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Do Mentoring and Induction Programs Have Greater Benefits for Teachers Who Lack Preservice Training?

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The purpose of this paper is to examine the impact of mentoring and induction programs on teacher retention, as measured by teachers' commitment to their profession. Using data from the 1999-2000 Schools and Staffing Survey, we perform logistic regression analyses to model the effect of induction and its different components on teacher commitment, and compare the marginal impact of induction programs on teachers with and without degrees in education. Our results show that teachers who have had mentors or gone through induction programs in their first year of teaching are more likely to be committed to the teaching profession. Moreover, mentoring and induction programs have a greater marginal benefit for teachers without education degrees than for those with education degrees. Based on our results, we recommend that districts (1) provide mentoring and induction programs for all teachers, and (2) allow school-level flexibility in tailoring induction and mentoring programs. [1]

Introduction

In the landmark No Child Left Behind school accountability legislation,

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the U.S. government acknowledged the importance of "highly qualified" teachers in promoting high student achievement. As teachers from the baby boom generation begin to retire, schools must find new teachers to fill these vacancies. Unfortunately, over the last decade, new teachers (i.e., those with fewer than four years of full-time teaching experience) are more likely to leave teaching or move to another school than any other experience level (Tabs 2004, 9). Many cite lack of support or poor preparation as justifications for leaving their current teaching positions. This turnover costs schools and teacher preparation programs time and money as they continually must find and prepare new educators. Some schools and districts attempt to stem the tide of new teacher attrition through comprehensive induction programs that include mentoring. These programs seek to address the support and preparation issues cited by departing teachers as the cause of their dissatisfaction.

In the 1999-2000 school year, approximately 232,000 individuals entered the teaching profession. One year later, about 287,000 teachers left the occupation, the majority of them far short of retirement age (Ingersoll 2003). In part because of the necessity created by these unprecedented classroom vacancies, many school systems have established "emergency" or "alternative" certification programs designed to place participants in the classroom as soon as possible. Unlike traditional education degree programs at colleges and universities, many of these lateral entry programs require fewer hours of preservice coursework and student teaching. Instead, they require observation and seminar meetings after the participant begins full-time teaching.

Given the rising popularity of these lateral entry programs and the increasing evidence that perceptions of poor preparation and support lead novice teachers to leave the profession at higher rates, one might expect that comprehensive induction programs would have a positive effect on teacher commitment and thus retention. This may be particularly true among teachers lacking significant preservice coursework in educational theory and practice (i.e., teachers lacking a bachelor's degree in education). To examine this theory, we test three hypotheses:

1. Mentoring and induction will have a positive effect on teacher commitment.

2. The positive effects of mentoring and induction on retention will be greater for teachers who have not had the extensive preservice training required to complete a bachelor's degree in education.

3. More comprehensive mentoring and induction programs (i.e., those that incorporate numerous induction strategies concurrently) will yield stronger positive effects on teacher retention for teachers without degrees in education.

Our research goes beyond previous efforts by attempting to link induction programs with the amount of preservice education training. Previous studies (including Smith and Ingersoll 2004; Moir 2003) find that induction programs can reduce teacher attrition by helping teachers feel more prepared, but they fail to specifically target those teachers whose lateral entry to teaching provided them with less preparation. Previous studies (including Gitomer, Latham and Ziomek 1999; Goe 2002) also find evidence of deficiencies in teachers who pursue these alternative paths to the classroom without considering whether induction programs may make up for a lack of preservice training.

Using data from the teacher and school portions of the 1999-2000 Schools and Staffing Survey, we performed logistic regressions to test these hypotheses. Based on our results, we conclude that mentoring and induction programs positively affect teachers' commitment to the profession and that this positive effect is stronger on teachers who do not have bachelor's degrees in education than on those who do. We also isolated particular features of induction programs as more effective than others in reducing the likelihood of attrition among teachers with and without education degrees. Consequently, we recommend the following two policies for districts to implement in order to improve turnover rates: (1) increase access to mentoring and induction programs for all beginning teachers, and (2) allow campus-level discretion in tailoring induction and mentoring to meet local needs

Literature Review

Comparing Teacher Training Programs

The increasing popularity of lateral entry teacher preparation programs raises a philosophical question about how new teachers best learn to teach. Proponents of lateral entry programs argue that teaching skills can be picked up "on-the-job" as long as new teachers possess subject matter expertise. In contrast, supporters of traditional, university-based education degree programs defend the importance of preservice professional training in theory and practice (Stoddart and Floden 1995, 9).

