American Educational Research Journal
Fall 2004, Vol. 41, No. 3, pp. 681–714

What Are the Effects of Induction and Mentoring on Beginning Teacher Turnover?

Thomas M. Smith
Vanderbilt University
Richard M. Ingersoll
University of Pennsylvania

In recent years there has been an increase in the number of programs offering support, guidance, and orientation for beginning teachers during the transition into their first teaching job. This study examines whether such programs—collectively known as induction—have a positive effect on the retention of beginning teachers. The data used in the analysis are from the nationally representative 1999–2000 Schools and Staffing Survey. The results indicate that beginning teachers who were provided with mentors from the same subject field and who participated in collective induction activities, such as planning and collaboration with other teachers, were less likely to move to other schools and less likely to leave the teaching occupation after their first year of teaching.

KEYWORDS: attrition, beginning teachers, induction, mentorship, retention, turnover.

In recent years, there has been a growth of support, guidance, and orientation programs—collectively known as induction—for beginning elementary and secondary teachers during the transition into their first teaching jobs. Historically, the teaching occupation has not had the kind of structured induction and initiation processes common to many white-collar occupations and characteristic of many of the traditional professions (Waller, 1932; Lortie,

THOMAS M. SMITH is an Assistant Professor of Public Policy and Education, Department of Leadership, Policy, and Organizations, Peabody College of Vanderbilt University, #514 GPC, Nashville, TN 37203-5721; e-mail *thomas.smith@vanderbilt.edu*. His areas of specialization are the organizational and policy contexts of teacher and teaching quality.

RICHARD INGERSOLL is an Associate Professor of Education and Sociology, Graduate School of Education, University of Pennsylvania, 3700 Walnut Street, Philadelphia, PA 19104-6216; e-mail *rmi@gse.upenn.edu*. His areas of specialization are the sociology of education and organizational sociology.

1975; Tyack, 1974). Ironically, although elementary and secondary teaching involves intensive interaction with youngsters, it is done largely done in isolation from colleagues (e.g., Sizer, 1992; Johnson, 1990; Ingersoll, 2003a). This is especially consequential for new entrants, who upon accepting a teaching position in a school are often left to their own devices to succeed or fail within the confines of their own classrooms—an experience likened by some to being lost at sea (e.g., Kauffman, Johnson, Kardos, Liu, & Peske, 2002; Johnson & Birkeland, 2003). Indeed, critics have long assailed teaching as an occupation that "cannibalizes its young" and in which the initiation of new teachers is akin to a "sink or swim," "trial by fire," or "boot camp" experience.

Perhaps not surprisingly, teaching has also traditionally been characterized as an occupation with high levels of attrition (i.e., loss of practitioners to other occupations), especially among beginners (Lortie, 1975; Grissmer & Kirby, 1987, 1992, 1997; Veenman, 1985). All occupations, of course, experience some loss of new entrants—either voluntarily because newcomers decide not to remain or involuntarily because employers deem them to be unsuitable. But researchers hold that teaching has long had high rates of attrition among newcomers. A number of studies have found that as many as 50% of new teachers leave within the first 5 years of entry into the occupation (Murnane et al., 1991; Ingersoll & Smith, 2003; Huling-Austin, 1990; Hafner & Owings, 1991). Moreover, several studies have found a significant correlation between teachers' likelihood of retention and their scores on exams, such as the SAT. The "best and the brightest" among the newcomers appear to be those most likely to leave (Murnane et al., 1991; Schlecty & Vance, 1981; Henke, Chen, & Geis, 2000).

In recent research we have documented what many educators have long suspected—a strong link between the perennially high rates of beginning teacher attrition and the perennial teacher shortages that plague teaching. It is widely believed that one of the pivotal causes of inadequate school performance is the inability of schools to adequately staff classrooms with qualified teachers, as a result of teacher shortages. However, in analyses of national data we have found that school staffing problems are not solely, or even primarily, due to teacher shortages, in the sense of too few new teachers being produced. In contrast, the data indicate that school staffing problems are to a large extent the result of a "revolving door": Large numbers of teachers leave their teaching jobs long before retirement (Ingersoll, 2001, 2003b).

This is the kind of occupational ailment that effective organizational induction programs are supposed to cure. Accordingly, in recent decades a growing number of states and school districts have developed and implemented a variety of such programs (for reviews of theory, policy, and research on teacher induction, see Arends & Rigazio-DiGilio, 2000; Holloway, 2001; Feiman-Nemser et al., 1999; Gold, 1999; Hegstad, 1999; Fideler & Haselkorn, 1999; Scherer, 1999; Serpell & Bozeman, 1999).

Teacher induction, it is important to clarify, is distinct from both preservice and in-service teacher training. *Pre-service* refers to the training and preparation that candidates receive before employment (including clinical

training, such as student teaching). *In-service* refers to periodic upgrading and additional training received on the job, during employment. Theoretically, induction programs are not additional training per se but are designed for teachers who have already completed basic training. These programs are often conceived as a bridge, enabling the "student of teaching" to become a "teacher of students." Of course, these analytic distinctions can easily become blurred in real situations.

Like the induction processes common to other occupations, teacher induction programs have a number of different, and sometimes conflicting, purposes. Teacher induction can also involve a variety of elements—workshops, collaborations, support systems, orientation seminars, and especially, mentoring. *Mentoring* is the personal guidance provided, usually by seasoned veterans, to beginning teachers in schools. During the past two decades, teacher mentoring programs have become the dominant form of teacher induction (Fideler & Haselkorn, 1999); indeed, today the two terms are often used interchangeably.

What kinds of induction programs exist, and to what extent they help, are clearly fundamental questions for the field and for policymakers faced with decisions about supporting such programs. Accordingly, with the growth of beginning teacher induction there has also been a growing interest in empirical research on both the variety and the effects of these initiatives. During the past two decades, numerous descriptive studies have documented that the content and characteristics of different types of programs themselves widely vary (e.g., Fideler & Haselkorn, 1999; Scherer, 1999; Ganser, 1997; 2002; Schaffer, Stringfield, & Wolfe, 1992; Wollman-Bonilla, 1997). This research has shown that duration and intensity are important sources of variation: Induction programs can vary 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. Programs vary according to the numbers of new teachers they serve; some include anyone new to a particular school, even those with previous teaching experience; others focus solely on candidates who are new to teaching. Programs vary according to their purpose. Some, for instance, are primarily developmental and designed to foster growth on the part of newcomers; others are also designed to assess, and perhaps weed out, those deemed ill suited to the job. Finally, mentoring programs themselves differ along the same dimensions. For example, they vary as to whether they include training for the mentors; how much attention they devote to the match between mentor and mentee; the degree to which mentor are compensated for their efforts, either with a salary supplement or a reduction in other duties; and whether an effort is made to provide mentors who have experience in teaching the same subjects as their mentees.

In addition to descriptive studies of the content of induction programs, there have been numerous evaluative studies examining the effects of induction, particularly mentoring, on various teacher outcomes. These outcome measures typically fall into two categories: teacher attitudes (e.g., teacher's job satisfaction, efficacy, and commitment); and teacher retention or turnover.

A number of studies seem to provide support for the hypothesis that well-conceived and well-implemented teacher induction programs are successful in increasing the job satisfaction, efficacy, and retention of new teachers (e.g., Holloway 2001; Fuller 2003; Wilson, Darling-Hammond, & Berry, 2001; Strong & St. John, 2001). Educational advocates and reformers frequently cite examples drawn from this research to secure additional funding, to garner political support, or to confirm a particular educational perspective.

There are, however, important limitations to the existing empirical research on the effects of teacher induction and mentoring programs. First, the majority of these empirical studies are program evaluations that collected data on outcomes solely from those who had participated in the particular programs being assessed (e.g., Wilson, Darling-Hammond, & Berry, 2001; Mitchell, Scott, Hendrick, & Boyns, 1999; Gregson & Piper, 1993; Strong & St. John, 2001; Fletcher, Strong, & Villar, 2004; Strong, 1998; Stroot et al., 1999; Scott, 1999). Such studies can provide valuable feedback to both providers and participants of induction programs. But unless a study collects similar outcome data from both participants *and* nonparticipants in a program, it cannot provide unambiguous conclusions about the value added (or lack thereof) of that program. In other words, to establish whether participants perform differently from nonparticipants, it is important to compare the outcomes across both groups.

Second, most existing studies did not, or could not, control for other relevant factors that might account for differences in the outcomes across induction programs. There are, of course, numerous factors that can account for differences in, for example, teacher attrition and also for any apparent connection between teacher induction and teacher attrition. It is reasonable to expect that particular kinds of schools have more teacher attrition than others, regardless of the degree of assistance provided to new hires. Alternatively, any relationship between induction and teacher attrition could be spurious, that is, the result of other, more fundamental, factors related to both. For instance, the affluence of a school's community might affect both whether it provides induction services and whether it has a high rate of teacher attrition. To determine whether there is, in fact, a relationship between induction and attrition, it is necessary to control for, or hold constant, other relevant factors.

Finally, in most cases, studies have focused on specific programs in particular school jurisdictions, making generalization difficult. All of these factors limit the conclusions that can be drawn from existing empirical research about the effectiveness of teacher induction and mentoring (for a critical review of empirical research on the effects of mentoring, see Ingersoll & Kralik, 2004).

