
<td>Department head</td>
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<tr>
<td>Curriculum specialist</td>
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<tr>
<td>Asst. principal/program dir.</td>
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<tr>
<td>Guidance counselor</td>
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<tr>
<td>Education &amp; training</td>
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<tr>
<td>Highest degree earned</td>
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<tr>
<td>Master's</td>
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<tr>
<td>Doctorate</td>
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<tr>
<td>Beliefs</td>
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<tr>
<td>Self-efficacy</td>
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<tr>
<td>Top three school goals:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>academics, literacy, work habits</td>
<td>0.021**</td>
<td>0.022**</td>
<td>0.020**</td>
<td>0.021**</td>
<td>0.030***</td>
<td>0.030***</td>
</tr>
<tr>
<td>Notes: *** p&lt;0.01, ** p&lt;0.05, * p&lt;0.1. Results only reported if statistically significant in both LPM and logistic regressions. Independent and dependent variables with no results that meet this requirement are excluded from this table.</td>
<td></td>
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</tr>
</tbody>
</table>

<sup>a</sup> Numbers reported in this column and in subsequent columns with this header are LPM coefficients.

<sup>b</sup> Numbers reported in this column and in subsequent columns with this header are odds ratios that were converted to numbers comparable to LPM coefficients. To calculate these numbers, I converted the logistic odds ratios to proportions. The numbers reported here are the difference between the baseline group proportions and the non-baseline group proportions predicted by the odds ratio estimate.
### Table 12. Linear Probability Model vs. Logistic Regression Results (Cont.)

<table>
<thead>
<tr>
<th>Principal characteristics</th>
<th>(7) LPM</th>
<th>(8) Logit</th>
<th>(9) LPM</th>
<th>(10) Logit</th>
<th>(11) LPM</th>
<th>(11) Logit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperative effort among staff</td>
<td>LPM</td>
<td>Logit</td>
<td>LPM</td>
<td>Logit</td>
<td>LPM</td>
<td>Logit</td>
</tr>
<tr>
<td>Nec. materials available</td>
<td></td>
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<tr>
<td>Level of misbeh. does not interfere</td>
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<tr>
<td>Generally satisfied</td>
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<tr>
<td>Experience</td>
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</tr>
<tr>
<td>Years of teaching experience</td>
<td>0.004*</td>
<td>0.004*</td>
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</tr>
<tr>
<td>Years as a principal</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>0.002** 0.002**</td>
</tr>
<tr>
<td>Years as principal of this school</td>
<td>0.006**</td>
<td>0.006**</td>
<td>0.008***</td>
<td>0.009***</td>
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<tr>
<td>Previous positions held</td>
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<tr>
<td>Department head</td>
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<td></td>
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<td>-0.017* -0.017*</td>
</tr>
<tr>
<td>Curriculum specialist</td>
<td></td>
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<tr>
<td>Asst. principal/program director</td>
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<tr>
<td>Guidance counselor</td>
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<td></td>
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<tr>
<td>Education &amp; training</td>
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<tr>
<td>Highest degree earned</td>
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<tr>
<td>Master’s</td>
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<tr>
<td>Doctorate</td>
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<tr>
<td>Beliefs</td>
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<tr>
<td>Self-efficacy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.018* 0.019**</td>
</tr>
<tr>
<td>Top three school goals: academics, literacy, work habits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.020** 0.021**</td>
</tr>
</tbody>
</table>

**Notes:** *** p<0.01, ** p<0.05, * p<0.1. Results only reported if statistically significant in both LPM and logistic regressions. Independent and dependent variables with no results that meet this requirement are excluded from this table.

*a* Numbers reported in this column and in subsequent columns with this header are LPM coefficients.

*b* Numbers reported in this column and in subsequent columns with this header are odds ratios that were converted to numbers comparable to LPM coefficients. To calculate these numbers, I converted the logistic odds ratios to proportions. The numbers reported here are the difference between the baseline group proportions and the non-baseline group proportions predicted by the odds ratio estimate.
Table 13. Summary of Results

<table>
<thead>
<tr>
<th>Principal Characteristics</th>
<th>Relationship?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience</td>
<td></td>
</tr>
<tr>
<td>Years of teaching experience</td>
<td>n.s./+</td>
</tr>
<tr>
<td>Years as a principal</td>
<td>m.s./+</td>
</tr>
<tr>
<td>Years as principal of this school</td>
<td>mixed</td>
</tr>
<tr>
<td>Previous positions held</td>
<td></td>
</tr>
<tr>
<td>Department head</td>
<td>n.s.</td>
</tr>
<tr>
<td>Curriculum specialist</td>
<td>n.s.</td>
</tr>
<tr>
<td>Asst. principal/program director</td>
<td>n.s.</td>
</tr>
<tr>
<td>Guidance counselor</td>
<td>n.s.</td>
</tr>
<tr>
<td>Education &amp; training</td>
<td></td>
</tr>
<tr>
<td>Did aspiring principals program?</td>
<td>n.s.</td>
</tr>
<tr>
<td>Highest degree earned</td>
<td></td>
</tr>
<tr>
<td>Master's</td>
<td>m.s./−</td>
</tr>
<tr>
<td>Doctorate</td>
<td>−</td>
</tr>
<tr>
<td>Beliefs</td>
<td></td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>m.s./+</td>
</tr>
<tr>
<td>Top three school goals: academics, literacy, work habits</td>
<td>+</td>
</tr>
</tbody>
</table>