In a meta-analysis of various measures of teacher preparation, Wilson, Floden and Ferrini-Mundy (2002) find education coursework a better

predictor of teaching success than subject matter major or GPA prior to entering the lateral entry program. Teachers credit their education coursework with providing essential instructional and disciplinary skills. However, critics argue that the considerable variation among teacher training programs renders evaluations of such programs questionable, if not impossible. Data limitations prevent most studies from directly linking the content of education coursework to student achievement. Instead, many studies use teacher certification status or teachers' scores on standardized certification examinations as proxies for the degree of pedagogical training (Goldhaber and Anthony 2003, 11).

Although many lateral entry programs do require professional training, most demand fewer hours of preservice formal educational coursework, and instead require more hours of supervised field experience as a full-time teacher (Stoddart and Floden 1995, 8). However, formal preservice coursework provides the information that most states deem essential for new teachers. Gitomer, Latham and Ziomek (1999, 24) find that educational coursework improves teachers' performance on the Educational Testing Service's Praxis II tests, the most widely used licensure tests in the country.

Several studies conclude that certified teachers elicit greater student achievement than uncertified teachers. Goe (2002) finds evidence that California schools with higher percentages of teachers with emergency permits display lower levels of student achievement as reflected by the state Academic Performance Index (API), even after controlling for students' socioeconomic status, racial identification, and parents' educational backgrounds. These controls are essential, since most unlicensed teachers find placements in low-performing, high-poverty urban schools.

In another California-based study, Laczko-Kerr and Berliner (2003) consider "undercertified" teachers, including teachers with no education coursework and those with some coursework but not enough to fulfill formal certification requirements. They find that students of certified teachers outscore students of undercertified teachers on the Stanford-9 Achievement Tests. They conclude that students of certified teachers gain about two months of achievement on a grade-equivalent scale, translating into a 20 percent penalty in academic growth for every year with an undercertified teacher.

Several studies evaluating the effect of teacher certification focus exclusively on mathematics classes, since this subject faces greater teacher shortages than other subjects assessed by standardized tests. Goldhaber and Brewer (2000) find that having a certified math teacher results in at

least a 1.3 point increase on the state assessment test. Monk (1994) finds that additional education courses on teaching mathematics have a greater positive effect on student achievement than do additional college mathematics courses. He concludes that subject area competence—the chief qualification of many alternative route teachers—is a "necessary but not a sufficient condition" for effective teaching (Monk 1994, 142).

In addition to actual teaching practice, traditional certification programs provide teachers with a sense of confidence in their abilities, which translates into greater teacher efficacy (Laczko-Kerr and Berliner 2003, 37). According to a survey of beginning teachers in New York City, more certified teachers feel adequately prepared than noncertified teachers (Darling-Hammond, Chung, and Frelow 2002). Uncertified teachers show a weaker sense of responsibility for student learning, as they are more likely to blame poor student performance on the students and their home environments. Teachers' sense of preparedness is significantly correlated to their perceived teaching efficacy. Teachers who feel poorly prepared are also more likely to teach only until "something better comes along" (Darling-Hammond, Chung, and Frelow 2002).

Importance of Induction

Alternate routes of teacher preparation assume that school staffs will support unprepared teachers as they begin their service. Unfortunately, limited resources on individual campuses often yield insufficient support for new teachers who emerge from lateral entry programs (Laczko-Kerr and Berliner 2003, 37). Because they work autonomously in individual classrooms, new teachers lack easy access to more experienced educators. To better address the concerns of and difficulties faced by new teachers, schools can explicitly endorse induction programs to build a professional culture of collaboration and problem solving (Feiman-Nemser 2003, 25).

Robinson (1998) used a meta-analysis of various induction models to identify the key components of an effective induction program. New teachers should have mentors within their teaching fields. Mentor-novice interactions should encompass teaching field materials and techniques as well as school-specific policies. Schools should assign novices limited teaching responsibilities so that they have extra time to prepare curriculum and observe their mentors and other experienced teachers in their classrooms.

The key political justification for investing in induction programs is to prevent teacher attrition. Schools require adequate staffing with qualified teachers to maintain and improve student achievement. Additionally, at-

trition imposes significant costs on the education system as it must prepare more teachers to fill classroom vacancies. Currently, after the first year of teaching, 15 percent of new teachers move to another school, and 14 percent leave teaching altogether (Smith and Ingersoll 2004, 694). Attrition rates are even greater at high-poverty schools, where teachers must contend with fewer resources, poorer working conditions, and needier students (Darling-Hammond 2003, 7).

Several studies find that attrition rates are higher for teachers with less formal preservice preparation. Darling-Hammond (2003) reviews studies showing higher than average attrition for alternative route and uncertified teachers in California, Massachusetts, and Texas. According to the National Center for Education Statistics, new teachers whose preservice training included student teaching had a 15 percent attrition rate over five years, compared to a 29 percent rate among those who lacked student teaching experience (Heinke, Chen, and Geis 2000, 49).