The Study

The objective of this study is to address the need for empirical evaluation of the effects of induction on beginning teacher turnover. We examined whether first-year teachers who participated in induction activities such as mentoring or collaboration with other teachers or who received additional resources were more or less likely to stay with their teaching jobs the following year.

Unlike the samples used in most previous empirical research, our sample was drawn from a cohort that included all beginning teachers in the United States in 1999–2000, which allowed us to compare the retention of those who did and those who did not participate in various induction activities. Moreover, unlike most previous empirical research, we used nationally representative data, and we controlled for a wide range of teacher and school factors.

Our data source is the Schools and Staffing Survey (SASS), administered by the National Center for Education Statistics (NCES). To date, four independent cycles of SASS have been completed: 1987–1988, 1990–1991, 1993–1994, and 1999–2000. In previous analyses using the 1990–1991 SASS we examined the distribution of effective assistance for new teachers and the effects of the distribution on overall teacher turnover (Ingersoll, 2000, 2001). We found that effective support for new teachers was strongly and significantly related to teacher turnover, after controlling for the characteristics of teachers and schools. But the degree to which we could address the question of induction and mentoring effectiveness in this particular study was limited. One reason was that the 1990–1991 SASS survey questionnaire items provided little detail on the characteristics and components of mentoring programs and effective assistance.

To rectify that limitation, the teacher survey questionnaire of the most recent cycle of SASS (1999–2000) included an expanded battery of items on teacher induction, mentoring, and professional development. Unlike the earlier cycles of SASS, the 1999–2000 SASS contained questions designed to elicit information on the kinds of possible induction, mentoring, and other supports available to teachers, such as reduced teaching load or number of preparations, collaborative planning time with other teachers, extra classroom assistance in the form of a teachers' aide, developmental seminars, and assignment to a mentor from the same area of teaching. Our current study uses these data from the 1999–2000 SASS.

We sought to answer four research questions in this study by using the SASS data:

- How widespread are induction programs across the United States, and has their prevalence increased in the past decade?
- How many beginning teachers participate in various kinds of induction and mentoring activities?
- What are the rates of turnover among beginning teachers?
- What are the effects of different kinds of mentoring and other induction activities on the likelihood that beginning teachers will leave their jobs?

Underlying our study are several premises. First, like most researchers on teacher induction and school staffing, we assume that elementary and secondary school performance relies on adequate staffing with qualified teachers (see Figure 1). Thus, if induction programs do succeed in increasing the retention of beginning teachers, this could lead to a reduction in school staffing problems, which in turn could have a positive impact on school performance.

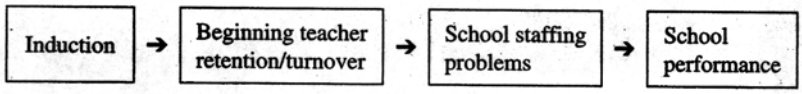

Figure 1. **The role of beginning teacher induction in school performance.**

Second, we accept the premise—drawn from the sociology of organizations, occupations, and work and from the literature on employee turnover—that teacher turnover rates have an important effect on school performance. Among researchers who study industry, organizations, occupations, and work, employee turnover is an important topic (e.g., Price, 1977, 1989; Bluedorn, 1982; March & Simon, 1958; Mobley, 1982; Steers & Momday, 1981). Indeed, there are literally thousands of studies of employee "quits," attrition, and separations. The general consensus in this literature is that a low level of employee turnover is normal and efficacious in a well-managed organization.

Too little employee turnover is tied to stagnancy in organizations; effective organizations usually both promote and benefit from a limited degree of turnover by eliminating low-caliber performers and bringing in "new blood" to facilitate innovation. Moreover, some job and career changes are normal and inevitable in any occupation. And in many occupations there exists a certain amount of temporary attrition—individuals who leave the occupation for a few years and then return. However, a central finding in the literature is that high levels of employee turnover are both a cause and a result of ineffectiveness and low performance in organizations. From an organizational perspective this finding applies to cross-organization moves as well as to exit from the occupation. In both cases the result is loss of staff for the organization.

A number of costs and consequences are associated with employee turnover. But in education research, unlike research on the industrial and corporate sectors, there has been virtually no work on this issue. One notable exception is a recent effort to quantify the costs of teacher turnover in Texas. That study produced a "conservative" estimate that teacher turnover cost the state of Texas more than $300 million per year (Texas Center for Educational Research, 2000). The study suffered from limitations, but it was a first step. Its findings suggest that ignoring high levels of teacher turnover is not fiscally responsible.

Some costs and consequences of teacher turnover are more obvious and more easily measured than others. One cost that is not easily quantified is the decline of organizational stability, coherence, and morale that often results. That cost is especially high in organizations where the production process requires extensive interaction among participants and, hence, is highly dependent on continuity, cohesiveness, and coherence. Schools are this kind of organization. Decades of educational research have documented that a sense of community and cohesion among families, teachers, and students is important for the success of schools (e.g., Durkheim, 1925/1961; Waller, 1932; Parsons, 1959; Grant, 1988; Rosenholtz, 1989; Bryk, Lee, & Holland, 1993; Coleman & Hoffer, 1987). High rates of teacher turnover can inhibit the development and

maintenance of a learning community; in turn, lack of community in a school may have a negative impact on teacher retention, thus creating a vicious cycle. Thus the assumption underlying our analysis is that high rates of beginning teacher turnover are of concern not only because they contribute to school staffing problems and perennial shortages but because this form of organizational instability is likely to be related to organizational effectiveness.

Data and Methods

Data

SASS, our data source for this study, along with its supplement, the Teacher Follow-up Survey (TFS), is the largest and most comprehensive data source available on the staffing, occupational, and organizational aspects of elementary and secondary schools. SASS was designed specifically to remedy the lack of nationally representative data on these issues (Haggstrom et al., 1988).

The U.S. Census Bureau collected the SASS data for NCES from a random sample of schools, stratified by state, public/private sector, and school level. Each cycle of SASS included separate, but linked, questionnaires for administrators and for a random sample of teachers in each school. In addition, after 12 months, the same schools were again contacted, and all those in the original teacher sample who had left their teaching jobs were asked to complete a second questionnaire, designed to obtain information on their departures. The TFS includes the latter group, along with a representative sample of those who stayed in their teaching jobs. Our analysis uses data primarily from the 1999–2000 SASS, linked with preliminary data from the 2000–2001 TFS (as of summer 2004; the most recent TFS had not yet been entirely released). The 1999–2000 SASS sample consists of about 52,000 elementary and secondary school teachers. Our analysis focuses on beginning teachers, whom we define as those in their first year of teaching in 1999–2000—a sample of 3,235. For this analysis we used data weighted to compensate for the over- and undersampling of the complex stratified survey design. To obtain unbiased estimates of the national population of teachers in the year of the survey, we weighted each observation by the inverse of its probability of selection.

The TFS is unusual in that it does not focus solely on a particular subset of turnover and inter-organizational mobility.[1] Unlike many other data sources, the TFS includes all teacher turnover or departures, including moves to teaching jobs in other schools (often referred to as *teacher migration*) and those leaving the occupation altogether (often referred to as *teacher attrition*). Our analysis assesses these two flows as two separate components of teacher turnover.

Methods and Measures

Our analysis is divided into two stages. In the first stage we present descriptive data on induction, mentoring, and turnover—in answer to the first three of our research questions. We begin by showing how widespread induction

and mentoring programs have been during the past decade across the United States. We then summarize descriptive data on the percentage of beginning teachers participating in mentorship and other induction programs, including the kinds of supports and components that such programs typically include. Finally, we conclude this stage by establishing the amount of turnover among beginning teachers and examining how turnover rates vary across schools with different characteristics.

In the second stage we present a multinomial logistic regression analysis of the impact of participation in mentorship and other induction activities on the rate at which beginning teachers leave the teaching occupation at the end of their first year (i.e., become "leavers"), move to a different school at the end of their first year (become "movers"), or stay in the same school to teach a second year (become "stayers"). We cumulatively examine four sets of predictors of these outcomes: (a) teacher characteristics and school characteristics; (b) participation in mentorship activities; (c) participation in group or collective induction activities; and (d) the provision of extra resources for beginners, such as reduced teaching workload or having a teacher's aide. The appendix provides definitions for these variables. Table 1 provides the mean teacher and school characteristics associated with the teachers in the sample.[2]

Following previous research on teacher turnover, we include in our models control variables for several key characteristics of teachers: race, gender, age, whether they are regular full-time teachers (as opposed to a part-time regular, itinerant, or long-term substitute teachers); their subject/field of teaching, and their school-related earnings in 1999–2000.

Following previous research on school organization (e.g., Bidwell & Quiroz, 1991; Bryk et al., 1993; Chubb & Moe, 1990; Coleman & Hoffer, 1987; Pallas, 1988; Rowan et al., 1991), we also include, as independent variables, school characteristics typically found to be important in this literature: school level, urbanicity, size, sector (public noncharter, public charter, and private), and the percentage of students approved to receive free or reduced price lunches (a measure of poverty concentration).