**Notes:**

1) n.s. = results are *non-significant* for 12 or 13 (out of 13) dependent variables
2) n.s./+ = results are sensitive to specification; one specification yields mostly *non-significant* results, while another provides evidence of a *positive* relationship
3) m.s./+ = results for one or two dependent variables are significant or *marginally significant* (p<0.1); when results are significant, they indicate a *positive* relationship
4) m.s./− = results for one or two dependent variables are significant or *marginally significant* (p<0.1); when results are significant, they indicate a *negative* relationship
5) mixed = results are significant for more than two dependent variables, but the relationship's direction is inconsistent
6) + = results are significant for two or more dependent variables and indicate a *positive* relationship
7) − = results are significant for two or more dependent variables and indicate a *negative* relationship
Table 14. Correlations Between Dependent Variables and Other Teacher Satisfaction Measures

<table>
<thead>
<tr>
<th></th>
<th>P. supportive, encouraging</th>
<th>P. knows kind of school wanted</th>
<th>P. enforces rules/back me up</th>
<th>P. discusses instruct'l practice</th>
<th>P. lets staff know expectations</th>
<th>Staff recognized</th>
</tr>
</thead>
<tbody>
<tr>
<td>T. not worried about job&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.05</td>
<td>0.01</td>
<td>0.04</td>
<td>-0.05</td>
<td>0.02</td>
<td>0.04</td>
</tr>
<tr>
<td>T. satisfied with salary&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.09</td>
<td>0.07</td>
<td>0.07</td>
<td>0.05</td>
<td>0.05</td>
<td>0.12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Cooperative effort among staff</th>
<th>Rules consistently enforced</th>
<th>Nec. materials available</th>
<th>Level of misbehav. does not interfere</th>
<th>Generally satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>T. not worried about job&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.03</td>
<td>0.00&lt;sup&gt;l&lt;/sup&gt;</td>
<td>0.09</td>
<td>0.13</td>
<td>0.07</td>
</tr>
<tr>
<td>T. satisfied with salary&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.07</td>
<td>0.08</td>
<td>0.09</td>
<td>0.09</td>
<td>0.09</td>
</tr>
</tbody>
</table>

Notes: All correlations in this table are statistically significant (p<0.01), except for one, which is not statistically significant and is identified with a ⬤ symbol.

<sup>a</sup>1 = teacher strongly or somewhat disagrees with the statement “I worry about the security of my job because of the performance of my students on state or local tests”; 0 = teacher strongly or somewhat agrees.

<sup>b</sup>1 = teacher strongly or somewhat agrees with the statement “I am satisfied with my teaching salary”; 0 = teacher strongly or somewhat disagrees.
Table 15. Correlations Between Teacher and Principal Perceptions of School Problems

<table>
<thead>
<tr>
<th>Problem</th>
<th>Correlation between teacher and principal views</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student tardiness</td>
<td>0.33</td>
</tr>
<tr>
<td>Student absenteeism</td>
<td>0.38</td>
</tr>
<tr>
<td>Class cutting</td>
<td>0.53</td>
</tr>
<tr>
<td>Physical conflicts</td>
<td>0.24</td>
</tr>
<tr>
<td>Theft</td>
<td>0.19</td>
</tr>
<tr>
<td>Vandalism</td>
<td>0.22</td>
</tr>
<tr>
<td>Student pregnancy</td>
<td>0.59</td>
</tr>
<tr>
<td>Alcohol use</td>
<td>0.57</td>
</tr>
<tr>
<td>Disrespect for teachers</td>
<td>0.23</td>
</tr>
<tr>
<td>Student apathy</td>
<td>0.26</td>
</tr>
<tr>
<td>Parental involvement</td>
<td>0.33</td>
</tr>
<tr>
<td>Poverty</td>
<td>0.50</td>
</tr>
<tr>
<td>Unprepared students</td>
<td>0.28</td>
</tr>
<tr>
<td>Student health</td>
<td>0.23</td>
</tr>
</tbody>
</table>

a Teachers and principals were asked identical questions about the extent to which each problem exists at their school. 1 = serious problem; 4 = not a problem.

b All correlations in this column are statistically significant (p<0.01).
X. REFERENCES