Growing evidence indicates that comprehensive induction programs can reduce attrition rates among new teachers. "Induction" can incorporate a variety of supports for new teachers, "from a single orientation meeting at the beginning of a school year to a highly structured program involving multiple activities and frequent meetings over a period of several years" (Smith and Ingersoll 2004, 683). Beyond finding that induction programs in general reduce attrition, Smith and Ingersoll (2004) measure how various induction activities individually affect new teacher retention. When considering these activities, Smith and Ingersoll find that assigning new teachers mentors from the same teaching field, scheduling new teachers extra time for collaboration or planning, and reducing new teachers' teaching schedule all significantly reduce the relative risk that new teachers would attrite by more than half.

Rather than looking at induction activities individually, Moir (2003) considers all elements in a comprehensive induction program as a single induction variable. Moir tracks participants in the Santa Cruz New Teacher Project (SCNTP), a comprehensive induction curriculum with a core of structured mentoring created at the University of California at Santa Cruz in 1988. After seven years, 88 percent of California teachers who had participated in SCNTP remained in teaching, a higher than expected retention rate. Applying the same induction model, schools in Charlotte-Mecklenburg, North Carolina reduced first year attrition rates from 32 percent for non-participants to 17.5 percent for teachers at participating schools (Moir 2003, 11).

Data

To test our hypotheses, we use data from the school and teacher portions of the 1999-2000 Schools and Staffing Survey (SASS) administered by the National Center for Education Statistics (NCES). The SASS is designed to facilitate research on teacher demand and shortage, teacher and administrator characteristics, school programs, and general school conditions. SASS also collects data on many other topics, including principals' and teachers' perceptions of school climate and problems in their schools, teacher compensation, district hiring practices and basic characteristics of the student population. We merged variables from the school and teacher surveys, resulting in a sample of 42,549 teachers.

Because our data is cross-sectional, we are unable to measure teacher attrition directly. In order to gauge the likelihood of a teacher leaving the profession due to a lack of success in the classroom, we used the measure of teacher intent to remain in the profession as a proxy for likely attrition.[2] Teachers who indicated that they intended to stay in the professional "for as long as possible" or "until retirement" were coded as committed to the profession; those who indicated that they would teach "unless something better comes along," who intended to leave teaching as soon as possible, or who were undecided were coded as not committed to teaching.

Our first independent variables of interest are a set of indicator variables for a teacher's participation in activities or receipt of supports typical of induction programs. Our second covariate of interest is a binary variable indicating whether the teacher's undergraduate degree is in education or some other discipline.

Beyond the teacher's preparedness for the classroom and the presence of professional supports in the school, a number of factors might influence a teacher's decision to leave the profession. Among these are the availability of other jobs, the remuneration the teacher receives for her work, working conditions within the teacher's school, and the degree of challenge presented in educating the school's students. We capture these factors imperfectly through control variables for characteristics of teachers and the schools in which they teach. Since teachers in urban schools are exposed to larger job markets, we control for the urbanicity of the area in which a school is located. High school teachers and teachers of science and math are likely to leave the profession at higher rates than other teachers, as are teachers who work in schools that serve large numbers of at-risk students. We use binary variables to control for a teacher teaching high school and teaching science or math and include measures of the percentage of limited-English-

proficient students, special education students, and students who qualify for free or reduced-price lunch at the teacher's school. We are also able to control for the extreme circumstance of a teacher's being threatened by a student. Other covariates include an indicator variable for large schools and schools receiving Title I funding and controls for teacher age, gender, race and earnings.

Methods

We use logistic regressions to model the effect of induction and its different components on teacher commitment. Our model for this regression is as follows:

$$\text{teacher commitment} = \alpha + \beta_1 \text{education degree} + \beta_2 \text{induction program or practice} + x\delta + \varepsilon \quad \text{(model 1)}$$

In a second model we test the hypothesis that the positive effect of induction may be greater on teachers without bachelor's degrees in education by interacting the indicator variable for a bachelor's degree in education with the indicator variable for induction.

$$\text{teacher commitment} = \alpha + \beta_1 \text{education degree} + \beta_2 \text{induction program or practice} + \beta_3 \text{educ.degree*induction} + x\delta + \varepsilon \quad \text{(model 2)}$$