Finally, after controlling for the above teacher and school factors, we focus on the effects of three sets of measures of induction programs. First, we examine whether each teacher was working closely with a master or mentor teacher and, if so, whether the mentor taught in the same subject area. In the second set, we examine whether the beginning teacher reported having any of the following kinds of collaborative or networking supports: (a) seminars or classes for beginning teachers; (b) common planning time with other teachers in their subject area or regularly scheduled collaboration with other teachers on issues of instruction; (c) participation in a network of teachers (e.g., one organized by an outside agency or on the Internet); and (d) regular or supportive communication with the school's principal, other administrators, or department chair.[3] Finally, in the third set of measures we examine whether each beginning teacher received additional assistance to help ease the transition, including (a) a reduced teaching schedule, (b) a reduced number of preparations, or (c) extra classroom assistance (e.g., teacher aides).

Table 1

Descriptive Statistics for Variables Utilized in Multinomial Logistics Regression Analysis (Weighted)

	M	*SE*	*SD*
Teacher characteristics			
Regular full-time	0.881	0.0080	—
Age	29.143	0.2379	8.321
Math/Science	0.150	0.0090	—
Special Education	0.091	0.0087	—
ESL	0.006	0.0014	—
Male	0.264	0.0123	—
Minority	0.187	0.0117	—
School earnings ($ thousands)	27.524	0.2174	8.261
School characteristics			
Charter	0.011	0.0007	
Catholic	0.064	0.0040	
Non-Catholic religious	0.081	0.0057	
Nonsectarian	0.040	0.0044	
Urban	0.325	0.0152	—
Rural	0.192	0.0106	—
Middle school	0.147	0.0130	—
High school	0.274	0.0100	—
Combined school	0.090	0.0061	—
% Poverty Enrollment	31.338	0.9808	29.642
Poverty Enrollment Flag	0.097	0.0092	—
Enrollment less than 350	0.259	0.0115	—
Enrollment more than 1,000	0.225	0.0133	—
Mentor programs			
Mentor from same field	0.479	0.0150	—
Mentor from other field	0.176	0.0121	—
Group induction activities			
Beginners' Seminars	0.621	0.0135	—
Collaboration or Planning Time	0.679	0.0130	—
Teacher network	0.173	0.0110	—
Supportive communication	0.814	0.0115	—
Reduced workload or extra resources provided			
Reduced schedule	0.106	0.0083	
Reduced preparations	0.113	0.0087	
Teacher aide	0.288	0.0131	—

Note. Standard deviation was not calculated for dichotomous variables.

This second stage of the analysis examines whether the likelihood of individual teachers moving from or leaving their teaching jobs is related to the aforementioned teacher-level measures of induction, while controlling for both teacher-level and school-level characteristics. The analysis uses a multinomial logit regression procedure—STATA software's svy estimator, "svymlogit"—which accounts for the clustering of teachers within schools resulting from the complex multilevel design of the SASS sample (for a description of these

commands see STATA Corp., 2001; for a description of the methodological background of these variance estimation procedures, see Cochran, 1977, and Wolter, 1985).

Limitations of the Measures

The advantage of using a large-scale data source such as SASS is that it allows us to make generalizable assessments of whether induction activities are associated with teacher turnover, after controlling for some key background characteristics of teachers and their schools. However, it is necessary to note that there are also some important limitations to the SASS measures on teacher induction.

First, although SASS did ask teacher mentees to evaluate the helpfulness of their mentors, it obtained little information beyond that on the characteristics of the mentors and the means of their selection. Some analysts argue that one of the key factors for program effectiveness is the skill and knowledge of the mentors and that the mere presence of mentors is not enough; the mentors' knowledge of how to support new teachers and their skill in providing guidance are also crucial (e.g., Kyle, Moore, & Sanders, 1999; Evertson & Smithey, 2000).

Second, although SASS asked teachers to indicate which kinds of supports were provided by their schools, little detail is available on the intensity, duration, cost, or structure of induction programs.

Results

We now turn to the results that emerged with regard to our four research questions.

1. How widespread are induction programs across the United States, and has their prevalence increased in the past decade?

The data indicate that participation in induction programs increased during the decade from 1990 to 2000. In the 1990–1991 school year, about 4 in 10 beginning teachers said that they had "participated in a formal teacher induction program, i.e., a program to help beginning teachers by assigning them to master or mentor teachers." By 1993–1994, the number increased to just over half of beginning teachers (see Figure 2). By the 1999–2000 school year, participation rates in induction programs rose to about 8 in 10.[4]

Our background analyses of the data also revealed that participation in induction programs varied widely among various kinds of schools, although there was strong growth in participation in induction programs across an array of public and private schools in the 1990s. In 1990–1991, teachers in private schools were less than half as likely to participate in an induction program as were teachers in public schools (25% and 51%, respectively). By the 1999–2000 school year, participation in induction programs had risen by about 35 percentage points in each sector, to 60% in the private sector and 83% in

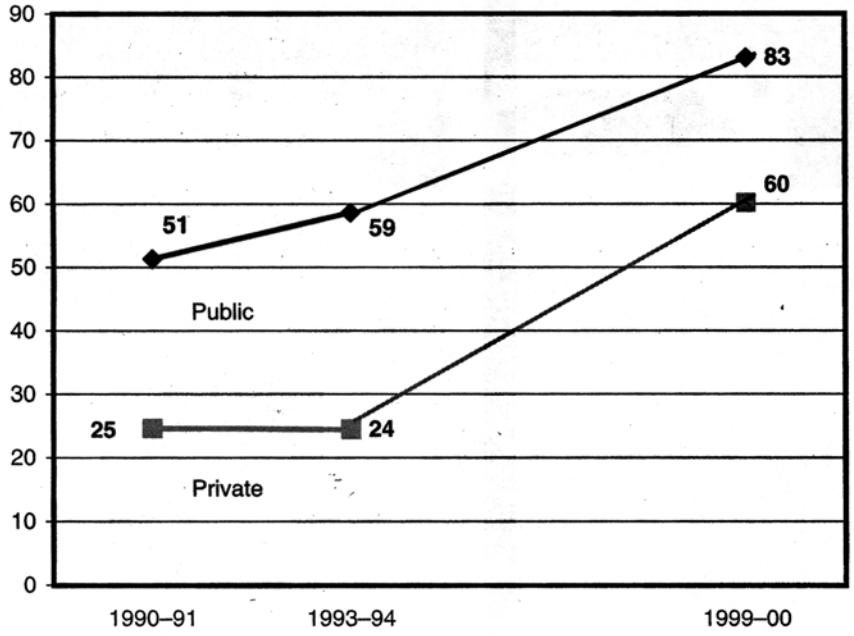

Figure 2. **Trends in the percentage of beginning teachers participating in induction programs in public and private schools (1990–1991 to 1999–2000).**

the public sector. In 1990–1991, among public school teachers, those in small schools and rural schools had far lower participation rates in induction programs (results not shown, available from authors). However, by 1999–2000, the gaps had lessened; more than 75% of teachers in these kinds of schools participated in induction programs. In sum, the data clearly demonstrate that induction and mentorship have expanded from a common to a widespread practice for newcomers in the teaching occupation.

2. How many beginning teachers participate in various kinds of induction and mentoring activities?

As noted above, induction programs can range from a single-day orientation to more enduring activities that attempt to tie new teachers into cooperative and collaborative networks of new and experienced teachers. The 1999–2000 SASS data allow us to examine participation rates in a number of kinds of induction-related activities. Table 2 shows weighted estimates of the percentage of beginning teachers: who had mentors; who participated in various forms of group or collective induction activities; and who had a reduced workload or extra resources made available to them. The 1999–2000 SASS also collected a comprehensive sample of public charter schools to gather

Table 2

Percentages of Beginning Teachers Who Participated in Mentor Programs or Group Induction Activities, or Had a Reduced Workload or Extra Resources Provided (1999–2000)

	Total	Public non-charter	Charter	Private
Mentor programs	(65.50)	(70.40)	(45.90)	(41.60)
	(1.35)	(1.54)	(2.50)	(2.91)
Mentor from same field	47.9	51.5	33.6	29.0
	(1.50)	(1.77)	(2.39)	(2.75)
Mentor from other field	17.6	18.9	12.4	12.7
	(1.21)	(1.45)	(1.63)	(1.98)
Among mentees, % finding it helpful	91.6	90.5	96.1	96.3
	(0.89)	(1.08)	(0.97)	(1.06)
Group induction activities				
Beginners' seminars	62.1	68.1	37.1	43.9
	(1.35)	(1.54)	(2.30)	(3.10)
Collaboration or planning time	67.9	71.0	54.2	71.0
	(1.30)	(1.51)	(2.42)	(2.68)
Teacher network	17.3	18.7	11.3	16.6
	(1.10)	(1.32)	(1.57)	(2.37)
Supportive communication	81.4	80.6	85.2	80.4
	(1.15)	(1.37)	(1.78)	(2.28)
Reduced workload or extra resources provided				
Reduced schedule	10.6	8.4	19.8	14.2
	(0.83)	(0.91)	(2.02)	(2.25)
Reduced preparations	11.3	9.7	18.0	15.5
	(0.87)	(0.99)	(1.91)	(2.31)
Teacher aide	28.8	29.8	23.7	40.3
	(1.31)	(1.56)	(2.17)	(3.01)

Note. Figures in parentheses are standard errors of estimates.

detailed organizational information about them. Because the regulatory and accountability policies faced by charter schools can differ significantly from those facing traditional public schools, often in ways that are related to turnover, we examine them separately in the descriptive analysis, along with noncharter public (hereafter, "public") schools and private schools.