Part II of our analysis explores how these different groups of teachers react to three types of mentoring and induction. Following the logic of Smith and Ingersoll, we hypothesize that the increased intensity of a mentoring and induction program should have a greater positive effect on non-education degree teachers' commitment to their job. Intensity, in the context of this study, is synonymous to the completeness or comprehensiveness of the induction program. Considering the limited resources of schools, this analysis is useful for identifying the most cost-effective methods of induction. Using our original variable for teacher commitment, we test three clusters of mentoring and induction programs: (1) the existence of a mentor and whether that mentor teaches in the same field, (2) group induction activities, and (3) extra resources provided. As in Part I, we use data from the 1999-2000 SASS. Each cluster contains several variables, and we interact each of these variables with the education degree indicator to isolate the effects of mentoring and induction for teachers with and without bachelor's degrees in education. This method results in nine separate models that have the following general equation:

$$\text{teacher commitment} = \alpha + \beta_1(\text{education degree}) + \beta_2(\text{induction program type}) + \beta_3(\text{interaction between induction variable and ed degree}) + x\delta + \varepsilon \quad \text{(models 3-11)}$$

All nine models in Part II control for the same teacher and school characteristics as in Part I, so that we are explaining only the effect of a particular cluster of mentoring and induction programs on teacher commitment. To account for the differential probabilities of sampling and the multi-stage design of the SASS, we weight observations in all models by their probability of selection and adjust standard errors for clustering at the school level.

Results – Part I

Our analysis finds that teachers who do not have bachelor's degrees in education differ systematically from those who do across a number of variables (see Table 1). Most importantly for the purposes of our hypotheses, we find that teachers with education degrees are 5.1 percent more likely to express a commitment to the profession than teachers with non-education degrees. Several other trends in the data are worth noting.

As we would expect, the variable across which the two groups of teachers most differ is the type of school in which they teach: Fully 68 percent of teachers without education degrees are employed in high schools, whereas only about 45 percent of those with education degrees are. Teachers without education degrees are also more likely to work in large schools and urban or suburban schools and less likely to be female. Several studies have shown that teachers in these types of environments tend to earn higher salaries. For example, in New York pupil population density and district enrollment were found to have positive and significant effects on teacher earnings. When incorporating these findings into predictive teacher wage indices, the same study found that it costs urban districts between 33 percent and 83 percent more than rural districts to attract teachers of similar qualifications (Duncombe 2002, 32). A comparable study in Oregon found that it costs urban districts between 17 percent and 29 percent more to attract similar teachers (Karson forthcoming). Consistent with these findings, teachers without education degrees have higher earnings on average as well. Additionally, though both sets of teachers work in schools with similar percentages of limited-English-proficient students and students who qualify for federal special education protections and/or modifications, teachers without education degrees are significantly less likely to work in schools that serve high percentages of students who receive free or reduced-price

lunch. It is also interesting to note a trend in the relative ages of the two groups of teachers: Among teachers with bachelor of arts in education, 34 percent are between the ages of forty and forty-nine, as compared to only 29 percent of teachers without bachelor of arts in education. We posit that this difference may be due to the galvanizing effect of the 1981 publication of *A Nation at Risk*, which emphasized the discipline-specific training of teachers.[3]

With the exception of their higher average earnings and reduced likelihood of teaching in schools serving poorer students, these trends would lead us to expect higher attrition among teachers without education degrees for reasons unrelated to their preparation for teaching. As noted above, we expect that younger teachers in more urban areas are more likely to leave the profession due to exposure to a large job market. Some evidence also suggests that men are more responsive than women are to the salary difference between teaching and other professions and that men leave teaching at higher rates than women in general (Tabs 2004, 9). Taken together, these trends suggest the importance of controlling for these relevant characteristics in determining the differential effect of induction on teachers without education degrees and those with education degrees.

The results of our logistic regressions are presented in Table 2 below. In all models, we find that salary earnings above $50,000, suburban or rural school location (as opposed to an urban location), and a free or reduced-lunch population of 5 to 19 percent (as compared to free or reduced-lunch population of less than 1 percent) predict a statistically significant increase in the probability of a teacher being committed to the profession. Conversely, we find that any percentage of special education students greater than 5 percent is associated with a statistically significant decrease in teacher commitment, as is, not surprisingly, a teacher having been threatened by a student.

The first two columns of Table 2 contain the results of the regression of teacher commitment on a bachelor's degree in education, mentoring, and the interaction of the two. The mentoring variable coefficients in the second row of the first and second columns indicate that the effect of a mentor in the first year of teaching is positive and marginally statistically significant to statistically significant. The interpretation of the coefficient on mentoring in the first column is that having a mentor in the first year of teaching is associated with a 16 percent greater likelihood of being committed to the teaching profession.

The latter two columns contain the results of the same models with induction replacing mentoring. The coefficient on the induction variable

in the third row of the third column indicates that the effect of induction in the first year of teaching is positive and statistically significant at the 0.05 level. The interpretation of this coefficient is that participating in an induction program in the first year of teaching is associated with a 20 percent greater likelihood of being committed to the teaching profession. As the coefficient on induction in the fourth column shows, the effect of an induction program is even greater once the interaction term has been introduced into the regression.

Interpreting the interaction terms in these models requires some care. In nonlinear models the interpretation of coefficients on interaction terms differs from that of the coefficients on other terms. Rather than an odds ratio, the interaction term is the ratio of odds ratios. The statistically significant coefficient of 0.67 on the interaction of the induction and bachelor's education degree variables can be interpreted in two ways: first, that the positive effect of induction is greater on teachers without education degrees than on those with education degrees; second, that the positive effect of a bachelor's degree in education is lower on teachers who have been through induction programs than on those who have not. The temporal precedence of the bachelor's degree recommends the first interpretation. The following figure presents a method for quantifying the interaction effect. It displays the predicted probability of a teacher being committed to the profession for each combination of induction and bachelor's degree, setting the cumulative effect of the control variables at its mean (0.38), and shows how an interaction effect in percentage points is derived:

Figure 1: Bachelor's Degree in Education

Induction Program	No	Yes		
No	0.60 (A)	0.67 (B)	(B-A) =	0.07
Yes	0.69 (C)	0.67 (D)	(D-C) =	-0.02

Interaction effect = (D-C) - (B-A) = -0.09

The figure indicates that the probability of a teacher without a bachelor's degree in education being committed to the profession increases by 9 percentage points if that teacher went through an induction program. It also provides evidence for the validity of the analysis in that it suggests that the interaction effect is entirely due to the positive effect of induction on teachers without education degrees and not to a negative effect of induction on the commitment of teachers with education degrees.

Results – Part II

The results of the logistic regressions testing our third hypothesis are presented in Table 3. Each column shows the separate results for Models 3 through 11. The interpretation of the coefficients is the same as in Part I; coefficients above 1 show a greater positive effect for teachers with education degrees, and vice versa.

Overall, Part II of our analysis does not support our third hypothesis. Of our 9 models, only Models 5 and 7 show significant results. Moreover, Model 5 shows greater positive effects for teachers with education degrees and Model 7 shows greater positive effects for teachers without education degrees. The inconsistency of our results and lack of significance on seven out of nine models prohibit us from drawing strong conclusions about the individual effects of various types of mentoring and induction programs.

The coefficient for the interaction term between supportive communication and the education degree indicator variable (Int: supportive * Ed degree) found in the column for Model 5 is 1.72, and is statistically significant at the 0.05 level. The interpretation of this coefficient is that a teacher *with* an education degree who gets supportive communication from her principal is more likely to be committed to the teaching profession compared to a teacher *without* an education degree who also gets supportive communication from his principal.

The coefficient for the interaction term between collaborative planning time and the education degree indicator variable (Int: collaborative * Ed degree) found in the column for Model 7 is 0.79, and is statistically significant at the 0.05 level. The interpretation of this coefficient is that a teacher *without* an education degree who has time for collaborative planning is more likely to be committed to the teaching profession compared to a teacher *with* an education degree who does get time for collaborative planning.

There are, however, two ways to interpret the results for these interaction terms. Model 5 may also be interpreted as indicating that the positive effect of an education degree is greater for teachers who receive supportive communication than those who lack supportive communication. Similarly, Model 7 may be interpreted to mean that the negative effects of a non-education degree are reduced when teachers are given time for collaborative planning when compared to non-education degree teachers who are not given time. As in the case of our results for Part I, since the decision of college major precedes any teacher induction program, these interpretations are not useful for our analysis.

Limitations

Our use of the public-use version of this data entails a few important limitations. First, the survey's complex stratified design necessitates the use of either replicate weights or Taylor Series approximations for calculating standard errors accurately. Unfortunately, the public-use version of SASS omits the variables required for the latter method in order to protect the privacy of specific schools and individuals. As a result, though we weight observations according to their probability of selection and adjust standard errors for clustering at the school level, the estimated standard errors are likely to be too small, resulting in an increased probability of Type I errors.

Another concern relates to use of the bachelor's degree in education as a measure of comprehensive preservice training in teaching. We work from the supposition that a bachelor's degree in education provides new teachers with more preservice hours of instruction in curriculum development, classroom management, and instructional methods than they would have received otherwise. However, new teachers increasingly become certified through minors in education, credentialing programs offered through universities or one-year master of arts in teaching degrees. Each of these means of certification may provide preservice instruction comparable to an education bachelor's degree, drawing into question our use of the degree as a proxy for the extensiveness of preservice training. The effect of including these teachers with those who do not have bachelor's degrees in education is likely to bias downward our estimates of the beneficial effects of induction programs on teachers who enter the classroom without training. Thus, this problem in measurement attenuates rather than invalidates our findings.