About two-thirds of beginning teachers said that they worked closely with a mentor, about 70% in public schools and 42% and 46% in charter and private schools, respectively. In about 7 in 10 of these cases, new teachers were matched with mentors in the same field.[5] The vast majority of mentees (nearly 9 in 10) found their mentors helpful.

Large proportions of beginning teachers reported participating in the various group and collective induction activities that we examined, with the exception of external networks, in which few participated. Sixty-eight percent

of beginning teachers said that they had common planning time with other teachers in the same subject area or that they had participated in regularly scheduled collaboration with other teachers on issues of instruction. Participation rates among beginning teachers in induction activities followed a similar pattern across public, charter, and private schools, as did mentorship, although the gap appears wider for some types of activities (e.g., seminars for beginning teachers; common planning time for teachers in the same subject area; or regularly scheduled collaboration with other teachers on issues of instruction) than for others (e.g., supportive communication with the principal, other administrators, or department chair; or participation in an external a network of teachers). For example, participation in seminars for beginning teachers showed a wide gap between public school teachers and their counterparts in charter and private schools (68% as compared with 37% and 44%, respectively); in contrast, the percentage of beginning teachers reporting that they had regular, supportive communication with their principal, other administrators, or department chair varied less across school types (about 80% in public and charter schools and 85% in private schools).

Far fewer beginning teachers reported receiving additional assistance to help ease their transition—such as a reduced teaching schedule, a reduced number of preparations, or extra classroom assistance (e.g., teacher aides)—than reported having a mentor or participating in other induction activities. Furthermore, teachers in private schools were twice as likely as teachers in public schools to have a reduced teaching schedule or a reduced number of preparations in their first year.

3. What are the rates of turnover among beginning teachers?

Overall, 29% of first-time teachers in 1999–2000 either changed schools at the end of the year (15%) or left teaching altogether (14%) (see Figure 3). Although beginning teachers in private schools were less likely than their public school counterparts to migrate between schools (10% as opposed to 16%), they were more than twice as likely to leave teaching at the end of the 1999–2000 school year (26% as opposed to 11%). Attrition rates among beginning teachers in charter schools were similar to those in private schools—about a quarter left teaching at the end of their first year. Our background analyses of the data also revealed variations in turnover rates among different kinds of public, charter, and private schools.

Among beginning teachers in public schools, turnover rates varied by school size and poverty concentration, although not by school location (urban, suburban, and rural; results not shown, available from authors). Beginning public school teachers in high-poverty schools (where 50% or more of the students were approved to receive free or reduced-price lunches) were less likely than their counterparts in medium-poverty schools to move (13% as opposed to 19%) but were more likely to leave teaching (16% as opposed to 9%). Public school teachers who started their careers in small schools were more likely to switch schools at the end of the year than those who started

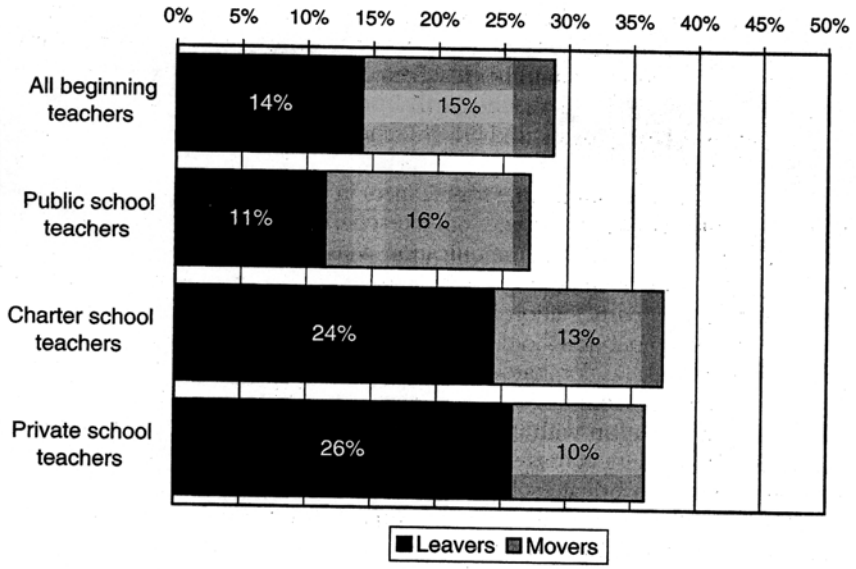

Figure 3. **Percentages of beginning teachers who moved from their school or left teaching at the end of their first year.**

in large schools; the percentage that left teaching at the end of their first year was about the same.

The strikingly high departure rates among beginning teachers in charter schools, noted above, pertain primarily to charter schools located in urban areas, where 30% of beginning teachers left teaching at the end of their first year, as compared with 18% and 17% of their counterparts in suburban and rural charter schools, respectively. These high departure rates were concentrated primarily among small charter schools—those with enrollments of fewer than 350 students—rather than in larger charter schools. Charter schools tend to be smaller than public schools in general, however, and more than half of first-time teachers who started their careers in charter schools in 1999–2000 were teaching in small schools.

Turnover rates among new private school teachers also varied by school characteristics—primarily the religious affiliation of the schools. For example, turnover among new teachers in Catholic schools was similar to that in public school (27% and 28%, respectively), whereas turnover in non-Catholic religious schools was much higher (42%). Most of the difference related to high departure rates among beginning teachers in non-Catholic religious schools—36% left teaching after their first year (as compared with 11% and 16% in public and Catholic schools, respectively). Departure rates among new teachers in nonsectarian private schools (22%) were also considerably below those in non-Catholic private schools. Both small and rural private schools were also at a

disadvantage in retaining new teachers, although the higher-than-average departure rates in rural private schools could have been related to the fact that most of those schools are small.

What Are the Effects of Induction on Turnover?

This section presents the results of our multinomial logistic models that examine the effects of mentoring and other induction activities on the relative risk that beginning teachers will leave teaching (Table 3) or move (Table 4), as opposed to staying, at the end of their first year, after controlling for teacher and school characteristics that previous research has shown to be associated with turnover. The first model in each table examines only the relationship between teacher characteristics and school characteristics and the likelihood of leaving as opposed to staying (Model 1, Table 3) and the likelihood of moving as opposed to staying (Model 1, Table 4). We then model the mentoring and induction variables both separately and together. Model 2 in each table focuses on participation in mentorship activities. Models 3–6 focus on participation in seminars for beginning teachers and other collective and group activities. Models 7 and 8 focus on access to extra resources, such as reduced teaching load or having a teacher aide. Model 9 examines the additive impact of these activities and resources simultaneously.

As shown in Model 1 of each table, new teachers who started their career as regular, full-time teachers (88% of the new teachers in 1999–2000) were less likely to leave or move than were those who began their first teaching job as regular part-time teachers, itinerant teachers, or long-term substitutes. The relative risk of regular full-time teachers leaving teaching at the end of their first year was about half that of part-time, itinerant, or substitute teachers; that is, the relative risk ratio (*rrr*) was .558, $p = .012$.[6] Teaching status had a similar impact on the relative risk that a teacher would switch schools at the end of the first year as opposed to staying, $rrr = .526$, $p = .013$. This makes sense, given that new teachers with part-time or irregular status are likely to be looking for more stable positions either inside or outside their current schools. The impact of a new teacher's age on his or her likelihood of leaving or moving is small and statistically insignificant. Although prior studies of turnover have found both younger and older teachers more subject to turnover (e.g., Murnane et al., 1991; Ingersoll, 2001), this analysis suggests that age does not influence turnover among beginning teachers.