In addition to these limitations in our data and model, there are alternate hypotheses that threaten the validity of our results. Teachers without degrees in education may be more likely to leave the profession because they have skills marketable outside of education rather than because they are not prepared for the classroom. We expect that mentoring and induction reduce attrition rates because they provide the necessary training. An alternate hypothesis consistent with our results is that mentoring and induction provide a socializing function that reduces the likelihood of teachers being drawn to other professions.

If it is the greater availability of career options that drives the attrition of teachers without education degrees, then we would expect there to be a stronger relationship between dissatisfaction and intent to leave the profession among these teachers. To test the validity of this hypothesis, we

performed a logistic regression in which an indicator variable for teacher satisfaction is included as a covariate in Model 1 and interacted with the education degree indicator. The results do not provide grounds to reject the hypothesis that satisfaction in teaching has no more of an effect on the commitment of teachers without education degrees than on those with education degrees. Nonetheless, the p-value (0.20) and magnitude of the interaction term (0.68) suggest the possibility that dissatisfied teachers with bachelor's degrees in disciplines other than education may leave the profession more quickly than equally dissatisfied teachers with bachelor's degrees in education.

Policy Recommendations

Our results suggest that a comprehensive induction program has strong positive effects on teacher commitment, and that this effect is greater for teachers without education degrees than for those with education degrees. Consequently, despite the limitations to our analysis, we recommend that school districts implement the following policies to reduce teacher attrition:

(1) ***Increase access to mentoring and induction programs for all beginning teachers.*** Our results concur with the body of research that finds mentorship and induction programs do succeed at preventing new teachers from leaving the classroom. Since induction programs have a positive effect on all teachers, they should be broadly implemented rather than targeted only toward those teachers who lack prior educational coursework and student-teaching experience. Widespread implementation of these programs may prove prohibitively expensive to some districts in terms of scheduling release time for teachers. However, we believe that the long-term benefits to student achievement brought on through retention of more experienced teachers justify any short-term costs.

(2) ***Allow campus-level discretion in tailoring induction and mentoring to meet local needs.*** Models 5 and 7 indicate that teachers with education degrees respond more favorably to supportive communication from their principals, while teachers without education degrees benefit most from collaborative planning time. These results suggest that principals faced with budget constraints may still reap benefits by encouraging those forms of mentorship and induction programs that operate within school culture. School administrators could use campus-level discretion to adapt individual induction programs to teaching staffs with differing levels of preservice training. As further research on mentoring and induction yields additional evidence of the effectiveness of particular practices, school leaders can adapt their programs accordingly.

Table 1: Characteristics of Teachers with and without Bachelor's Degrees and of the Schools in Which They Work

	Bachelor's in education field	***Non-education bachelor's***	***Difference***
Teacher Characteristics	%	%	%
Committed to teaching	74.0	68.9	5.1
High school teacher	44.5	68.3	-23.8
Female	70.1	61.5	8.6
Non-white	14.8	16.8	-2.0
Mentoring Programs			
Mentor in 1st year	58.1	55.6	2.5
Mentor from same field	74.8	73.0	1.8
Induction Programs			
Induction program in 1st year	54.4	56.0	-1.6
Supportive communication	75.8	74.1	1.7
Teacher network	25.1	27.0	-1.9
Collaboration or planning time	37.6	35.4	2.2
Beginners' seminars	53.2	56.2	-3.0
Teacher's aide	25.4	23.4	2.0
Reduced schedule	6.3	6.7	-0.4
Reduced preparations	8.3	10.4	-2.1
Teacher age			
Less than 30	15.4	16.5	-1.1
30 to 39	21.5	23.2	-1.7
40 to 49	34.4	29.2	5.2
50 or older	28.7	31.1	-2.4
Base teaching salary			
Less than $25,001	15.4	12.8	2.6
$25,001 to $30,000	19.9	18.4	1.5
$30,001 to $35,000	18.5	19.7	-1.2
$35,001 to $45,000	27.1	26.8	0.3
$45,001 or more	19.1	22.4	-3.3
School Characteristics			
Title I School	46.0	33.6	12.4
Enrollment under 500	44.4	29.7	14.7
Number of LEP students			
Less than 1%	21.6	22.1	-0.5
1 to 4%	44.1	43.4	0.7
5 to 19%	22.1	21.0	1.1