Teachers whose main assignment field was special education were far more likely than other teachers to move or leave teaching. For instance, the odds that a special education teacher would leave were about 2½ times higher than for other teachers ($rrr = 2.669$, $p = .002$). Across models, new teachers whose main assignment field was math or science were about 10% more likely than other teachers to leave, although the coefficients are not statistically significant. Conversely, teachers whose main assignment fields were bilingual education or English as a second language were less likely to leave, although again these differences were not statistically significant. Neither

Table 3

Multinomial Logistic Regression Analysis of the Likelihood of Beginning Teacher Attrition

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Teacher characteristics									
Regular full-time	0.558**	0.571**	0.562**	0.592**	0.557**	0.561**	0.596**	0.549***	0.633*
	[0.012]	[0.017]	[0.014]	[0.020]	[0.012]	[0.012]	[0.030]	[0.009]	[0.053]
Age	1.003	1.002	1.003	1.002	1.003	1.003	1.003	1.003	1.002
	[0.796]	[0.821]	[0.793]	[0.850]	[0.795]	[0.781]	[0.800]	[0.806]	[0.868]
Math/science	1.1	1.097	1.101	1.086	1.096	1.12	1.098	1.105	1.091
	[0.695]	[0.707]	[0.693]	[0.741]	[0.707]	[0.643]	[0.702]	[0.682]	[0.726]
Special education	2.669***	2.648***	2.676***	2.582***	2.659***	2.670***	2.651***	2.627***	2.443***
	[0.002]	[0.002]	[0.002]	[0.003]	[0.002]	[0.002]	[0.003]	[0.005]	[0.008]
ESL	0.412	0.409	0.413	0.403	0.404	0.386	0.406	0.408	0.368
	[0.293]	[0.292]	[0.295]	[0.295]	[0.285]	[0.263]	[0.291]	[0.287]	[0.254]
Male	0.901	0.878	0.9	0.896	0.899	0.92	0.896	0.902	0.889
	[0.593]	[0.509]	[0.590]	[0.580]	[0.592]	[0.672]	[0.574]	[0.597]	[0.556]
Minority	1.117	1.133	1.127	1.17	1.124	1.148	1.08	1.113	1.118
	[0.618]	[0.574]	[0.585]	[0.489]	[0.599]	[0.539]	[0.720]	[0.629]	[0.616]
School earnings ($ thousands)	0.978	0.978	0.978	0.977	0.978	0.978	0.981	0.979	0.98
	[0.235]	[0.237]	[0.235]	[0.193]	[0.229]	[0.228]	[0.287]	[0.244]	[0.258]
School characteristics									
Charter	2.454***	2.271***	2.422***	2.476***	2.444***	2.457***	2.426***	2.454***	2.298***
	[0.000]	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]
Catholic	2.181**	2.041**	2.150**	2.018**	2.129**	2.204**	2.181**	2.205**	1.953**
	[0.013]	[0.027]	[0.014]	[0.025]	[0.016]	[0.012]	[0.015]	[0.012]	[0.040]
Non-Catholic religious	4.501***	4.182***	4.448***	4.168***	4.349***	4.565***	4.364***	4.540***	3.791***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]

Nonsectarian	2.377**	2.302**	2.323**	2.235**	2.302**	2.433**	2.312**	2.395**	2.148*
	[0.021]	[0.029]	[0.025]	[0.034]	[0.027]	[0.018]	[0.029]	[0.020]	[0.050]
Urban	1.047	1.02	1.044	1.03	1.051	1.028	1.048	1.045	1.017
	[0.835]	[0.929]	[0.849]	[0.894]	[0.822]	[0.900]	[0.834]	[0.842]	[0.938]
Rural	1.059	1.043	1.05	1.05	1.066	1.062	1.045	1.063	1.045
	[0.806]	[0.858]	[0.836]	[0.838]	[0.785]	[0.797]	[0.849]	[0.795]	[0.855]
Middle school	2.328***	2.299***	2.329***	2.336***	2.285***	2.324***	2.308***	2.321***	2.252**
	[0.007]	[0.009]	[0.007]	[0.008]	[0.008]	[0.008]	[0.007]	[0.007]	[0.011]
High school	1.566*	1.539*	1.555*	1.498*	1.587*	1.552*	1.577*	1.563*	1.513*
	[0.062]	[0.075]	[0.067]	[0.092]	[0.056]	[0.068]	[0.058]	[0.064]	[0.090]
Combined school	1.381	1.378	1.373	1.383	1.381	1.366	1.376	1.377	1.378
	[0.274]	[0.281]	[0.280]	[0.272]	[0.273]	[0.292]	[0.280]	[0.278]	[0.282]
% Poverty enrollment	1.011**	1.011**	1.011**	1.012***	1.011**	1.011**	1.011**	1.011**	1.011**
	[0.015]	[0.013]	[0.015]	[0.010]	[0.016]	[0.013]	[0.017]	[0.015]	[0.013]
Poverty enrollment flag	1.996**	2.023**	1.999**	2.033**	1.979**	2.006**	2.018**	1.999**	2.076**
	[0.013]	[0.011]	[0.012]	[0.012]	[0.013]	[0.012]	[0.012]	[0.013]	[0.011]
Enrollment less than 350	1.295	1.279	1.29	1.258	1.29	1.303	1.312	1.292	1.28
	[0.230]	[0.262]	[0.239]	[0.294]	[0.234]	[0.222]	[0.209]	[0.238]	[0.268]
Enrollment more than 1,000	1.04	1.052	1.049	1.029	1.03	1.035	1.035	1.047	1.015
	[0.888]	[0.855]	[0.867]	[0.919]	[0.917]	[0.901]	[0.903]	[0.871]	[0.957]
Mentor programs									
Mentor from same field		0.704*							0.793
		[0.084]							[0.311]
Mentor from other field		0.818							0.864
		[0.433]							[0.589]
Group induction activities									
Beginners' seminars			0.934						1.108
			[0.706]						[0.602]
Collaboration or planning time				0.572***					0.598***
				[0.000]					[0.002]

(continued)

Table 3 (Continued)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Teacher network					0.667				0.711
					[0.104]				[0.174]
Supportive communication						0.746			0.869
						[0.155]			[0.499]
Reduced workload or extra resources provided									
Reduced teaching schedule							1.632**		1.817**
							[0.038]		[0.015]
Reduced preparations							0.763		0.783
							[0.253]		[0.309]
Teacher aide								1.061	1.159
								[0.779]	[0.486]
Number of observations	3,235	3,235	3,235	3,235	3,235	3,235	3,235	3,235	3,235

Note. Coefficients reflect the relative risk of leaving as opposed to staying. Figures in brackets are *p* values.
*$p < .1$. **$p < .05$. ***$p < .001$. (Two-tailed tests.)

Table 4

Multinomial Logistic Regression Analysis of the Likelihood of Beginning Teacher Migration

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Teacher characteristics									
Regular full-time	0.526**	0.528**	0.534**	0.542**	0.531**	0.526**	0.594*	0.526**	0.630*
	[0.013]	[0.014]	[0.016]	[0.020]	[0.014]	[0.014]	[0.050]	[0.012]	[0.085]
Age	0.992	0.992	0.992	0.991	0.992	0.992	0.992	0.992	0.992
	[0.457]	[0.462]	[0.455]	[0.422]	[0.480]	[0.436]	[0.475]	[0.454]	[0.465]
Math/science	0.898	0.898	0.901	0.893	0.9	0.924	0.914	0.893	0.929
	[0.635]	[0.637]	[0.645]	[0.620]	[0.641]	[0.724]	[0.690]	[0.614]	[0.739]
Special education	1.563	1.559	1.57	1.541	1.562	1.57	1.571	1.667	1.662
	[0.166]	[0.170]	[0.160]	[0.190]	[0.167]	[0.166]	[0.162]	[0.111]	[0.126]
ESL	0.601	0.601	0.603	0.592	0.601	0.538	0.596	0.655	0.603
	[0.540]	[0.539]	[0.540]	[0.536]	[0.541]	[0.454]	[0.535]	[0.606]	[0.540]
Male	1.209	1.209	1.206	1.206	1.213	1.246	1.208	1.187	1.229
	[0.332]	[0.330]	[0.342]	[0.336]	[0.324]	[0.267]	[0.335]	[0.377]	[0.296]
Minority	0.881	0.881	0.898	0.899	0.88	0.909	0.819	0.867	0.844
	[0.578]	[0.580]	[0.635]	[0.639]	[0.576]	[0.676]	[0.387]	[0.527]	[0.460]
School earnings ($ thousands)	0.981	0.981	0.981	0.98	0.98	0.98	0.986	0.98	0.984
	[0.166]	[0.166]	[0.172]	[0.148]	[0.156]	[0.150]	[0.302]	[0.155]	[0.255]
School characteristics									
Charter	0.809	0.808	0.785	0.811	0.812	0.81	0.788	0.853	0.819
	[0.417]	[0.423]	[0.361]	[0.426]	[0.425]	[0.422]	[0.362]	[0.541]	[0.466]
Catholic	0.426**	0.426**	0.412**	0.408**	0.427**	0.431**	0.428**	0.414**	0.404**
	[0.017]	[0.018]	[0.015]	[0.014]	[0.018]	[0.019]	[0.019]	[0.013]	[0.013]
Non-Catholic religious	0.338**	0.338**	0.329**	0.324**	0.340**	0.343**	0.314**	0.339**	0.311**
	[0.016]	[0.016]	[0.013]	[0.012]	[0.017]	[0.017]	[0.011]	[0.016]	[0.010]

(continued)

Table 4 (Continued)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Nonsectarian	0.743	0.741	0.706	0.733	0.753	0.769	0.703	0.754	0.691
	[0.508]	[0.505]	[0.447]	[0.496]	[0.532]	[0.560]	[0.430]	[0.536]	[0.428]
Urban	1.083	1.086	1.079	1.08	1.082	1.071	1.071	1.108	1.097
	[0.698]	[0.686]	[0.712]	[0.708]	[0.702]	[0.738]	[0.740]	[0.616]	[0.649]
Rural	1.027	1.028	1.003	1.018	1.024	1.039	1.002	1.072	1.021
	[0.907]	[0.904]	[0.989]	[0.940]	[0.919]	[0.868]	[0.993]	[0.759]	[0.927]
Middle school	0.848	0.85	0.845	0.85	0.852	0.842	0.837	0.819	0.818
	[0.539]	[0.541]	[0.531]	[0.544]	[0.551]	[0.522]	[0.507]	[0.448]	[0.440]
High school	0.606**	0.607**	0.596**	0.590**	0.602**	0.599**	0.604**	0.577**	0.550***
	[0.021]	[0.022]	[0.018]	[0.016]	[0.020]	[0.019]	[0.021]	[0.013]	[0.008]
Combined school	0.543**	0.544**	0.536**	0.536**	0.540**	0.533**	0.528**	0.519**	0.489**
	[0.045]	[0.045]	[0.040]	[0.040]	[0.043]	[0.040]	[0.038]	[0.033]	[0.020]
% Poverty enrollment	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.998	0.998
	[0.396]	[0.399]	[0.399]	[0.466]	[0.393]	[0.416]	[0.353]	[0.595]	[0.620]
Poverty enrollment flag	1.02	1.02	1.022	1.038	1.028	1.026	1.029	0.99	1.032
	[0.951]	[0.952]	[0.948]	[0.909]	[0.932]	[0.936]	[0.931]	[0.975]	[0.922]
Enrollment less than 350	1.361	1.364	1.346	1.349	1.365	1.364	1.415	1.386	1.437
	[0.184]	[0.182]	[0.203]	[0.201]	[0.182]	[0.177]	[0.130]	[0.160]	[0.119]
Enrollment more than 1,000	0.761	0.76	0.771	0.763	0.762	0.759	0.746	0.775	0.767
	[0.278]	[0.280]	[0.303]	[0.284]	[0.280]	[0.270]	[0.236]	[0.307]	[0.275]

Mentor programs									
Mentor from same field		0.999							1.153
		[0.997]							[0.471]
Mentor from other field		0.977							1.027
		[0.928]							[0.918]
Group induction activities									
Beginners' seminars			0.861						0.862
			[0.410]						[0.434]
Collaboration or planning time				0.749					0.783
				[0.108]					[0.217]
Teacher network					1.16				1.18
					[0.489]				[0.452]
Supportive communication						0.687*			0.735
						[0.079]			[0.173]
Reduced workload or extra resources provided									
Reduced teaching schedule							2.489**		2.558***
							[0.011]		[0.008]
Reduced preparations							0.615		0.684
							[0.171]		[0.280]
Teacher aide								0.585***	0.624**
								[0.005]	[0.017]
Number of observations	3,235	3,235	3,235	3,235	3,235	3,235	3,235	3,235	3,235

Note. Coefficients reflect the likelihood of moving as opposed to staying. Figures in brackets are *p* values.
*$p < .1$. **$p < .05$. ***$p < .01$. (Two-tailed tests.)

gender nor minority status were statistically significant in predicting turnover, although in the SASS sample, male teachers were slightly less likely than female teachers to leave and more likely to move; minority teachers were more likely than White teachers to leave and less likely to move. Higher earnings from all school-related jobs were also negatively associated with both moving and leaving, although, again, the impact was not statistically significant.

Among the school-level characteristics included in Model 1, sector and school poverty level were among the strongest predictors of likelihood of leaving as opposed to staying. Beginning teachers in charter, Catholic, and nonsectarian private schools were all more than twice as likely as their public school counterparts to leave at the end of their first year of teaching; beginning teachers in non-Catholic religious schools were more than five times as likely as were public school teachers ($rrr = 4.501$, $p < .000$). These dramatic differences are an interesting finding, but we will not pursue them further here because it digresses from our primary focus on the effects of induction. Also, we found it interesting that new teachers who started their career in Catholic or non-Catholic religious schools were only about half as likely as their public school counterparts to migrate between schools (as opposed to staying in the same school) at the end of their first year ($rrr = 0.426$, $p = 0.017$, and $rrr = 0.338$, $p = 0.016$, respectively). New teachers in nonsectarian private schools and charter schools were about as likely as their public school counterparts to move between schools at the end of their first year of teaching.

School-level poverty concentration was also associated with an increased risk of beginning teachers' leaving at the end of their first year ($rrr = 1.011$, $p = 0.015$). For example, a 50% increase in the percentage of students approved to receive free or reduced-price lunches (e.g., the difference between a school where 25% of the students are poor as opposed to a school where 75% of the children are poor) increased the risk of new teachers' leaving by about 50%. School poverty concentration was not associated with the risk that a beginning teacher would switch schools, however. Beginning teachers in middle schools were nearly twice as likely as their counterparts in elementary schools to leave after the first year ($rrr = 2.328$, $p = 0.007$), whereas teachers in high schools were about 50% more likely to leave ($rrr = 1.566$, $p = 0.062$). Differences in the risk of leaving were not statistically significant for teachers in combined schools as compared with elementary school teachers, however. As with the descriptive statistics above, there was little difference in the likelihood of turnover by school location (urban, suburban, small town/rural). School size also did not have a statistically significant impact.

The question of particular interest here is whether different forms of induction decrease the rate of teacher turnover after controlling for variation in teacher and school characteristics. Model 2 examines the relationship between teacher mentorship and the likelihood of leaving as opposed to staying (Model 2, Table 3) and the likelihood of moving as opposed to staying (Model 2, Table 4). Having a mentor in one's field reduced the risk of leaving at the end of the first year by about 30%, a result that was statistically

significant at the 90% level of confidence (*rrr* = 0.704, $p = 0.084$). Having a mentor outside one's field was associated with reducing the risk of leaving by 18%, although the coefficient was not statistically significant (*rrr* = 0.818, $p = 0.433$). Mentorship appears to have had little impact on the likelihood that a teacher would change schools at the end of the first year.

Next, we examined the relationship between turnover and whether beginning teachers reported having the following kinds of supports in their first year: seminars or classes for beginning teachers (Model 3); common planning time with other teachers in their subject area or regularly scheduled collaboration with other teachers on issues of instruction (Model 4); participation in a network of teachers (e.g., one organized by an outside agency or on the Internet) (Model 5); and regular or supportive communication with the principal, other administrators, or the department chair (Model 6).

The provision of seminars or classes for beginning teachers (Model 3 in Tables 3 and 4) was associated with a small and statistically insignificant reduction in the risk of either leaving teaching (*rrr* = 0.934, $p = 0.706$) or switching schools (*rrr* = 0.861, $p = 0.410$) at the end of the first year, although the coefficients were in the expected direction (i.e., they were related to a reduction in the likelihood of turnover). Activities involving teacher collaboration had a stronger impact. Having common planning time with other teachers in their subject area or participating in regularly scheduled collaboration with other teachers on issues of instruction (Model 4) reduced the risk of leaving, as opposed to staying, by about 43% (*rrr* = 0.572, $p < 0.000$) and the risk of moving, as opposed to staying, by 25% (*rrr* = 0.749, $p = 0.108$), although the latter effect did not quite reach statistical significance at a 90% level of confidence. Participation in an external network of teachers (e.g., one organized by an outside agency or on the Internet) reduced the likelihood of leaving teaching (Model 5) by about 33% (*rrr* = 0.667, $p = 0.104$), although this coefficient also was not significant. But the same factor increased the likelihood of moving, although its impact was statistically insignificant (*rrr* = 1.16; $p = 0.489$). It is plausible that teacher networks outside schools can facilitate moving because teachers who participate in them may receive more information about opportunities in other schools. Finally, regular supportive communication with the school principal, other administrators, or the department chair (Model 6) was associated with reducing the likelihood of both leaving (*rrr* = 0.746, $p = 0.155$) and moving (*rrr* = 0.687, $p = 0.079$), although these effects were not statistically significant.

As a final step, we examined additional resources that could aid the transition of new teachers (Models 7 and 8 in Tables 3 and 4). Although a reduced number of preparations during the first year of teaching was associated with reductions in the likelihood of leaving (*rrr* = 0.763, $p = 0.253$) and in the likelihood of moving (*rrr* = 0.615, $p = 0.171$), neither of those relationships was statistically significant. Contrary to expectations, having a reduced teaching schedule was positively associated with leaving (*rrr* = 1.632, $p = 0.038$) and positively associated with moving (*rrr* = 2.489, $p = 0.011$). To more fully explore this unexpected result, we examined teacher- and school-level characteristics

associated with having a reduced teaching schedule during the first year of teaching. We found that part-time, itinerant, or substitute teachers; teachers who have lower school-related earnings; teachers who are uncertified or only partially certified; and teachers with no practice (student) teaching experience are far more likely to have a reduced teaching schedule, controlling for the school-level characteristics included in our turnover models. This suggests that the positive association between turnover and having a reduced teaching schedule in the first year of teaching may be at least partially explained by characteristics of the teachers' job status or level of preparation for teaching—factors not included in our models.[7]

Finally, we examined whether beginning teachers who were assigned an aide during their first year had a reduced rate of turnover (Model 8 in Tables 3 and 4). Having a teacher's aide had a small and insignificant association with an increase in the likelihood of leaving ($rrr = 1.061$, $p = 0.779$) but was associated with a 41% reduction in the likelihood of moving ($rrr = 0.585$, $p = 0.005$). It appears that for the average beginning teacher, the only extra resource, among those we examined, that has a strong and statistically significant impact on turnover is having extra help in the classroom; and the impact is statistically significant only in reducing the likelihood of switching schools.