20% or more	12.2	13.6	-1.4
Number of IEP students			
Less than 5%	6.6	6.9	-0.3
5 to 9%	30.7	32.0	-1.3
10 to 14%	35.6	36.3	-0.7
15 to 19%	16.0	14.6	1.4
20% or more	11.1	10.2	0.9
Number of free- or reduced-lunch students			
Less than 5%	6.0	9.4	-3.4
5 to 19%	25.1	30.7	-5.6
20 to 49%	38.9	34.9	4.0
50% or more	30.0	25.0	5.0
Urbanicity of school			
Large or mid-size central city	21.0	25.4	-4.4
Urban fringe of large or mid-size city	37.4	43.2	-5.8
Small town/Rural	41.5	31.4	10.1

Source: School and Staffing Survey, 1999-2000

Table 2. Logistic Regression: Mentoring and Induction as Predictors of Teacher Commitment to Stay in the Profession, Interacted with Bachelor's Degree in Education

	Effect of Mentoring		***Effect of Induction***	
Variable	*Model 1*	*Model 2*	*Model 1*	*Model 2*
Education degree	**1.05**	**1.26**	**1.05**	**1.34**
	-0.097	-0.18	-0.097	(0.20)*
Mentor	**1.16**	**1.37**	—	—
	(0.10)*	(0.17)**	—	—
*Int: mentor * Ed degree*	—	**0.74**	—	—
	—	-0.13	—	—
Induction	—	—	**1.20**	**1.48**
	—	—	(0.10)**	(0.20)***
*Int: induction * Ed degree*	—	—	—	**0.67**
	—	—	—	(0.12)**
School earnings[a]				
30 to 39K	**1.16**	**1.15**	**1.15**	**1.15**
	-0.15	-0.15	-0.14	-0.14
40 to 49K	**0.96**	**0.96**	**0.95**	**0.95**
	-0.14	-0.14	-0.14	-0.14

Greater than 50K	**1.51**	**1.50**	**1.51**	**1.52**
	(0.26)**	(0.26)**	(0.26)**	(0.26)**
Teacher age in years[b]				
30 to 39	**0.96**	**0.95**	**0.98**	**0.97**
	-0.12	-0.12	-0.12	-0.12
40 to 49	**1.08**	**1.08**	**1.09**	**1.10**
	-0.14	-0.14	-0.14	-0.14
50 or older	**0.95**	**0.95**	**0.95**	**0.95**
	-0.12	-0.12	-0.12	-0.12
Math or science teacher[c]	**0.89**	**0.89**	**0.90**	**0.91**
	-0.11	-0.11	-0.11	-0.11
Special education teacher[c]	**0.98**	**0.97**	**0.98**	**0.97**
	-0.14	-0.14	-0.14	-0.14
ESL teacher[c]	**1.01**	**0.99**	**1.00**	**1.01**
	-0.26	-0.25	-0.25	-0.25
Male teacher[c]	**1.04**	**1.04**	**1.03**	**1.03**
	-0.10	-0.10	-0.10	-0.10
Non-white teacher[c]	**1.04**	**1.03**	**1.03**	**1.03**
	-0.13	-0.13	-0.13	-0.13
Threatened by a student	**0.64**	**0.64**	**0.64**	**0.64**
	(0.08)***	(0.07)***	(0.07)***	(0.07)***
	1.13	1.13	1.14	1.14
Students receive Title I services	**-0.12**	**-0.12**	**-0.12**	**-0.12**
Percentage of students limited-English-proficient[d]				
1 to 4%	**1.21**	**1.20**	**1.20**	**1.20**
	-0.14	-0.14	-0.14	-0.14
5 to 19%	**0.98**	**0.98**	**0.98**	**0.98**
	-0.14	-0.14	-0.14	-0.14
20% or more	**1.14**	**1.14**	**1.13**	**1.13**
	-0.20	-0.20	-0.20	-0.20
Percentage of students with Individual Development Plans[e]				
5 to 9%	**0.62**	**0.62**	**0.61**	**0.60**
	(0.12)**	(0.12)**	(0.12)**	(0.12)**
10 to 14%	**0.64**	**0.65**	**0.64**	**0.64**
	(0.13)**	(0.13)**	(0.12)**	(0.12)**
15 to 19%	**0.54**	**0.55**	**0.53**	**0.53**
	(0.11)***	(0.11)***	(0.11)***	(0.11)***

Table 2.(continued) Logistic Regression: Mentoring and Induction as Predictors of Teacher Commitment to Stay in the Profession, Interacted with Bachelor's Degree in Education