The data also revealed that the above induction supports, activities, or practices rarely exist in isolation. In other words, of the beginning teachers who had some kind of induction, most received several types of support. This conclusion is born out in Model 9 in Tables 3 and 4, which estimates the impact of all of the mentoring and induction variables concurrently on leaving and moving. The attenuation of the size of the coefficients when modeled simultaneously, making a number of them statistically insignificant, suggests that teachers who participated in at least one of the programs were likely to have participated in others, making it difficult to isolate an individual effect. However, the fact that the impact of a number of these activities was not strong enough individually to be statistically significant does not necessarily mean that they are of no value as components in a comprehensive induction program. To get a sense of the joint impact of multiple related activities, we calculated the additive effect of three induction "packages," each involving progressively more components. We selected the components for each package on the basis of their prevalence. Hence, the first package was comprised of a few supports that were most frequently received by beginning teachers; while the last package included many components including those less frequently found. The results of our additive analyses showed that, collectively, as the number of components in the packages increased, the probability of turnover decreased, but the number of teachers receiving the package also decreased. Notably, the largest reductions in turnover were associated with activities that tied new teachers into a collaborative network of their more experienced peers.

Figure 4 shows the predicted turnover probabilities for teachers completing the various induction packages (the darker bar is the predicted probability of leaving; the lighter bar adds the predicted probability of moving).[8]

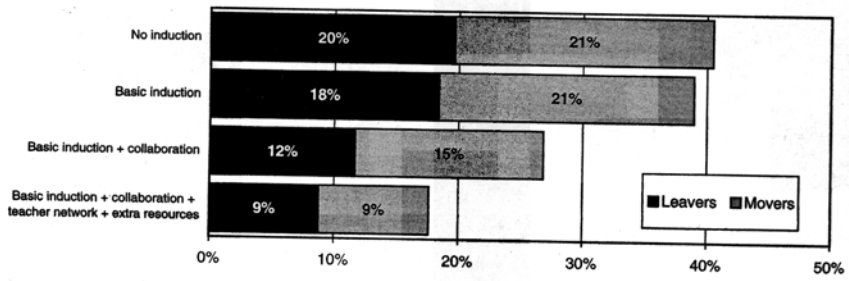

Figure 4. **Predicted probability of turnover after the first year of teaching by various induction "packages."**

Only 3% of all beginners who entered teaching in the 1999–2000 school year received none of our measured induction or mentoring supports. Their predicted rate of turnover at the end of first year was more than 40%, as shown in the first bar in Figure 4.[9]

In contrast, 56% of beginning teachers received a "basic induction" package consisting of two induction components: They had a mentor who was from either their own field or another field; and they had supportive communication with their principal, other administrators, or the department chair. Their predicted turnover rate was 39% (18% probability of leaving and 21% probability of moving). The additive effects of these two components of induction on the likelihood of leaving ($rr = .706$, $p = .218$) or moving ($rr = .822$, $p = .464$) were not significantly different from zero.[10]

A second "basic induction + collaboration" package included four support components: the teachers had mentors from their own field; they had regular or supportive communication with their principals, other administrators, or department chair; they had common planning time or regularly scheduled collaboration with other teachers in their subject area; and they participated in a seminar for beginning teachers. Twenty-six percent of beginning teachers received this package. Their predicted turnover rate was 27% (12% probability of leaving and 15% probability of moving). The additive effects of the four components of induction on the likelihood of leaving ($rr = .457$, $p = .008$) or moving ($rr = .571$, $p = .054$) were statistically significant, although the latter was only marginally so.

Finally, a very small number (fewer than 1% of beginning teachers in 1999–2000) had a full "basic induction + collaboration + teacher network + extra resources" package that included those four components plus three others: participating in an external network of teachers, having a reduced number of preparations, and being assigned a teacher's aide. The larger package further reduced the predicted rate of turnover—the predicted probability of a departure at the end of the first year for teachers receiving this package was less than half the probability for teachers who participated in no induction activities. The additive effects of the seven induction components on the likelihood

of leaving ($rrr = .295$, $p = .009$) or moving ($rrr = .288$, $p = .010$) were statistically significant.

Discussion

Nearly 3 in 10 new teachers move to a different school or leave teaching altogether at the end of their first year in the occupation. Some of this turnover is, of course, normal, inevitable, and even beneficial. Not all of those who enter the teaching occupation should or will remain in teaching. And individuals leave their jobs for a variety of reasons—personal and professional—many of which have little to do with the character of the workplace they are leaving. But high levels of turnover are costly in various ways, not all equally obvious. One of the costs is the current teacher shortage. Our recent research documents that the staffing problems plaguing schools are to a significant extent the result of a "revolving door": Large numbers of teachers move from their schools or leave teaching altogether long before retirement (Ingersoll, 2001, 2003b; Ingersoll & Smith, 2003).

In response, during the past decade induction programs have been instituted in growing numbers to help new teachers cope with the practicalities of teaching, of managing groups of students, and of adjusting to the school environment. Between 1990–1991 and 1999–2000, the proportion of beginning teachers participating in school induction programs dramatically increased. In the 1990–1991 school year, fewer than half of beginning teachers reported participating in an induction program. By the 1999–2000 school year, almost 80% of teachers reported having a mentor or participating in an induction program. Mentorship programs, collaboration and planning time with other teachers, seminars for new teachers, and regular communication with administrators or department chairs were the major components used to integrate teachers into a new school.

The data also show large variations among types of schools in the numbers and types of induction-related activities offered to beginning teachers and also in the rates of beginning teacher turnover in those schools. Moreover, our analysis found a strong link between participation in induction programs and reduced rates of turnover. Given the limitations in using data from large-scale survey questionnaires (discussed below), the strength of our findings is notable.

We also found that some types of activities appear to be more effective than others in reducing turnover. The most salient factors were having a mentor from the same field, having common planning time with other teachers in the same subject or collaboration with other teachers on instruction, and being part of an external network of teachers. Although some of the components of induction that we examined did not, individually, have a statistically significant impact on teacher turnover, most did collectively. That is, teachers participating in combinations or packages of mentoring and group induction activities were less likely to migrate to other schools or to leave teaching at the end of their first year.

We also found that receipt of some kinds of extra resource supports is *not* associated with reductions in turnover. After controlling for the provision of other components of induction, having a reduced teaching schedule was associated, unexpectedly, with an increased likelihood of both moving and leaving at the end of the first year. This finding does not appear to support the use of this extra resource for reducing turnover although we can only speculate as to why this might be the case. This resource is rarely provided in public schools (8%) and only found in some private schools (14%). One hypothesis is that this type of extra support is targeted towards those that might be more likely to quit in the first place (either because they are struggling or because they are planning to leave for better options). If that were the case, it would be difficult to interpret what our results do and do not indicate about the impact of extra resources on the attrition of beginning teachers.

Implications for Further Research

Although our research provides general support for the use of mentor teachers and collaborative activities for new teachers in reducing turnover, there are important limits to its usefulness. Numerous studies have documented large variations in induction programs (see, e.g., Fideler & Haselkorn 1999). Programs and activities vary in purpose, in length, in intensity, in their structure, in the numbers and kinds of beginning teachers they serve, in the numbers and kinds of veteran teachers they utilize, in how they select these veterans and whether they provide training to them and, last but not least, in their cost. As an omnibus survey covering a wide range of school organization and staffing issues, SASS did not collect information on the details of induction program intensity, duration, structure or cost and, hence, our research cannot address questions concerning which kinds of programs are most cost effective.

There are many pressing policy questions that warrant investigation and for which existing research has of yet, shed little light. Is there a significant difference in effectiveness between induction and mentoring programs depending upon how the mentors are selected, kind of training they are given, and the degree to which they are compensated for their participation? How does the quantity and timing of contact between new teachers and their mentors impact the effectiveness of the mentorship experience? Is there an optimum program length for induction and mentoring programs, beyond which additional time is of diminishing value? Are induction and mentoring programs particularly helpful for new teachers whose formal preparation is relatively weak, or are they helpful regardless of the quality of pre-classroom preparation?

Addressing the above questions will not always require new data collection. State induction programs such as the TxBESS (Texas Beginning Educator Support System) program and the BTSA (Beginning Teacher Support and Assessment) program in California have entailed extensive data collection with which promising analyses are being undertaken (e.g., Fletcher, Strong & Villar 2004; Fuller, 2003). What is not needed, however, are more studies that do not involve the kind of careful control that would allow unambiguous conclusions

about the particular value added by the program component being considered. In a comprehensive review of the empirical literature on the effects of mentoring programs (Ingersoll & Kralik, 2004), we found many such studies already exist. In contrast, conspicuous by their absence in this field are careful experimental or quasi-experimental studies involving random assignment procedures and controlled trials with a no-treatment control group. This kind of approach is perhaps the most expensive, but also is potentially the most fruitful.

Appendix
Definition of Measures Used in the Analysis

- *Teacher turnover.* A categorical variable: 1 = leaver/not teaching in fall 2000; 2 = mover/teaching in a different school in fall 2000 than in 1999/2000; 0 = stayer/teaching in the same school in fall 2000 as in 1999/2000.

Teacher Characteristics

- *Regular full-time.* A dichotomous variable: 1 = regular, full-time teachers; 0 = regular part-time teachers, itinerant teachers (those whose assignments require them to provide instruction at more than one school), or long-term substitutes (those whose assignments require that they fill the role of a regular teacher on a long-term basis but who are still considered substitutes).
- *Age.* A continuous variable measuring teachers' age, calculated as (1999 minus year of birth).
- *Math/science.* A dichotomous variable: 1 = teachers listed by their principal as teaching primarily secondary math or science; 0 = other teachers.
- *Special education.* A dichotomous variable: 1 = teachers listed by their principal as teaching primarily special education; 0 = other teachers.
- *ESL.* A dichotomous variable: 1 = teachers listed by their principal as teaching primarily bilingual education or English as a second language; 0 = other teachers.
- *Male.* A dichotomous variable: 1 = male teacher; 0 = female teacher.
- *Minority.* A dichotomous variable: 1 = non-White teacher; 0 = other teachers.
- *School earnings.* A continuous variable measuring a teacher's total yearly earnings from all school-related jobs (in thousands of dollars).

School Characteristics

- *Charter.* A dichotomous variable: 1 = public charter; 0 = public non-charter or private.
- *Catholic.* A dichotomous variable: 1 = Catholic school; 0 = public non-charter, charter, other religious private, or nonsectarian private school.

- *Non-Catholic, religious.* A dichotomous variable: 1 = non-Catholic religious school; 0 = public non-charter, charter, Catholic, or non-sectarian private school.
- *Nonsectarian.* A dichotomous variable: 1 = nonsectarian private school; 0 = public non-charter, charter, Catholic, or other religious private school.
- *Urban.* A dichotomous variable: 1 = large or mid-size central city; 0 = urban fringe of large or mid-size city or small town/rural.
- *Rural.* A dichotomous variable: 1 = small town/rural; 0 = large or mid-size central city or urban fringe of large or mid-size city.
- *Middle school.* A dichotomous variable: 1 = school in which the lowest grade is any of Grades 5–8 and the highest is any of Grades 5–8; 0 = school that has another grade structure.
- *High school.* A dichotomous variable: 1 = school in which the lowest grade is any of Grades 7–12 and the highest grade is any of Grades 9–12; 0 = school that has another grade structure.
- *Combined school.* A dichotomous variable: 1 = school in which the grade structure crosses a boundary between elementary and middle school or middle and high school (e.g., all ungraded K–12, 5–12 schools); 0 = school that has an elementary, middle, or high school grade structure.
- *Poverty enrollment.* Percentage of students approved to receive free or reduced-price lunches through the National School Lunch Program. Private schools that did not participate in the National School Lunch Program were coded as zero. Public schools where the principal stated that no students were eligible or that he/she didn't know if any were eligible were coded as zero. Missing data were imputed conditioning on sector (private, public charter, public non-charter); urbanicity; percentage of students who were part of a minority group; school size; school level; and a composite measure of teachers' perception of the student family background for the population of students in school (based on responses from all teachers sampled as part of SASS, not just beginning teachers).
- *Poverty enrollment flag.* A dichotomous variable: 1 = teachers for whom the percentage of students approved to receive free or reduced-price lunches was imputed; 0 = all other teachers.

Mentor Programs

- *Mentor from same field.* A dichotomous variable: 1 = in first year of teaching, teacher worked closely with a master or mentor teacher in the same subject area; 0 = in first year of teaching, teacher worked with a mentor who was not in the same subject area, or teacher did not work with a mentor.
- *Mentor from other field.* A dichotomous variable: 1 = in the first year of teaching, teacher worked closely with a master or mentor teacher

who was not in the same subject area; 0 = teacher worked with a mentor in the same subject area or did not work with a mentor.

Group Induction Activities

- *Beginners' seminars.* Participated in "seminars or classes for beginning teachers": 1 = yes; 0 = no.
- *Collaboration or planning time.* Had "common planning time with teachers in your subject," or "regularly scheduled collaboration with other teachers on issues of instruction": 1 = yes; 0 = no.
- *Teacher network.* "Participated in a network of teachers (e.g., one organized by an outside agency or over the internet)": 1 = yes; 0 = no.
- *Supportive communication.* Had "regular supportive communication with your principal, other administrators, or department chair": 1 = yes; 0 = no.

Extra Resources Provided

- *Reduced schedule.* Had a "reduced teaching schedule": 1 = yes: 0 = no.
- *Reduced preparations.* Had a "reduced number of preparations": 1 = yes; 0 = no.
- *Teacher aide.* Had "extra classroom assistance (e.g., teacher aide)": 1 = yes; 0 = no.

Notes

The order of author names for this article was determined by randomization—each contributed equally to the article. An earlier version was presented at the annual meeting of the American Educational Research Association in Chicago, April 2003.

[1]See Price, 1997, pp. 532–537, for a discussion of different subsets and definitions of turnover.

[2]The actual SASS questionnaires are available from *http://www.nces.ed.gov/surveys/sass/*.

[3]In the SASS questionnaire, three of these items come from a battery of questions on induction; numbers 3 and 4 come from a battery of items on professional development. Although these may not all be components of a formal induction program per se, all are concerned with the integration of newcomers into the occupation and may have a positive impact on a new teachers' experience. Because of their conceptual overlap (i.e., all relate to cooperative or collaborative networks of teachers or administrators), we examined them separately and simultaneously as part of this analysis.

[4]The wording of questions asking teachers about their participation in induction programs changed between the earlier cycles of SASS (i.e., 1990–1991 and 1993–1994) and the 1999–2000 version. The earlier cycles defined induction as including mentoring. The 1999–2000 cycle simply asked, "Did you participate in a teacher induction program?" Sixty-one percent of respondents answered that question in the affirmative. To test the sensitivity of the change in question wording between the 1993–1994 cycle and the 1999–2000 cycle, we calculated the percentage of teachers who said that they had participated in an induction program or "worked closely with a master or mentor teacher" (the latter being similar to how induction was defined in 1990–1991 and 1993–9494 in the SASS questionnaire). This resulted in a more liberal estimate of participation—showing that 78.8% of beginning teachers in 1999–2000 said that they had participated in an induction program, worked closely with a mentor, or participated in both of those activities. We used the latter in Figure 2.

[5]Seventeen percent of beginning elementary teachers said that they had a mentor outside their subject field, as compared with 27% at the middle school level and 15% at the

high school level. Although it is relatively clear what having a mentor outside one's subject field means in middle or high school, it is less clear in elementary school. The field of most elementary teachers is "general elementary" and they teach the same group of students all or most of the subjects in self-contained classrooms. However, some teach subjects to selected groups of students in special education, "enrichment," and "pull-out" classes. In our background analyses we found that these teachers constituted some, but not all, of the group that had mentors from another field. SASS did not ask about the subject field of the mentor, but the data showed that 25–30% of beginning elementary teachers in special education, "enrichment," and "pull-out" classes reported having a mentor outside of their field. It is also possible that some of the beginning elementary teachers who were assigned mentors from different grade levels (e.g., a 3rd-grade teacher assigned to mentor a new kindergarten teacher) reported that their mentor was in a different subject field. However, there was no way to test this with SASS.

[6]The relative risk ratio is a means of comparing the conditional probabilities of a particular outcome across two groups, in this case the probability that a regular full-time teacher will leave at the end of the first year of teaching relative to the probability that a part-time, itinerant or substitute teacher will leave, holding all of the other variables in the model constant (which is the conditional part). The relative risk ratio associated with this particular comparison is .558, which can be interpreted as a 44.2% reduction in the risk of leaving (as opposed to staying) for teachers with regular, full-time positions.

[7]These results are based on a logistic regression, predicting that a first-year teacher had a reduced teaching schedule conditioned on a range of teacher- and school-related characteristics included in our turnover models, including teaching status, age, field of teaching, gender, minority status, the teacher's school-related earnings, level of school, and sector of school (public, charter, Catholic, non-Catholic religious, nonsectarian private), school size, and poverty level, as well as the teacher's degree status (M.A., B.A., no B.A.), certification status (None, Less-than-Full, Full, or Probationary), and whether they had student teaching experience. The results are available from the authors on request.

[8]Predicted probabilities are based on multinomial logit results, holding constant teaching status, age, field of teaching, gender, minority status, the teacher's school-related earnings, the school's level and sector (public, charter, Catholic, non-Catholic religious, nonsectarian private), school size and poverty level, and all other mentoring and induction variables not being compared.

[9]The percentage of beginning teachers who received no induction in Figure 4 is greater than the percentage who received no induction in Figure 2, because the latter refers to those who indicated that they did or did not participate in a formal induction program alone, whereas the former refers to those who indicated that they did or did not receive any of the many induction components we included in the "Basic induction + collaboration + teacher network + extra resources" package.

Teachers in the "No induction" category in Figure 4 had none of the following induction experiences: mentoring, seminars for beginning teachers, common planning time or collaboration with other teachers on instruction, supportive communication with administrators, participation in an external teacher network, reduced number of preparations, or assistance from a teachers' aide. Only 3% of beginning teachers in 1999–2000 fit this category.

[10]The coefficient for mentor was added to the coefficient for supportive communication and tested for statistical significance using a *t* test. We used the svylc command in STATA to conduct this test.

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Manuscript received June 6, 2003
Revision received March 30, 2004
Accepted May 3, 2004