	Effect of Mentoring		***Effect of Induction***	
Variable	*Model 1*	*Model 2*	*Model 1*	*Model 2*
20% or more	**0.57**	**0.57**	**0.57**	**0.57**
	(0.13)**	(0.13)**	(0.13)**	(0.13)**
Percentage of students eligible for free- or reduced-price lunch[e]				
5 to 19%	**1.60**	**1.59**	**1.62**	**1.64**
	(0.35)**	(0.35)**	(0.36)**	(0.37)**
20 to 49%	**1.28**	**1.27**	**1.30**	**1.30**
	(0.29)	(0.28)	(0.30)	(0.30)
50% or more	**1.45**	**1.45**	**1.48**	**1.49**
	(0.37)	(0.37)	(0.38)	(0.39)
Urbanicity[f]				
Suburban	**1.34**	**1.34**	**1.35**	**1.36**
	(0.16)**	(0.16)**	(0.16)**	(0.16)***
Rural	**1.59**	**1.58**	**1.61**	**1.61**
	(0.21)***	(0.21)***	(0.21)***	(0.21)***
Enrollment>500	**0.92**	**0.92**	**0.92**	**0.92**
	(0.10)	(0.10)	(0.10)	(0.10)
High school	**0.91**	**0.91**	**0.91**	**0.92**
	(0.09)	(0.09)	(0.09)	(0.09)
Observations	4952	4952	4952	4952
Pseudo-R^2	0.025	0.026	0.026	0.027

Coefficient estimates in bold. Robust standard errors in parentheses, adjusted for clustering on school identifying variable.
* significant at 10% level; ** significant at 5% level; *** significant at 1% level
a: Omitted category is less than $30K.
b: Omitted category is under 30.
c: Omitted category is all other teachers.
d: Omitted category is under 1%.
e: Omitted category is under 5%.
f: Omitted category is central city/urban.

Table 3. Logistic Regression: Mentoring and Induction as Predictors of Teacher Commitment to Stay in the Profession, Interacted with Bachelor's Degree in Education

These models include the same teacher and school control variables as in Models 1 and 2.

	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Bachelor's Degree Type									
Ed degree or other degree	1.26	1.21	0.87	1.39	1.45	1.46	1.27	1.33	1.33
	(0.18)	(0.32)	(0.16)	(0.08)**	(0.09)**	(0.23)*	(0.11)**	(0.11)**	(0.14)**
Mentoring Program									
Mentor in 1st year?	1.37								
	(0.17)*								
Int: Mentor * Ed degree	0.74								
	(0.13)								
Mentor from same field		0.97							
		(0.22)							
Int: Mentor from same field * Ed degree		1.10							
		(0.32)							
Group Induction Program									
Supportive communication			0.82						
			(0.14)						
Int: supportive * Ed degree			1.72						
			(0.38)*						
Teacher network				1.19					
				(0.11)					
Int: network * Ed degree				0.88					
				(0.10)					
Collaborative planning time					1.14				
					(0.10)				
Int: collaboration * Ed degree					0.79				
					(0.85)*				
Beginners' seminars						1.20			
						(0.18)			
Int: seminar * Ed degree						0.85			
						(0.16)			
Extra Resources Provided									
Teacher's aide							1.11		
							(0.16)		
Int: aide * Ed degree							1.16		
							(0.21)		
Reduced Preparations								1.31	
								(0.25)	
Int: red. prep. * Ed degree								0.86	
								(0.21)	
Reduced schedule									1.23
									(0.37)
Int: red. Sch. * Ed degree									0.78
									(0.30)
Observations	4952	2924	4952	20858	20858	4952	8160	8160	4952
Pseudo-R^2	0.263	.0203	0.023	0.013	0.013	0.0207	0.014	0.013	0.020

Robust standard errors in parentheses, adjusted for clustering on school identifying variable.
* significant at 10% level; ** significant at 5% level; *** significant at 1% level

Notes

[1] The authors wish to thank Dr. Christina Gibson-Davis and Dr. Helen Ladd for their assistance in the development of this paper.

[2] The SASS teacher survey includes four questions that might be used to gauge the likelihood of a teacher's leaving the profession due to a lack of success in the classroom: the first assesses the teacher's satisfaction at the school; the second assesses the teacher's sense of efficacy in her job; the third asks whether the teacher would become a teacher if she had the choice to make over again; and the last asks the teacher how long she intends to remain in teaching. Teacher responses to these items, which vary in the number of acceptable answers they allow, are not highly correlated.

[3] *A Nation at Risk* would have first shown an effect on future teachers' choices of major in the mid-80s. A hypothetical 18-year-old who chose a discipline-specific major in 1981 would have been 37 in 2000. Teachers age 40 to 49 are thus too old to have been affected. Those over 50 may have attended college before schools of education became large.

[4] An additional consideration in interpreting interactions in nonlinear models is that both the magnitude and the significance of the interaction term can vary with the predicted probability of the model (in other words, depending on the effect of the covariates) and with the method used to calculate the coefficient (See Norton et al. 2004). Not surprisingly, as the predicted likelihood of a teacher's being committed to the profession rises above 0.7, the differential effect of induction on teachers without education degrees and teachers with education degrees falls.

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